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**Exploring individual characteristics related to community-based sentence compliance: Is there an association between neuropsychological functioning, traumatic brain injury, and non-compliance with a community-based sentence?**

A thesis  
submitted in fulfilment  
of the requirements for the degree  
of  
**Doctor of Philosophy in Psychology**  
at  
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by  
**Emily Macdonald Norman**



THE UNIVERSITY OF  
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### Abstract

Non-compliance with a community-based sentence can result in serious consequences for an individual, including imprisonment. Probation officers, who supervise those on community sentences, play an essential role in supporting compliance and determining how to respond when non-compliance occurs; however, little research has explored how probation officers use their discretion. Neuropsychological dysfunction and a history of traumatic brain injury (TBI) are overrepresented amongst incarcerated offenders and associated with poorer outcomes (recidivism, treatment attrition, disciplinary infractions). However, much less is known about the neuropsychological function and history of TBI amongst community-based offenders (i.e., supervisees). Thus, this research project sought to understand probation officers' perspectives on and responses to non-compliance and explore the association between a supervisee's compliance and current neuropsychological functioning and recent TBI.

The first study involved two focus groups with 17 New Zealand probation officers; the aim was to explore probation officers' views on compliance and how they practice supervision. All probation officers reported using 'social worker' type, evidenced-based practices such as building quality relationships and using motivational interviewing. Probation officers viewed problems with cognitive skills as a key barrier to sentence compliance and reported using various strategies to support the compliance of supervisees with cognitive issues.

The second study, involved 106 adult men ( $n = 82$ , 77.4%) and women ( $n = 24$ , 22.6%) on community sentences who participated in an initial interview that included a screen for a history of TBI and consent to collect compliance (arrests, sentence violations) and related variables (e.g., risk scores) from the New Zealand Department of Corrections database and police records over six months. At the conclusion of the initial interview,

supervisees were invited to return and complete neuropsychological tests. Sixty-four men ( $n = 47$ , 73.4%) and women ( $n = 17$ , 26.5%) returned and completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), the Comprehensive Trail Making Test, and Color-Word Inference Test, and the Behavior Rating Inventory of Executive Function- Adult Version (BRIEF-A). Twenty-six probation officers, whose supervisees participated in the study, were interviewed regarding their supervisees' compliance.

The first manuscript from this study focused on the executive functioning of this sample compared to a normative sample and investigated the association between executive functioning and compliance with sentence conditions. The results indicated that the community-based sample had significantly poorer executive functioning compared to a normative sample. Still, contrary to what was expected, those supervisees who complied with their sentence conditions had poorer executive functioning than those who were non-compliant. However, exploratory analyses showed that those with poorer executive functioning received more probation officer support to comply with sentence conditions.

The second manuscript described the sample's neuropsychological function compared to a normative sample and investigated the association between sustaining a TBI in the last year (i.e., within the year prior to joining the study) and current neuropsychological function. We then explored if a TBI in the last year or current neuropsychological function were associated with compliance with sentence conditions and compliance with the law (i.e., being arrested). The results indicated that the community-based sample's neuropsychological functioning was significantly poorer than a normative sample. Our findings also suggested that a TBI in the last year was a significant predictor of arrest, even when controlling for risk of reconviction and current substance use. However, a recent TBI was not associated with non-compliance with sentence conditions nor with poorer performance on the

neuropsychological tests. In addition, no significant associations were found between performance on the neuropsychological tests and either measure of non-compliance.

Overall, the results from this thesis suggested that individual characteristics like TBI and neuropsychological functioning impact compliance with a community-based sentence in different ways: A recent TBI was predictive of re-arrest while serving a community sentence, and poorer neuropsychological functioning was significantly associated with increased support from the probation officer to comply.

The main implications of this research for corrections departments are that supervisees on a community sentence with poor neuropsychological functioning or a recent TBI may need additional monitoring or support to reduce the risk of non-compliance and reoffending. While further research needs to be undertaken to inform any changes in policy or practices, the results from this thesis suggest that community corrections would benefit from the implementation of services and screens to target important responsivity issues like TBI and poor neuropsychological functioning. Corrections departments attention to these issues may help alleviate the risk of individuals getting trapped in the criminal justice system for non-criminal activities (e.g., not attending an appointment).

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These past three years have been quite eventful, to say the least. You stood so strong through it all. Thank you for not letting me give up. This thesis would not have happened without your support and love.



### **Dedication**

This thesis is dedicated to my daughter Kelly June.

Thank you for all you have given me, taught me, and showed me about life. Your brief life changed mine forever. I will love you and think of you each day until I take my last breath.

**List of Publications**

Norman, E., Wilson, L., Polaschek, D.L.L., Starkey, N. (2021). How probation officers understand and work with people on community supervision sentences to enhance compliance. *Probation Journal*. Published online DOI: 10.1177/02645505211041579.journals.sagepub.com/home/prb

Norman, E., Polaschek, D.L.L., Starkey, N. (2021). Executive function in individuals who are compliant and non-compliant with the conditions of a community-based sentence. *Journal of Psychiatry, Psychology, and Law*. Accepted for Publication: 20 October 2021

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**List of Abbreviations**

BRIEF	Behavior Rating Inventory of Executive Function
CWIT	Color Word Inference Test
CTMT	Comprehensive Trail Making Test
DKEFS	Delis-Kaplan Executive Function System
IOMS	Integrated Offender Management System
LOC	Loss of consciousness
OSU-TBI-ID	Ohio State University Traumatic Brain Injury-Identification Screen
RBANS	The Repeatable Battery for the Assessment of Neuropsychological Status
RNR	Risk Need Responsivity
RoC*RoI	Risk of Conviction*Risk of Imprisonment
TBI	Traumatic brain injury

## Chapter 1: Introduction

In the past decade or more, there has been a surge in research that seeks to understand the neurological basis of antisocial behaviour and the potential relevance of TBI among incarcerated offenders. The body of literature has established that TBI is overrepresented in incarcerated samples (Durand et al., 2017) and other studies suggest that offenders with a history of TBI have poorer neuropsychological functioning (Pitman et al., 2015). However, among those serving community-based (i.e., non-custodial) sentences, the relevance of individual characteristics such as TBI or poor neuropsychological functioning to compliance outcomes is seriously under-examined and, consequently, poorly understood. This is particularly true of New Zealand community-based offenders, with whom, to date, very little empirical research has been conducted. Not only are neuropsychological impairments associated with an elevated risk of criminal offending, but they likely have a profound effect on an individual's ability to comprehend and comply with the requirements of their sentence. Therefore, this thesis aims to explore the community-based sentence compliance of individuals in New Zealand<sup>1</sup> specifically how neuropsychological function and TBI are relevant to the supervision and compliance of offenders in the community. Establishing a better understanding of which individual characteristics contribute to non-compliance with community-based sentences can help inform management practices and training, rehabilitative programmes and services, and ease burdens on the system and those involved.

This introduction begins by giving an overview of community-based sentences, including sentence compliance. Next, research on probation officers' roles and the Risk Need Responsivity model (RNR; Bonta & Andrews, 2007) of offender management and assessment are discussed. Then, the body of research on the neuropsychological function and

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<sup>1</sup> Participants in the study were individuals who are serving a supervised sentence (i.e., probation or parole, under a probation officers supervision)

TBI in a criminal justice context is examined. Last, the introduction closes by outlining the remainder of the thesis.

### **Community-based sentences**

Probation and parole are often used as an alternative to imprisonment, either as a substitute sentence for going to prison in the first place or as a bridge between time in prison and full release into the community. The purpose of a supervised sentence in the community is two-fold, short-term risk management and long-term behavioural rehabilitation and reintegration of offenders in the community (Paparozzi & Gendreau, 2005). Community corrections also serve to alleviate the high cost of custodial sentences by keeping people out of prison (Canton & Dominey, 2017). The structure and organization of community corrections services vary across countries and jurisdictions. In New Zealand, both individuals sentenced by the court to a community supervision sentence (i.e., probation) and those serving a supervised sentence following a term of imprisonment (i.e., parole) are managed by the New Zealand Department of Corrections. Currently, the New Zealand Department of Corrections estimates that they supervise 30,000 individuals in the community each week and more than 10,000 in their prisons (Corrections, 2016). An individual serving a community-based sentence (referred to as supervisee hereon) is given a number of standard and special conditions they are required to adhere to throughout their sentence in the community. As the name implies, standard conditions apply to all community sentenced and paroled supervisees. These include requirements such as regularly reporting to community probation and not associating with antisocial peers (Corrections, 2016). Additionally, special conditions may be imposed. Examples of special conditions are enrolment in a domestic violence program or electronic monitoring (Corrections, 2016). Non-compliance occurs when a supervisee does not follow their condition requirements (e.g., the offender does not show up for a scheduled meeting).



**Compliance.**

A key contribution to the literature on compliance with community-based sentences is offered by Bottoms (2001), who defines the two principal types of non-compliance. The first of these is labelled 'short-term requirement compliance,' which refers to compliance with the specific conditions of the community-based sentence (e.g., attending meetings with the probation officer, abstaining from drugs and alcohol). The second type of compliance refers to compliance with criminal law, labelled 'long-term legal compliance,' which implies no further re-offending or arrests. Therefore, supervisees are non-compliant with their sentence in two main ways: by re-offending and by failing to follow specific instructions of the probation officer, for example, missing appointments or failing to attend programmes (Grattet et al., 2018). Expanding on this, researchers created two subcategories, formal and substantive compliance, to represent behaviour consistent with meeting the bare minimum to pass and behaviour demonstrating active engagement to change (Robinson & McNeill, 2008). Compliance is typically measured by short-term formal compliance with the conditions, meeting all requirements of the sentence as directed by the court or parole board (Robinson & McNeill, 2008). Non-compliance with the conditions set by the court or parole board and the subsequent breach proceedings are important issues implicated in entrapping people in the criminal justice system and feeding the rising prison populations (Smit, 2007).

For example, in California 49% ( $n = 151,750$ ) of the sample ( $N = 200,000$ ) had at least one formal violation (i.e., breached and found guilty of violating the sentence), and 39% ( $n = 59,182$ ) of those individuals were returned to prison (Grattet et al., 2009). While some of the breaches resulted from new criminal charges, 35% ( $n = 53,112$ ) were non-criminal acts, two-thirds of which were for not attending a meeting with the probation officer (Grattet et al., 2009). This is consistent with research that finds breach proceedings are most often undertaken when a supervisee fails to report to their probation officer without communicating

a reason for the absence (Robinson & McNeill, 2008). In New Zealand, the links between compliance with conditions, new criminal charges, and breach proceedings are not well understood, with further research needed to explore how probation officer decision making relates to imprisonment.

There exist a number of different barriers to compliance with sentence conditions that are similar to factors that predict re-offending such as criminal history, young age, substance use, unemployment, and being male (DeLisi et al., 2021; Grattet et al., 2009). Nevertheless, while many barriers to short-term compliance are shared with long-term compliance (e.g., substance use, unemployment), problems with transportation, childcare, and cost (e.g., paying fines, transportation), also interfere with compliance with conditions and are not factors associated with criminality (Denney et al., 2014; Ugwudike, 2010). Similarly, common obstacles to successful re-entry into the community following a term in prison include unstable housing (Herbert et al., 2015; Listwan, 2009) and limited access to transportation (Garland et al., 2011; Luther et al., 2011). Supervisees report that the reasons for non-compliance are linked to social circumstances, lack of resources, chaotic lifestyles, and poor planning (Hucklesby, 2009; Weaver et al., 2020). In addition to practical and situational causes, the empirical literature that addresses non-compliance with community-based sentences indicates that probation officers play an essential role in both increasing the compliance of supervisees (Gyateng et al., 2010) and reducing recidivism (Smith et al., 2018; Wan et al., 2016).

### **Probation officers.**

In New Zealand, the Department of Corrections employs probation officers to monitor the supervisees' compliance with the sentence conditions ordered by the court or parole board. While the supervisee is ultimately responsible for 'doing' their sentence, probation officers play an essential role in the successful completion of a sentence. Probation

officers assess whether a supervisee has successfully completed the requirements of their sentence (Van Deirse et al., 2018), and assist in the supervisee's rehabilitation and reintegration. The research on probation officers' attitudes, practices (e.g., their use of discretion), and the quality of the relationship they form with the supervisee indicate probation supervision is a factor associated with recidivism (Smith et al., 2018; Wan et al., 2016; Zettler & Medina, 2020).

Several studies have aimed to test the effectiveness of probation at decreasing recidivism. For example, propensity score matching<sup>2</sup> was used to compare two groups of paroled offenders on factors likely to influence re-offending (e.g., age, ethnicity, offence, prior good behaviour, prior imprisonment), the authors found that those who received supervision in the community were significantly less likely to re-offend compared to those whose parole did not involve a supervision component (Wan et al., 2016). In a rapid evidence assessment that included 13 studies, the authors concluded that re-offending was lower for those offenders who received probation supervision (Smith et al., 2018). In fact, missed contacts (i.e., missing probation officer meetings) with probation officers have been linked to an increased likelihood of re-arrest while on probation when controlling for gender, ethnicity, employment, previous arrest, offence type, and sentence length (Zettler & Medina, 2020).

### ***Probation officers' dual role.***

Ideally, probation officers serve a dual role: one of change agent and one of enforcement agent. Three main roles describe probation officers' orientation: law enforcer, social worker, and synthesizer (Glaser, 1964; Klockars, 1972; Papanozzi & Gendreau, 2005;

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<sup>2</sup> Propensity score matching is a quasi-experimental method in which the researcher uses statistical techniques to construct an artificial control group by matching each treated unit with a non-treated unit of similar characteristics.

Skeem & Manchak, 2008), with the law enforcer adopting a more punitive style, the social worker a more rehabilitative, and the synthetic type adopting a combination of the two (DeMichele & Payne, 2018). As the title suggests, those probation officers who adopt a law enforcement attitude focus on enforcing sentence conditions, monitoring supervisee's activities, and rely on punitive strategies when managing non-compliance (DeMichele & Payne, 2018). Not surprisingly, probation officers who hold more law enforcement attitudes were more likely to pursue revocation hearings for supervisees non-compliance (Steiner et al., 2011). On the other hand, probation officers who approach supervision with a rehabilitative attitude incorporate motivational interviewing practices to encourage compliance (DeMichele & Payne, 2018) and assist with resources to address the diverse needs that place the supervisee at risk of unsuccessful sentence completion (Aarten, 2019). Supervisees whose probation officers assume the role of 'synthetic officer', that of enforcer and social worker, are more successful at long-term compliance, as evidenced by less recidivism (Klockars, 1972; Papanozzi & Gendreau, 2005; Skeem et al., 2007; Skeem & Manchak, 2008). The hybrid approach is a difficult balance to achieve, however important. More effective synthetic probation officers place equal emphasis on changing offenders' behaviour and protecting public safety, instead of placing a heavier emphasis on one over the other (Klockars, 1972).

Historically, probation officers have reportedly found themselves more concentrated on surveillance oriented practices to ensure community safety (West & Seiter, 2004) or bound by the sentence imposed to be more law enforcement oriented (Bracken, 2007). However, recently, in response to the increasing prison populations in countries like the United States, a shift towards probation officers adopting a more hybrid approach of law enforcer and social worker has occurred (Grattet et al., 2018). For example, in California, probation officers were mandated to adopt the hybrid approach to management, as opposed to

law enforcer, in an attempt to decrease the custodial population (Grattet et al., 2018). As predicted, California found that when probation officers adopted the hybrid role—law enforcer and social worker—it led to reductions in the prison population through decreases in informal proceedings for technical violations (Grattet et al., 2018). In a review of studies to determine the importance of correctional staff practice in delivering services to consumers (i.e., offenders), Dowden and Andrews (2004) found that elements of the ‘synthetic officer’, such as effective reinforcement, effective disapproval, and relationship factors were associated with significantly less re-offending.

***Probation officer and supervisee relationship.***

The relationship between the probation officer and the supervisee has been regarded as a critical component of community supervision associated with reducing recidivism (McNeill, 2006). A body of literature points to developing a therapeutic alliance characterized by openness, mutual respect, collaboration, and non-blaming as a critical factor to successfully managing a supervisee (Van Deirse et al., 2018). Like therapists, effective probation officers establish a working alliance with offenders to empower their successful rehabilitation. A working alliance involves collaborating on the supervisee’s needs and goals and creating a high-quality relationship that empowers the supervisee’s success in meeting those needs and goals (Flaskas & Perlesz, 2018). A relationship characterized by a working alliance is believed to foster a supportive, responsive management style that adapts to the individual supervisee and it is suggested that probation officers who establish these quality relationships foster greater compliance (Aarten, 2019; Raynor et al., 2012; Ugwudike, 2010; Van Deirse et al., 2018). Building high-quality relationships with supervisees has been linked to reductions in recidivism as well (DeLude et al., 2012; Rex, 1999), regardless of a supervisee’s assessed risk level (i.e., even in high-risk supervisees) or personality traits (Kennealy et al., 2012). For example, the risk of re-arrest amongst supervisees decreased

when their probation officers adopt an approach that is characterized by a firm, fair, and caring style (Kennealy et al., 2012). Supervisees who reported a better relationship with their probation officer had fewer drug use days and fewer sentence violations (Blasko et al., 2015); even when probation officers are just friendly and show interest, the supervisees report that they have more interest in complying with the sentence and require fewer warnings (Sorsby et al., 2017).

However, the relationship is not totally dependent on the probation officer's behaviour. Compared with those with more positive traits, offenders with traits like alienation, hostility, and aggression may be less likely to establish a working alliance with their probation officer and be more likely to recidivate, regardless of the relationship with the probation officer (Kennealy et al., 2012). Similarly, it may be more challenging to establish a working alliance with a high-risk supervisee because probation officers' options for resolving non-compliance are restricted. The discretionary practices (e.g., flexibility, verbal warnings) that assist in establishing a working alliance between the probation officer and supervisee cannot be practised when a risk level dictates prescribed responses (Ugwudike, 2013b).

### ***Probation officer discretion.***

Probation officers have a lot of discretion in managing a supervisee and resolving issues of non-compliance (Wortley, 2003) and determining if a supervisee has successfully completed their community sentence (Canton & Dominey, 2017). The most critical act of discretion a probation officer can make is initiating formal breach charges against a supervisee that can result in imprisonment (Jones, 2004). In a study exploring probation officers' ( $N = 61$ ) perspectives on discretion, the authors found that most probation officers (78%) agreed that they use their discretion to uphold public safety (Slabonik & Sims, 2002). Nearly a quarter of the respondents (23%) agreed that probation officers should have extensive discretion, while the other three quarters believed there should be limits and

oversight to their discretion (Slabonik & Sims, 2002). Probation officers have reported that they are most likely to bring formal sanctions against a supervisee who ignored a previous verbal warning for a non-association or missed treatment violation; however, if it was the supervisee's first act of non-compliance for missing a meeting or failing to secure employment, most would not initiate a technical violation (Jones & Kerbs, 2007). In contrast, if the violation were related to alcohol use or a missed curfew, half of the probation officers surveyed ( $N = 417$ ) would respond with a technical violation (Jones & Kerbs, 2007).

Probation officers also use their discretion to decide what strategies to employ, such as offering flexible appointments, reminding supervisees to attend appointments and making home visits in response to practical obstacles (e.g., childcare and transport problems) to compliance (Ugwudike, 2010). The existing research on probation officer discretion describes how discretion is used in response to different violations or practical barriers to compliance. However, research into the individual level characteristics of a supervisee and how they may influence the decision-making of the probation officer is limited. There has been some speculation that probation officers use client-centred approaches when the supervisee's functioning (e.g., cognitive) is potentially impaired, and this results in better compliance outcomes (Mason & Murphy, 2002; Sorsby et al., 2017). The approach toward supervision of offenders in the community is highlighted in the empirically supported Risk Need Responsivity (RNR) model, which advocates for individualized considerations when delivering services (Andrews et al., 1990).

### **Risk Need Responsivity model**

Effective intervention for offenders has been guided by the three principles in the Risk Need Responsivity model (RNR; Bonta & Andrews, 2007; Bonta & Andrews, 2016). The risk principle maintains that the amount of supervision and services corrections applies to an offender should be relative to their risk of recidivism (i.e., high risk, more intensive

services and supervision; Bonta & Andrews, 2007; Lowenkamp et al., 2006). The need principle is the process of identifying and considering the offender's changeable risk factors for crime (i.e., the central eight risks/needs factors of criminal offending) in order to target through programs and services (e.g., community-based sentence conditions) offered by corrections (Bonta & Andrews, 2016). These factors include criminal history, pro-criminal attitudes, pro-criminal associates, antisocial personality pattern, poor family relationships, poor school and work history, history of substance abuse, and lack of participation in pro-social leisure activities (Bonta & Andrews, 2016).

Responsivity, the final principle of the RNR model, concerns the delivery of these correctional services to the offender in a way that they can both engage with and learn from (Bonta & Andrews, 2016). The responsivity principle emphasizes the importance of considering the offender's individual characteristics (e.g., Andrews et al., 1990; Bonta & Andrews, 2007). Research in the area of responsivity is limited compared to the abundance on the risks and needs of offenders (Bourgon & Bonta, 2014), specifically as it concerns the delivery of community supervision and supervisee's individual characteristics. When providing examples for specific components of responsivity, neuropsychological functioning is an individual characteristic often discussed by the architects of the RNR model as an essential responsivity issue. Empirical evidence suggests that poor neuropsychological functioning is common amongst individuals who serve criminal sentences (LaDuke et al., 2017). For instance, neuropsychological deficits have been identified as an individual characteristic in some life-course persistent offenders (i.e., individuals who began offending in childhood and persisted in offending into adulthood; Moffitt, 1993).

### **Neuropsychological function**

In conceptualising antisocial behaviour patterns, authors have distinguished between adolescent-limited offending, which they defined as individuals whose antisocial behaviours



began in adolescents but desisted as young adults, and life-course persistent offending, which they defined as antisocial behaviours beginning in childhood and persisting into adulthood (Moffitt, 1993). From the earliest points at which data have been collected, those most at risk of ongoing criminal behaviour in adulthood—known variously as “early-onset” or “life-course persistent” offenders—experience and demonstrate difficulties in multiple domains, including neuropsychological functioning (Hodgins, 2007; Moffitt, 1993; Piquero, 2001). Moffitt and colleagues are among the leading proponents of the neuropsychological hypothesis: in children with early-onset, persistent antisocial and criminal behaviour, their risk is proposed to emerge “from inherited or acquired neuropsychological variation, which is initially manifested as subtle cognitive deficits, difficult temperament, or hyperactivity” (Flannery et al., 2007, p. 50; Moffitt, 2007). A growing body of such research has been developed in this area (e.g., Piquero, 2001; Raine et al., 2005). For example, a prospective longitudinal study of  $N = 169$  men aged 26 years found that the presence of neuropsychological impairments during early childhood predicted persistent antisocial behaviours in adulthood (Moffitt et al., 2002). Significantly, they found that early-onset neuropsychological impairments predicted life-course persistent offending but not the adolescent limited pattern (Moffitt et al., 2002).

### **The frontal lobes.**

The neuropsychological hypothesis developed by Moffitt and colleagues aligns with the biological theory of crime, emphasising the relationship between damage to the frontal lobes and crime (Marsh, 2007). The frontal lobes are responsible for conceptual thinking, judgement, planning, prolonged motivation, and self-regulation (Miller & Cummings, 2017). The frontal lobes house a group of processes that fall under the umbrella term *executive functions*. Impaired executive function may present in a variety of ways: inability to focus, impulsivity, reduced working memory, difficulties monitoring or regulating performance,

inability to plan actions, disorganization, poor reasoning ability, difficulties generating and implementing strategies, resistance to change in activities, difficulties shifting between conflicting demands, and failure to learn from mistakes (Anderson et al., 2010). Executive dysfunction may also present as social and emotional functioning problems, such as maladaptive affect and social behaviour (Anderson et al., 1999). Indeed, it has been argued that discrete executive function deficits in areas of self-regulation and problem solving co-exist with the central eight criminogenic risk/need factors outlined in the RNR model (Cheng et al., 2019).

The importance of the frontal, particularly prefrontal areas of the brain can be seen by the amount of space they command: the prefrontal cortex makes up 29% of the total cortex (Miller & Cummings, 2017). The frontal lobe is one of the last regions of the brain to develop, making it especially vulnerable to damage. In general, our brain development is a hierarchical progression beginning with the central nervous system, followed by posterior areas and anterior regions reaching maturity last (Gogtay et al., 2004; Hudspeth & Pribram, 1990, 1992). For example, increases in white matter volume, signalling an increase in myelination, have been observed to progress from the occipital and temporal lobes (posterior areas) to the parietal lobe and finally, the frontal lobe (anterior areas; Giedd et al., 1999). An individual with frontal lobe damage may misperceive elements of a situation, make poor social judgements, overreact to provocation, lack the communication skills to navigate social conflict verbally, or act impulsively (Turkstra et al., 2003). In addition, recurrent aggressive behaviour has also been related to frontal lobe damage (Brower & Price, 2001).

### **Executive and cognitive function.**

A meta-analysis that included 43 imaging studies of the structural and functional areas of the frontal lobe of antisocial individuals found the structure and function of the key areas that house executive functions—orbitofrontal cortex, anterior cingulate cortex, and the

dorsolateral prefrontal cortex—were significantly reduced compared to what would be expected in individuals of their same age (Yang & Raine, 2009). The orbitofrontal cortex plays a vital role in emotion processing, learning from reward and punishment, and decision making (Blair, 2004). The anterior cingulate assists in error processing, conflict monitoring, and avoidance learning (Holroyd & Coles, 2002; Kosson et al., 2006). The dorsolateral prefrontal cortex is responsible for important self-regulatory skills, such as attention, cognitive flexibility, and impulsivity (Yang & Raine, 2009), processes employed to plan, evaluate, and control emotional behaviour (Fishbein, 2000). Some suggest that impairment in executive functions may facilitate aggression and violent behaviour, particularly in stressful, precarious, or provocative situations (Marsh & Martinovich, 2006). A review of 17 neuroimaging studies revealed that the areas associated with aggressive behavioural acts, particularly impulsive acts, were located in the prefrontal cortex and the medial temporal regions (Bufkin & Luttrell, 2005). One hypothesis was that disruptions in frontal and prefrontal areas, in particular, may lead individuals who are impulsive and aggressive to misinterpret situations as threatening and potentially dangerous, which in turn increases the probability of violent behaviour against a perceived threat (Bufkin & Luttrell, 2005).

A body of research has established a statistically significant relationship between antisocial behaviour and executive functioning deficits measured by performance-based tests. Two meta-analyses concluded that there is a significant association between executive functioning deficits and antisocial personality disorder (Brower & Price, 2001; Morgan & Lilienfeld, 2000; Ogilvie et al., 2011); the findings indicate the executive functioning differences between offender samples and non-offender samples are on the scale of 0.61 standard deviations (Ogilvie et al., 2011) to 0.91 standard deviations (Morgan & Lilienfeld, 2000). Numerous studies demonstrate that the neuropsychological functioning of offender groups on performance-based measures compared to non-offender groups is significantly

poorer (Bergeron & Valliant, 2001; Hancock et al., 2010; LaDuke et al., 2017). For instance, in a study that utilized a performance-based measure of executive functioning, offenders and non-offenders performed a non-verbal Stroop task, which measures inhibitory control and selective attention, while undergoing a magnetic resonance imaging scan (Schiffer et al., 2014). The researchers found that offenders, when compared to the non-offenders, had reduced response time and a different pattern of activity in the areas of the brain responsible for cognitive control, attention, language, and emotion processing (e.g., anterior cingulate, dorsolateral prefrontal cortex; Schiffer et al., 2014).

Meijer et al. (2015) reviewed seven studies to investigate the executive functioning of general population prisoners related to non-offender controls. Each study utilized performance-based measures<sup>3</sup> and found that attention, working memory, and mental flexibility were impaired compared to non-offender controls. Results from performance-based measures in other studies indicate that deficits in planning, mental flexibility, problem-solving, visuospatial constructional abilities, visual memory and inhibitory control are most associated with re-convictions (Bergeron & Valliant, 2001; Meijers et al., 2017; Ouimet et al., 2007; Roszyk et al., 2013; Seruca & Silva, 2015; Valliant et al., 2003). For instance, the number of previous arrests was significantly associated with problems solved in minimum moves as measures by the Stocking of Cambridge test (Lowe & Rabbitt, 1998); for each additional previous arrest, the number of problems solved decreases by 0.067 (Meijers et al., 2017). Studies using self-report measures of executive functioning show similar results; recidivist offenders have significant deficits in inhibition, emotional control, self-monitoring, planning/organizing, and task monitoring, compared to first time offenders (Sánchez de Ribera et al., 2020).

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<sup>3</sup> Performance-based measures assess what an individual *can do* in a controlled setting as opposed to what they *actually do* in day-to-day living

However, a Canadian study has shown that performance on tests measuring language, memory, reasoning, calculations, and construction, were not associated with re-convictions upon release or completion rates of correctional programs while incarcerated (Stewart et al., 2016). Nevertheless, a number of previously published studies suggest that incarcerated offenders who drop out of correctional treatment programs lack inhibitory control (Fishbein et al., 2009), have poorer attention skills (Cornet et al., 2015), and score lower on memory tasks (Overend, 2011). The findings also indicate that offenders who are unable to shift their thinking or responses based on novel information struggle to meet treatment objectives (Fishbein et al., 2009). A recent study found that community-based sentenced perpetrators of interpersonal violence against women who performed poorly on cognitive flexibility measures had higher rates of interpersonal violence treatment attrition and recidivism compared to perpetrators with better cognitive flexibility performance (Romero-Martínez et al., 2021). Indeed, Raines (1993) assessed the mental flexibility of patients with frontal lobe damage using the Wisconsin Card Sorting Test. Participants made mistakes even though they could verbalize their errors and realized the appropriate response strategy (Raines, 1993). This inability to respond ‘correctly’ in a formal test setting is an interesting parallel to certain antisocial individuals who can verbalize prosocial life strategies they should adopt while at the same time engaging in antisocial behaviour (Raines, 1993).

### **Causes of neuropsychological impairment in offenders.**

The likely causes of neuropsychological impairments amongst offenders are diverse. Inheritance, prenatal factors (e.g., malnutrition, maternal drug use, exposure to toxins) and delivery complications and early developmental factors (e.g., lack of nurturance) may play a part (Moffitt, 1993). The sources of neuropsychological impairments amongst offenders may not have occurred in the developmental period but could be related to other factors overrepresented amongst offending populations. There is evidence that chronic alcohol and

substance use during adolescence and adulthood produces cognitive impairments (Hanson et al., 2011), including compromising executive functioning (Koob & Volkow, 2016). Another important cause of neuropsychological dysfunction is traumatic brain injury (TBI), high rates of which can be found in offending populations (Durand et al., 2017).

### **Traumatic brain injury (TBI)**

Traumatic brain injury (TBI) can be defined broadly as any alteration in brain function resulting from an external, physical force, with a classification system for mild, moderate, and severe TBI (Menon et al., 2010). In addition to situations in which the head is struck or strikes an object, this definition also includes cases where there is no direct trauma to the head, but brain function is affected nonetheless, such as when the brain undergoes a rapid acceleration/deceleration movement (e.g., whiplash; Menon et al., 2010). In New Zealand, as in many other parts of the world, TBI has been identified as a significant public health issue, with over half of serious injury claims to the New Zealand Accident Compensation Corporation (ACC) referencing some form of head or brain injury (Corporation, 2017). The lifetime prevalence of TBI in New Zealand's general population has been reported to be as high as 31.7% for men and 21.9% for women (McKinlay et al., 2008). A meta-analysis including studies from Australia, Canada, New Zealand and the United States reports that lifetime prevalence in the general population is 12% (Frost et al., 2013). A population-based study to investigate TBI incidence found that younger (>35 years) European men are most likely to sustain a TBI in New Zealand. However, it is important to note that the total incidence of TBI is higher among Māori (the indigenous people of New Zealand) than any other ethnic group, the authors attributed this to more Māori over the age of 35 sustaining TBIs related to other ethnicities (Feigin et al., 2013).

A loss of consciousness (LOC) of more than 24 hours is widely viewed as a characteristic feature of severe TBI: as a general rule, if LOC has persisted for longer than

one day, there is likely to be some permanent neuropsychological impairment (Miller, 1992). The classification of mild TBI in the literature varies, with different definitions including concussion with no LOC, while other studies define mild TBI as LOC of less than 30 minutes (e.g., Bernstein, 1999; Cohen et al., 1999). Presently, there is relative consensus on the diagnostic criteria for mild TBI. Established by the ACRM and the WHO, the criteria for mild TBI state one must have a Glasgow Coma Scale of 13-15 (GCS; Teasdale & Jennett, 1974), 30 minutes after the injury, and one or more of the following symptoms: 1) any period of loss of consciousness for <30 minutes 2) post-traumatic amnesia (PTA) <24 hours 3) any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused), and 4) transient neurological deficit (ACRM, 1993; MTBI, 2004). The ACRM criteria are consistent with the criteria outlined in the TBI screen used in this thesis (i.e., OSU-TBI-ID-Short Version; Bogner & Corrigan, 2009). Injuries of mild severity are the most common form of head injury and occur in 70-90% of cases (Cassidy et al., 2004), although in New Zealand, they are estimated to account for 95% of TBI cases (Feigin et al., 2013).

### **TBI aetiology.**

In New Zealand, TBI is most commonly the result of falls (38%), mechanical force (21%), transport crashes (20%), and assaults (17%; Feigin et al., 2013). Impact to the head can also occur during a more innocuous event, such as inadvertently hitting one's head with a door or other inanimate object. Studies indicate that young (i.e., < 30 years) males are more likely to sustain a TBI (Feigin et al., 2013; Kennedy et al., 2017). In a New Zealand population-based incidence study, children and young adults (0-34 years) made up nearly 70% of the TBI cases ( $n = 1369$ ; Feigin et al., 2013). The group most likely to report a TBI are between 15 to 24 years (Zillmer & Spiers, 2001). Adolescents 15-19 and children 0-4 years are more likely to sustain a TBI that results in emergency room visits, hospitalizations

and deaths combined than any other age group (Langlois et al., 2006). There are also high rates of TBI in children and adolescents aged 5 to 14, with falls accounting for the largest percentage of TBIs in this age group (Pickett et al., 2001). An early and underrecognized—perhaps unattended—source of TBI is childhood physical abuse, a blow to the head can cause multiple microscopic lesions in the brain, while rough shaking of a child can result in whiplash-like effects that cause shearing of white matter fibre (Raines, 1993). At the same time, exposure to adverse childhood experiences is associated with an increased risk of TBI as an adult (Ma et al., 2019). Men are twice as likely as women to experience a TBI (Langlois et al., 2006). Reasons for the predominance of men in TBI statistics may relate to the social factors dictated by gender roles, such as responsibilities, attitudes, traits, expression, and social-cultural expectations (e.g., risk taking, substance using; Mollayeva et al., 2018).

The consequences of TBI primarily depend on the severity of the injury and the area of the brain that is affected, with more severe injuries typically being associated with wider spread/ more severe symptoms. TBI can have a number of deleterious effects on cognitive functioning (Arciniegas et al., 2002). Common cognitive impairments include memory, attention, concentration, planning, perception, learning, information processing and communication difficulties (Barnfield & Leathem, 1998; Miller, 2002). Depression and anxiety (Jorge & Robinson, 2002; Lezak, 1987b; Van Zomeren & Van den Burg, 1985), elevated levels of anger (Demark & Gemeinhardt, 2002; Lezak, 1987b; Rosenbaum & Hoge, 1989) and increased impulsivity (Bechara & Van Der Linden, 2005; Prigatano, 1986), are also common consequences of TBI. Furthermore, research shows that individuals who sustain multiple TBIs tend to display more deficits in areas of neuropsychological functioning related to inhibition and divided attention than individuals who have not experienced a TBI (Wall et al., 2006). Studies investigating the short term outcome among children with TBI indicated that a number of neuropsychological domains of functioning were affected, including



problem solving, language, memory, and psychomotor performance (Anderson et al., 2018; Cattalani et al., 1998). Indeed, the ways in which TBI can adversely affect the brains of young people are manifold—and a comprehensive review of this literature is beyond the scope of the present chapter. To give just one example, though, the corpus callosum—the neurological structure responsible for attention, arousal, perception, and memory storage and retrieval—contains a thin white matter that develops throughout adolescence (Lenroot & Giedd, 2006). Neurological injury during that period might inhibit the full connective maturation of this substance and thereby permanently hamper cognitive development (Lenroot & Giedd, 2006).

### **Mild TBI.**

The acute physical symptoms of a mild brain injury include feeling dazed or confused, headaches, nausea, and fatigue, and could include a period of LOC (Ruff, 2005). Post mild TBI sequelae typically includes a constellation of somatic and neuropsychological symptoms that include dizziness, fatigue, headaches, diminished concentration, anxiety, irritability, difficulty with memory, insomnia, and sensitivity to noise and are very common in the first few weeks following injury (Levin et al., 1982). Until recently, it was thought that only moderate or severe injuries led to continuing impairments, with the consequences of mild injuries resolving within 2-4 weeks. However, even mild TBI can cause long term problems that affect a person's ability to perform daily activities and return to work (Langlois et al., 2006). More recent evidence suggests that mild TBIs (e.g., concussions) may result in impairments lasting longer than a month, and individuals may experience symptoms for up to 5 years post-injury (Jakola et al., 2007; Theadom et al., 2016; Theadom et al., 2018).

Studies suggest that persons with mild head injury recover quite well as a group, with 80-90% having good outcomes (Ruff, 2005); however, some have argued that these good outcomes may represent a behavioural adaptation rather than a return to pre-injury levels of

functioning (Bernstein, 1999). It is also suggested that there are 10%-20% who have persistent symptoms following a mild TBI (Ruff, 2005). While most people with mild TBI recover entirely within the first three months, a significant minority continue to report symptoms at one year or longer post-injury (Barker-Collo et al., 2015; Belanger et al., 2005; Jakola et al., 2007; Theadom et al., 2016). Nevertheless, the course and effects of an injury of mild severity continue to be scrutinised, and the exact nature and course of post-acute cognitive recovery remain an area of debate. In a meta-analysis of the relevant literature on mild TBI, Belanger et al. (2005) revealed no residual neuropsychological impairment by three months post-injury in samples. Notwithstanding such speculation, evidence from self-reports and neuropsychological assessments suggests that around 15% of people who sustain a mild TBI continue to be symptomatic beyond one year (Barker-Collo et al., 2015; Reitan & Wolfson, 2000; Theadom et al., 2016). Barker-Collo et al. (2015) and Theadom et al. (2016) reported that individuals with mild TBI ( $n = 341$ ) completed a computerised neuropsychological assessment (CNS-Vital signs) at baseline and 12-months post-injury. At 12-months post-injury, just over 10% of the sample obtained scores in the very low range ( $>70$ ; Theadom et al., 2016), with complex attention having the highest proportion of participants (16.3%) remaining in the very low range at 12-months post-injury (Barker-Collo et al., 2015). Furthermore, no significant improvements in functioning were found in memory domains between baseline and 12-months post mild TBI, with 15.6% remaining in the very low range at 12-months post-injury (Barker-Collo et al., 2015). Together, mild TBI is not benign, and the research signals that it should not be assumed that post-injury recovery will occur within a specified time frame.

### **TBI prevalence in offenders.**

Existing research establishes the high prevalence of TBI amongst incarcerated offender populations, albeit with the caveat that studies vary in their definitions, samples, and

methodological design, making it difficult to determine generalizability and conclusive prevalence rates. Rates of past TBI amongst offender populations vary between 10% and 100%, though this latter estimate is based on a very small and distinct offender sample (i.e., death row inmates; Lewis et al., 1986). In the last ten years, a body of research has established that TBI is overrepresented amongst incarcerated offenders, both men and women serving custodial sentences have a higher incidence of TBI than non-incarcerated populations (Durand et al., 2017; Perkes et al., 2011). In a systematic review of 36 studies ( $n = 9342$ ), the prevalence of TBI amongst incarcerated samples was estimated to be 46%; this was primarily based on male samples in developed countries (e.g., Australia, Europe, and North America), and self-report data (Durand et al., 2017). The lifetime prevalence of TBI in New Zealand's general population has been reported to be as high as 31.7% for men, and 21.9% for women (McKinlay et al., 2008), while a meta-analysis including studies from Australia, Canada, New Zealand and the United States reports lifetime prevalence in the general population is 12% (Frost et al., 2013). However, the prevalence of lifetime TBI among incarcerated men and women is even higher than that found in those community samples. Two recent New Zealand self-report studies suggest that 60.0% of incarcerated men and 94.7% of incarcerated women have experienced a TBI with LOC at some point in their lives (Mitchell et al., 2017; Woolhouse et al., 2018). Rates of TBI with LOC are quite similar across countries for incarcerated men: in Australia (65%; Schofield et al., 2006a), the United States (65%; Ferguson et al., 2012), and Canada (50.4%; Colantonio et al., 2014). Rates of TBI in incarcerated women in the United Kingdom (65%; O'Rourke et al., 2018a), Canada (30%; Colantonio et al., 2014), and the United States (42%; Brewer-Smyth et al., 2004), are similar to the rates for men. An international meta-analysis of 17 studies ( $n = 4,865$ ) concluded that over half of incarcerated men (59.3%) and women (55.4%) had sustained a TBI with LOC in their lifetime (Shiroma, Ferguson, et al., 2010). A recent study from the United States was the

first to report prevalence rates of TBI in a community sentenced population: the study found that approximately one-half ( $n = 1,029$ ; 44-97% depending on the probation site) self-reported a significant TBI<sup>4</sup> history (Gorgens et al., 2021). In the general population, the most common causes of TBI are falls and motor vehicle crashes; however, amongst incarcerated offenders, TBI most often results from fights, and injuries from falls (Morrell et al., 1998).

### **TBI and offender outcomes.**

TBI affected offenders have increased recidivism rates and convictions (Piccolino & Solberg, 2014; Pitman et al., 2015; Ray & Richardson, 2017; Ray et al., 2014; Williams et al., 2010) relative to incarcerated offenders without a history of TBI. Piccolino and Soldberg (2014) reported re-offence rates for incarcerated offenders with a history of TBI range from 33%-51%, higher than those without a history of TBI. Ray et al. (2014) found that offenders with a history of TBI were 1.5 times more likely to have a prior arrest than offenders without a history of TBI when controlling for age, ethnicity, education, and mental health disorders. In another study, when controlling for age, ethnicity, education, prior arrests, and offence type, recidivism was 1.85 times greater for those with a history of TBI than those without (Ray & Richardson, 2017). Common factors shown to increase the risk of recidivism include substance abuse, history of exposure to violence, and poor treatment compliance (Blonigen et al., 2017; Kopak et al., 2016; Leon-Carrion & Ramos, 2003), which are also often mentioned in the TBI literature as comorbidities in incarcerated TBI populations (Durand et al., 2017). In addition, studies show incarcerated offenders with a history of TBI tend to spend more time in prison (Durand et al., 2016; Hawley & Maden, 2003; Williams et al., 2010), have increased rates of behavioural infractions (Ferguson et al., 2012; Piccolino & Solberg, 2014; Shiroma, Pickelsimer, et al., 2010), lower rates of treatment completion (Piccolino &

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<sup>4</sup> The study defined a significant TBI as one moderate/severe brain injury, an injury with a loss of consciousness before age 15, or multiple, repeated brain injuries

Solberg, 2014), and have significantly more difficulty following prison rules, as measured by disciplinary rule infractions (Ferguson et al., 2012; Merbitz et al., 1995) relative to offenders without a history of TBI. Gorgens et al. (2021) found that community sentenced offenders with a significant history of TBI<sup>1</sup> have higher rates of felony<sup>5</sup> convictions, are less likely to complete probation successfully, and are significantly more likely to re-offend than community-sentenced offenders without a significant TBI.

### **Co-existing risk factors: TBI and offending.**

There is evidence that individuals with a history of TBI share a number of characteristics/risk factors with those who repeatedly break the law, including a history of low educational attainment, unstable employment, and problematic substance use (Bonta & Andrews, 2007; Parry-Jones et al., 2006; Ponsford et al., 1995). Indeed, increased risk for the poor outcomes following a TBI includes low educational attainment, psychosocial stress, previous psychiatric illness, substance abuse, and a prior TBI (Hardman & Manoukian, 2002; Schofield et al., 2006b). A number of longitudinal studies have reported an association between TBI and criminality. A longitudinal birth cohort of children born in Christchurch, New Zealand, indicated that those who sustained a TBI in their lifetime were at increased risk of engaging in criminal activities (McKinlay et al., 2014). Other countries have used birth cohorts to establish a link between sustaining a TBI and criminal justice involvement, each drawing the same conclusions as New Zealand's birth cohort (Fazel et al., 2011; McIsaac et al., 2016; Timonen et al., 2002). A population-based study suggested that men and women who had sustained a TBI were about two and half times more likely to be incarcerated than men and women who had not sustained a TBI (McIsaac et al., 2016). Furthermore, a 35-year population-based study in Sweden determined that those diagnosed with a TBI were three

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<sup>5</sup> A felony is typically defined in the United States as an offense punishable by a term of imprisonment

times more likely to commit a violent crime compared to age and gender matched controls and two times more likely than their siblings (Fazel et al., 2011).

Data from a longitudinal birth cohort showed that participants at age 17 years with mild TBI ( $n = 800$ ) relative to those participants with no TBI showed increased odds of alcohol use (OR = 1.51, 95% CI 1.21–1.90), cannabis use (OR = 1.54, 95% CI 1.22–1.94), being in trouble with the police (OR 1.62, 95% CI 1.21–2.17), and increased odds of offending (OR = 1.72, 95% CI 1.32–2.23) when controlling for pre-birth and childhood covariates (Kennedy et al., 2017). Further analyses revealed that participants with a mild TBI between birth and age 11 years had higher odds of psychiatric symptoms at age 17 years. In comparison, participants who incurred a mild TBI between age 12 and 16 years had higher odds of problematic substance use and criminal behaviours at age 17 years, perhaps suggesting that age at injury may influence individual outcomes (Kennedy et al., 2017). New Zealand's Christchurch birth cohort indicated an association between a history of TBI and self-reported arrests, property offences and violent offences (McKinlay et al., 2014). Participants whose first injury occurred between ages 0-5 years were more likely to engage in violent offences, sustaining a TBI between 6-15 years increased risk of arrest and property offences, and those who sustained a TBI between 16-21 years were at risk for arrest and violent offences (McKinlay et al., 2014). Other studies have reported that individuals who sustained their first TBI prior to age 12 years began committing crimes earlier than those who acquired a TBI after 12 years (Timonen et al., 2002).

The symptomology of TBI can disrupt educational achievement (Catroppa & Anderson, 1999; Catroppa et al., 2009), and research shows that children who sustain a TBI are more likely to have ongoing educational and, later, employment problems than children without such injuries (Anderson et al., 2011). For instance, a literature review suggests that educational attainment is an important factor in later offending behaviours (Machin et al.,

2011), and reporting a higher number of symptoms (e.g., headaches, confusion, forgetfulness, poor concentration, difficulty with recall) related to TBI has been shown to significantly mediate the relationship between decreased educational attainment and more frequent convictions (Clasby et al., 2019). Still, some studies report no evidence that prior TBIs were associated with an increased risk of subsequent criminal convictions from age 12 to age 24 when considering socioeconomic status and childhood disruptive behaviours (Guberman et al., 2019). However, these latter factors are associated with an increased prevalence of TBIs among adult offenders (Ma et al., 2019). In fact, TBI has been associated with an increased risk of developing conduct disorder (Kennedy et al., 2017), and conduct disorder during childhood have been implicated in an increased risk of TBI in adulthood (Vassallo et al., 2007). The links between TBI and crime are complex. Those who offend could be risk takers with a low threshold for harm avoidance (Beaver et al., 2017). However, a range of potentially criminogenic pre-injury factors could also be risk factors for, and be exacerbated by, TBI. Socioeconomic deprivation, being male, and risk taking are co-associated with TBI and incarceration—and might occur by coincidence (Farrer et al., 2013). Explanations for the high rates of TBI amongst offenders include that involvement in violence and crime is itself a risk factor for sustaining a TBI (Raine, 1997). While the studies described above have failed to describe the exact mechanisms that maintain the relationship between offending and TBI, it has been suggested that TBI is associated with meaningful behavioural and cognitive consequences amongst offenders (Pitman et al., 2015), including executive function deficits (Cheng et al., 2019) and that those consequences are what make TBI predictive of offending.

A TBI might contribute to neuropsychological impairment leading to elevated offending risk; through the reduced capacity for problem solving and increased impulsivity and aggression. Alternatively, it is possible that the same factors that cause crime and violence also predispose an individual to TBI, such as higher levels of aggression (Jansen,

2020). Studies show that offenders with a history of TBI have significantly poorer neuropsychological performance (Pitman et al., 2015), are twice as likely to develop psychiatric disorders (Ray et al., 2014), and report more drug misuse (Walker et al., 2003), compared to offenders without a history of TBI. However, a recent study investigating TBI and neuropsychological performance amongst incarcerated women found no difference in neuropsychological functioning between participants who reported a history of TBI and those who did not (O'Sullivan et al., 2020). Each of the previously-mentioned studies and literature examining TBI and neuropsychological functioning amongst offenders have focused on comparing those with a history of TBI relative to those without a history of TBI. However, offenders often present with a number of the risk factors for poor neuropsychological functioning, making it difficult to determine if the poor performance on neuropsychological tests is related to a historical TBI. Measuring the neuropsychological functioning of those with a recent head injury may be more likely to result in more meaningful insight into how the neuropsychological consequences of a TBI are related to offender outcomes. In many cases of TBI, there is some combination of focal and diffuse damage to the brain, so that any injury to the brain often exacerbates any pre-existing pattern of impairment, leading to an overall inefficiency or lethargy of cognitive processing in affected individuals around the time of the injury (Miller, 1992).

Taken together, TBI is an individual characteristic, like poor neuropsychological functioning, that is associated with poorer treatment, rehabilitation, and disciplinary outcomes for incarcerated offenders, and emerging research is indicating similar outcomes for those offenders serving non-custodial sentences. However, further investigation needs to be undertaken with community populations to understand further how TBI and neuropsychological problems influence the sentence outcomes of those serving a community-based sentence.



## Conclusion

The body of literature describing the representation and impact of TBI and neuropsychological dysfunction amongst incarcerated samples has grown in the last decade, establishing the importance of these individual characteristics on successful outcomes for offenders. It is reasonable to expect that both TBI and poor neuropsychological function would be associated with the compliance of those serving community-based sentences, however the relevance of these factors to compliance amongst a community-based sample is underexamined. In addition, it is suggested that the role of a probation officer and the process of supervision are important to the success of an individual serving a community-based sentence (Kennealy et al., 2012). Probation officers have a lot of discretion in how they manage an individual supervisee, but still our understanding of how probation officers view and respond to non-compliance amongst those individuals who have a history of TBI or current neuropsychological problems is unknown.

We consider community sentence compliance to be a particularly important topic for research because judges who want to use the community-based sentence as an alternative to custody in any jurisdiction must face the fact that such penalties rely to a far greater extent than custodial environments upon not only the compliance of offenders to make them ‘work’ but also the corrections staff engaged with the offender. It is therefore remarkable that, despite a promising literature on the effectiveness of community supervision (Wan et al., 2016)—and a common finding of problems of attrition in respect of a variety of community-based programmes and treatment (e.g., Farrall, 2002; Raynor, 2004)—the topic of offenders’ compliance with community-based sentence has attracted relatively little in the way of empirical or theoretical attention. For example, despite the critical role probation officers play in compliance and supervisee’s outcomes, there is little research investigating how probation officers define and manage compliance (Ugwudike, 2013a). Emerging research

into recidivism and program attrition amongst incarcerated offenders has indicated that poor neuropsychological function can hamper offender rehabilitation—representing an important responsibility issue—however, no studies have considered neuropsychological functioning as an issue related to increased non-compliance amongst community sentenced offenders. The relevance of TBI amongst offenders who serve non-custodial sentences (i.e., community-based sentences) has received little attention.

Impairments in neuropsychological functions in a community corrections setting may be more likely to manifest as compliance and engagement issues, especially when the sentence requirements are undertaken in tandem with the duties, responsibilities, and difficulties of everyday life (e.g., family, work, and social commitments). Imprisonment ordinarily entails a temporary suspension of—and separation from—'normal life': the life of most prisoners is highly regimented and requires little in the way of personal self-regulation skills. By contrast, a community-based sentence is both less structured and can be more complex. Difficulties with time management, problem-solving, managing daily responsibilities, and self-regulating behaviour and emotions—all of which can negatively affect education, employment and justice-system involvement—can be related to neuropsychological dysfunction resulting from a number of different causes one of which might be a TBI. Non-compliance with sentence conditions, which amounts to not attending an appointment in most cases, can result in significant consequences for the supervisee (e.g., imprisonment). It is speculated that imprisonment can result in more harm to those individuals with neuropsychological deficits or consequences from a TBI because of the fragile self-regulatory regimes some people may have in place in the community: especially if they depend on supports in the community for their deficits. To meet the layered goals of community corrections, to rehabilitate and reintegrate offenders, manage and minimize risk in the community, decrease prison populations and reduce custodial costs, it is worthwhile to

explore further what individual characteristics are contributing to non-compliance. This is particularly true in New Zealand, where to date, no empirical research has been conducted on the neuropsychological functioning and the potential relevance of TBI on the compliance of community-based offenders.

### **Thesis outline**

The first chapter of this thesis provided an introductory overview of community-based sentences, probation officers' roles, neuropsychological function, and TBI. Chapters 2 through 5 relate to the research that makes up this thesis. In chapter 2, the research rationale, aims and methodological approach are outlined. Chapters 3 through 5 present the results of our research in the form of three manuscripts published in or submitted to peer-reviewed academic journals. Chapter 3 presents our first manuscript, which has been accepted pending revision by the Probation Journal. Chapters 4 and 5 are manuscripts still under review at the time of this submission. Finally, Chapter 6 provides an integrated summary of our findings and implications for future research and practices.

## **Chapter 2: Research Rationale and Methodology**

### **Research rationale and aims**

The body of literature in the previous introduction supports the conjecture that successful compliance is partly dependent on maintaining intact cognitive functions. This leads us to believe that without an understanding of the offender's current neuropsychological deficits, it is difficult to know how a history of TBI relates to any behaviours, specifically behaviours leading to non-compliance. While substance use, for example, tends to be persistent and the signs more likely to be observed by trained probation officers, the way in which a recent TBI and resulting neuropsychological dysfunction can undermine processes such as problem solving, attentional control, behavioural control, and emotional control (Garcia-Barrera et al., 2011), are probably less understood or appreciated. The symptoms of a TBI and neuropsychological deficits can masquerade as other problems, making it much harder for probation officers to link a history of TBI or poor current neuropsychological functioning with current behaviours. Probation officers have a lot of discretion in their application of responses (e.g., sanctions, warnings) for non-compliance, but the research regarding probation officers' perspectives on causes of non-compliance is limited, particularly in a New Zealand context. To understand how individual level factors such as TBI and neuropsychological functioning impact compliance, it is important to ask probation officers how they define, view causes and respond to non-compliance. Research suggests that incarcerated offenders with a history of TBI have more difficulty following prison rules as evidenced by increased behavioural infractions compared to those without TBI (Ferguson et al., 2012; Piccolino & Solberg, 2014; Shiroma, Ferguson, et al., 2010). It is feasible to speculate that adhering to a community-based sentence in tandem with other life obligations is taxing on neuropsychological functions, and a recent TBI has the potential to influence one's ability to meet their sentence obligations negatively (i.e., follow the rules).

When planning this thesis, the research into TBI, neuropsychological functioning and offenders did not include community sentenced samples. Recently, a study was published that explores the TBI histories and neuropsychological functioning within a community corrections sample, expanding the TBI research into community corrections (Gorgens et al., 2021). However, there are still important gaps in the research that need to be addressed to inform policy changes and practices. This thesis is a first step in answering some preliminary questions around the relevance of TBI and neuropsychological functioning to the management and compliance of individuals who serve supervised community-based sentences in New Zealand.

First, few researchers have explored how probation officers understand compliance and use discretion to respond to non-compliance (Jones & Kerbs, 2007; Slabonik & Sims, 2002). The literature suggests that probation officers play an important role in the compliance of a supervisee; however, probation officers' views on different causes of non-compliance and the supports they provide to supervisees have not been adequately explored in the literature and consequently, how probation officers define and respond to compliance is unclear (Ugwudike, 2013a). In addition, there is no research exploring New Zealand probation officers' perspectives on compliance issues. Therefore, study one in this thesis was designed to elicit probation officers' views on the causes of non-compliance and how they respond.

Second, both poor neuropsychological functioning and a history of TBI have been associated with poor corrections outcomes, but the research has mainly involved incarcerated samples. The research has not been sufficiently expanded to explore these factors in a sample of community-based offenders. Therefore, this thesis aims to fill these gaps by collecting the perspectives of probation officers on non-compliance, assessing the TBI and

neuropsychological characteristics of offenders<sup>6</sup> on community sentences and carry out research to explore the effects of TBI and poor neuropsychological functioning on outcomes for those serving community-based sentences.

### **Study one methodology**

How probation officers understand and work with people on community supervision sentences to enhance compliance

Study one is presented in Chapter three and aimed to obtain probation officers' perspectives on defining and responding to non-compliance. This study was used to inform the next phase of the thesis project involving supervisee participants. The study's objective was to understand the factors probation officers in New Zealand view as contributing to community-based sentence non-compliance amongst supervisees and their response. Probation officers have a critical role in considering, identifying, and responding to supervisees' needs, so it was important to obtain their views on supervisees' non-compliance before starting the next phase of the study. Assumptions about what probation officers might define as non-compliance and types of causes of non-compliance that might be discussed were derived from the existing literature related to typical sentence requirements and risk factors for recidivism and non-compliance.

The research questions for this study were (1) What chronic reasons, circumstances, needs do New Zealand probation officers identify contributing to non-compliance? (2) What are acute circumstances that lead to non-compliance? (3) How do New Zealand probation officers respond to non-compliance?

Probation officers were invited to participate in focus groups to answer the research questions. Focus groups were advantageous for two reasons: they allowed us to gather

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<sup>6</sup> Participants in this study were both community *only* sentenced offenders (i.e., probation) and offenders serving a community sentence following a term in prison (i.e., parole)

multiple probation officers' perspectives in a small amount of time and allowed the probation officers to have an open discussion on the topic of compliance which helps generate ideas and responses. In each group, probation officers were asked structured questions to elicit open discussions about how non-compliance is managed and the strategies deployed to increase compliance.

Thematic analysis was used to identify patterns or themes within the qualitative data to answer the research questions. Braun and Clarke's (2006) 6-step framework for thematic analysis was followed: 1) become familiar with the data 2) generate initial codes 3) search themes 4) review themes 5) define themes 6) write up the outcomes. The six-step method helped identify themes across the entire data set, capturing important patterns and coding information related to non-compliance from probation officers' perspectives (Braun & Clarke, 2006).

Participants were 17 probation officers from offices located in the central North Island of New Zealand. Ten probation officers attended the first focus group, and seven officers made up the second group. The majority of participants were women ( $n=14$ ), with only 3 participants identifying as men. The ethnic composition of the sample was approximately 88% ( $n=15$ ) New Zealand European, and 12% ( $n=2$ ) New Zealand Māori. Probation officers' years of experience in the role ranged from 6 months to 29 years ( $M=8.09$ ,  $SD=6.87$ ).

### **Study two methodology**

The current neuropsychological functioning, history of TBI and sentence compliance of a community-based sample.

Study two aimed to explore the relationship between current neuropsychological functioning, a recent TBI and sentence non-compliance. Study two is divided into two manuscripts that appear in Chapters four and five, respectively.

Chapter four focuses on the self-reported executive function and its association with compliance. The research questions for Chapter four are: 1) What is the self-reported executive functioning of individuals who served a criminal sentence in the community in comparison to a normative sample and, 2) is there was an association between executive functioning and compliance with community-based sentence conditions?

Chapter five presents the participants' self-reported history of TBI and current neuropsychological functioning while focussing on how a recent TBI is associated with current neuropsychological functioning and compliance. The research questions for Chapter five are: 1) is recent TBI associated with poorer neuropsychological functioning, 2) is there a relationship between recent TBI and community non-compliance, and 3) is there a relationship between neuropsychological performance and community non-compliance?

To answer these research questions, individuals supervised by probation officers (i.e., supervisees) were told about the study during routine report-ins with their probation officer. Those who were interested were introduced to the researcher and given an information sheet. Supervisees who volunteered to participate in an initial interview were asked to give written informed consent. As part of their informed consent, supervisees allowed the researchers to access and collect their criminal justice data and interview their probation officer regarding their compliance. During the initial interview, supervisees were asked questions regarding their demographic characteristics, psychosocial histories (e.g., substance use, mental health) and current sentence compliance. Supervisees were also screened for a history of TBI using the Ohio State Traumatic Brain Injury-Identification Screen (Bogner & Corrigan, 2009). At the conclusion of the interview, supervisees were invited to return and complete neuropsychological assessments. Sixty-four of the 106 interviewed returned and completed the neuropsychological tests. Following each supervisee's initial interview, their supervising



probation officer was interviewed about their sentence compliance, including obstacles to compliance and strategies the probation officer uses to manage the supervisee.

The supervisee's criminal history, risk scores, and compliance documented by the probation officer were also collected from New Zealand Corrections' electronic database, the Integrated Offender Management System (IOMS). Non-compliance information from probation officer notes and police records was collected for each participant over a 6-month period: typically three months before and three months after enrolment in the study. Any instance of non-compliance with sentence conditions, whether or not it resulted in formal action, was recorded, and the total instances of non-compliance with sentence conditions for each person was calculated. Any record of an arrest was also recorded as "non-compliant with the law."

#### **Chapter 4.**

Executive function in individuals who are compliant and non-compliant with the conditions of a community-based sentence

Chapter four describes the self-reported executive functioning of a community sentenced sample related to a normative sample and explores if supervisees' executive functioning is related to their compliance with sentence conditions. The executive functioning of the supervisee was assessed using the Behaviour Rating Inventory of Executive Function- Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005), an ecologically valid measure of nine domains of executive function.

For this study, we used both quantitative and qualitative analysis. Data, executive function scores and compliance variables were entered into SPSS 27 for statistical analysis. Differences between those supervisees who were compliant with their sentence conditions and those not were also assessed to determine if any co-variables for non-compliance existed. One of these variables included receiving additional supports to comply from a probation

officer. Probation officer interviews were coded for whether the probation officer reported using additional strategies to support the compliance of a particular supervisee.

The supervisee participants were men, primarily ( $n = 64$ ; 47 men and 17 women), and had a mean age of 37.42 years. The majority of the supervisee sample identified as New Zealand Māori 70% ( $n = 45$ ), 25% ( $n = 16$ ) supervisee participants identified as New Zealand European, and one each 5% ( $n = 3$ ) identified as Samoan, Indian, and Australian, respectively.

Twenty-four probation officers, mostly women ( $n = 24$ ; 5 men and 19 women), were interviewed about the supervisees who participated in the neuropsychological portion of this study. Probation officers were predominantly New Zealand European 75% ( $n = 18$ ), followed by New Zealand Māori 17% ( $n = 4$ ), and African 8% ( $n = 2$ ). Probation officers averaged three years and nine months in the role (range four months to 14 years). The number of supervisees on their caseload who participated in this portion of the study ranged from 1 to 12 ( $M = 2.46$ ,  $SD = 2.55$ ).

## **Chapter 5.**

### Traumatic brain injury, neuropsychological function and compliance

Chapter five explores the relevance of a recent TBI and current neuropsychological functioning to compliance with a community-based sentence. Our objective was to understand the history of TBI in individuals serving community-based sentences and explore whether a TBI within the last year was related to compliance (sentence conditions and the law) and neuropsychological performance. We examined if a more recent (as opposed to lifetime) TBI was related to poorer neuropsychological functioning and sentence non-compliance. Overall cognitive functioning was assessed using The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; Randolph, 1998) and two tests from the Delis Kaplan Executive Function System (Delis et al., 2001) were administered to assess

areas of executive functioning: The Color-Word Interference Test (CWIT) and The Comprehensive Trail Making Test (CTMT).

Data were entered into SPSS 27 to determine any relationships or associations between TBI in the last year, neuropsychological functioning and compliance. Additional analysis was undertaken to identify co-variables to enter into a regression model to predict non-compliance.

Participants ( $N = 106$ ) included 82 men and 24 women serving a community supervision sentence of 6 months or more. The samples mean age was 37.59 years. The sample predominately identified as New Zealand Māori 70% ( $n = 74$ ), New Zealand European 27% ( $n = 29$ ), Australian 1% ( $n = 1$ ), Indian 1% ( $n = 1$ ), and Samoan 1% ( $n = 1$ ).

**Chapter 3: Manuscript 1**

How probation officers understand and work with people on community supervision  
sentences to enhance compliance

### **Abstract**

This study aimed to explore, describe, and interpret New Zealand probation officers' insights into supervisees' non-compliance with community sentences. Seventeen probation officers participated in two focus groups. Probation officers viewed problems with cognitive skills as a key barrier to sentence compliance. They reported that these problems underpinned other factors linked to compliance, such as meeting basic needs and skill acquisition. Probation officers employed a number of 'social worker' oriented evidenced based strategies, including building high quality relationships and being flexible, along with modification of sentence requirements to increase supervisee compliance, especially with supervisees who faced considerable obstacles when engaging with a community sentence.

### **Key words**

Non-compliance; cognitive skills; probation officer perspective; offender supervision

## Introduction

In New Zealand, the Department of Corrections is responsible for the supervision of approximately 30,000 supervisees per year who serve community-based sentences. Probation officers are employed to monitor the supervisees' compliance with the sentence conditions ordered by the court or parole board. Community sentences have the dual purposes of rehabilitating and monitoring supervisees. Sentence conditions correspond with these objectives by including a mix of rehabilitative (e.g., anger management classes) and constraining (e.g., electronic monitoring) elements. Probation officers have discretion in responding to compliance issues, including situational barriers that substantially increase the risk of non-compliant behaviors despite a supervisee's motivation to be compliant or commitment to change (Braithwaite, 2003; Robinson & McNeill, 2008). However, the perspective of probation officers who monitor, manage, and support these sentences, on the factors that contribute to non-compliance has been largely overlooked. Therefore, we explored how probation officers understand and respond to non-compliance, to provide more clarity about the situational contexts that contribute to non-compliance with community sentences.

Distinct types of community sentence compliance have been proposed by both Bottoms (2001) and Robinson and McNeill (2008). Bottoms (2001) distinguished between compliance where supervisees adhere to all conditions of their sentences: referred to as "short-term requirement" compliance, and actual desistance from crime, referred to as "longer-term legal compliance". Robinson and McNeill (2008) expanded on Bottoms' work by further dividing short term, or sentence compliance into two sub categories—formal vs. substantive compliance—to represent the minimum level of behavior needed to comply with the "letter" of the sentence, and behavior demonstrating active engagement in change respectively. Often the causes of non-compliance can be related back to a supervisee's

dynamic risk factors such as attitudes, associates, and substance use (Bonta & Andrews, 2016). Nevertheless, non-compliance is also driven by chronic issues such as the supervisee's chaotic lifestyle or inability to effectively manage a host of personal problems (Deering, 2010; Farrall, 2002; Hucklesby, 2009; Ugwuodike, 2013a), and not having access to basic needs, such as reliable transportation (Garland et al., 2011; Luther et al., 2011) or stable housing (Herbert et al., 2015). Similar to police officers and custodial correctional officers who use discretion when enforcing laws and rules (Goldstein, 1963; Haggerty & Bucerius, 2020), probation officers have the authority to use discretion when deciding how they will respond to a supervisee's non-compliance (Jones & Kerbs, 2007). Thus, probation officers are responsible for discerning the causes and motivations for non-compliant behaviors; in turn, their perceptions of the behavior and its causes guide their response (e.g., do nothing, give a verbal warning, impose sanctions, or initiate a formal breach). Therefore, at the center of supervisees' compliance with community supervision are not just their own decisions and actions, but also the strategies probation officers employ when responding to their behavior, potentially leading to better or poorer compliance with sentence conditions (Robinson & McNeill, 2008).

The compliance literature tends to focus on three areas: why people comply (Nellis, 2006), how to encourage people to comply (Hughes, 2012; Sloas et al., 2019), and the impact of enforcement techniques on compliance outcomes (Boone & Maguire, 2017; Mowen et al., 2018). It is understood that compliance is often not static, but can change depending on a number of factors like motivation, individual level characteristics and supervision techniques (Boone & Herzog-Evans, 2013; Boone & Maguire, 2017; Bottoms, 2001; Hucklesby, 2009; Robinson & McNeill, 2008). For instance, enforcement responses to non-compliance that are viewed as lacking legitimacy by the supervisee may promote further non-compliance (Boone & Maguire, 2017; Robinson & McNeill, 2008). Research involving probation officers has

traditionally focused on how probation officers view their job (Annison et al., 2008; Epperson et al., 2014; Van Deirse et al., 2018), their attitudes toward their role (e.g., law enforcer or social worker) and to offenders (Schaefer & Williams, 2018; Steiner et al., 2011; Whitehead & Lindquist, 1992), and elements of supervisory practice (Grant & McNeill, 2014; Hughes, 2012). Research on probation officers' view of the causes of non-compliance has uncovered that probation officers identify practical obstacles to compliance (e.g., childcare and transport problems) and use various strategies in response to support compliance, such as offering flexible appointments, reminding supervisees to attend appointments and making home visits (Ugwudike, 2010).

Other studies focused on incarcerated populations re-integrating into society following imprisonment have offered probation officer insights into compliance with a supervision sentence. In phone interviews, Brown (2004, p. 4) asked 74 probation officers "what [do] parolees need to succeed in the first 90 days post release?" Common responses related to basic needs such as food, housing, and transportation. Other responses included problem solving skills, employment assistance, and insight into problems (Brown, 2004). Gunnison and Helfgott (2011) mailed surveys to 132 probation officers with a list of factors supervisees could encounter in the community that could impact successful re-entry. The most common factor, chosen by 90% of probation officers, was unemployment, followed by anti-social peers (88%), crime ridden neighborhoods (70%), and poor family support (70%;Gunnison & Helfgott, 2011). However, use of a survey limits the amount of information or detail probation officers can add to our understanding of the situations that hamper an individual's re-entry. For example, substance use, a factor shown to significantly impact community sentence compliance outcomes (DeLisi et al., 2021), was not included in the survey's pre-selected options, though it was the most common free text response.



Despite the current literature on the topic, how probation officers define and respond to compliance remains unclear (Ugwudike, 2013a), particularly in New Zealand, where no research on probation officers perspective has been undertaken. It seems to us that a fully formed understanding of community-based sentence compliance includes the perspectives of probation officers on the chronic and acute causes of non-compliance. Therefore, this study seeks address this gap in knowledge by describing probation officers' perspectives of the underlying mechanisms that lead to supervisees' non-compliance, and the strategies these staff employ to manage non-compliance.

### **Method**

The study was approved by the Human Ethics Committee at the University of Waikato (Ethics Approval Reference Number is HREC[Health] 2018#61), and by the New Zealand Department of Corrections. This study is part of a larger academic research study regarding community-based compliance.

Probation officers were recruited from three community probation offices in New Zealand. Approximately 114 probation officers were invited to volunteer for the study via an email from the regional manager. The regional manager sent out two times and dates for the groups and probation officers who were available could volunteer. Seventeen probation officers chose to participate, including 14 women and 3 men. The ethnic composition of the sample was approximately 88% ( $n= 15$ ) New Zealand European, and 12% ( $n= 2$ ) New Zealand Māori. Probation officers' years of experience in the role ranged from 6 months to 29 years ( $M= 8.09$ ,  $SD= 6.87$  ). Two focus groups were conducted, each in a staff meeting room at two of the probation offices. Prior to participating, participants read an information sheet and were asked if they had any questions, then signed a consent form. Ten probation officers attended the first focus group and seven officers made up the second group.

Probation officers supervised individuals on parole orders following imprisonment, and individuals who were sentenced to community supervision following a conviction.

The first author led and moderated each of the focus groups. Participants were asked three open-ended questions: (a) What are some of the reasons or needs supervisees present with that contribute to non-compliance? (b) What are some of the causes or triggers you think contribute to the sudden non-compliance? (c) How do you deal with different types of non-compliance? When further clarification was necessary or a discussion needed to be expanded on, the moderator prompted the participants to expand on their responses. Focus groups lasted approximately 60 minutes each. Each session was audio recorded. The first author transcribed each session, and the second author reviewed the audio recording and transcription to ensure accuracy.

### **Data analysis**

Thematic analysis was used to analyze the responses to the three questions. We used the six-step method for thematic analysis outlined by Braun and Clarke (2006) to identify themes across the entire data set, capturing important patterns and coding information (e.g., causes, triggers, and strategies) related to non-compliance from probation officers' perspectives. Co-authors reviewed the analysis, checking the themes and codes for consistency. This strategy has been used in previous qualitative investigations using focus groups to obtain correctional staff perceptions and observations of offender behaviors (see Atkinson & Mann, 2012).

### **Results**

The following results describe probation officers' experiences with supervisees on community sentences in New Zealand. Themes and example referential quotes from probation officers are presented to exemplify probation officer's perceptions of the chronic

and acute causes of a supervisee non-compliance, and the strategies they employ to increase compliance or respond to non-compliance.

### **Chronic issues/conditions that facilitate non-compliance**

Analysis identified eight key themes characterizing chronic factors that contributed to offender non-compliance (see Table 1).

#### **Basic needs.**

The stability that meeting basic living needs—and having the skills to do so—brings to an individual's life was seen by probation officers as an essential component to successful compliance with a community sentence.

*PO8: 'First, they need their immediate needs met so they have some stability in their lives; income, housing, transport.'*

Probation officers recognized that many of their supervisees struggled to maintain consistent childcare or reliable transportation in an area with little public transport. Supervisees who otherwise were motivated to set and meet prosocial goals struggled to comply at times.

*PO10: 'Things like paying their bills so their car isn't repossessed or having enough money to catch the bus in.'*

#### **Lifestyles.**

Lifestyles that lacked structure or were chaotic made compliance a difficult endeavour. Successful management of a community sentence was thus challenged by homelessness and unstructured lives.

*PO3: 'I think too, their lifestyles, they are at crisis themselves, they are in the middle of that chaos, that unstructured lifestyle they have.'*

Probation officers recognized that substance use leads to non-compliance through a variety of pathways. Drug abuse was a recurring code in this theme, and a topic that was

brought up often throughout the discussions, because it was viewed as contributing to a chaotic lifestyle, personality changes, and lack of accountability.

*PO12: '[drugs] can alter their mood considerably from being focused and onto it to totally unfocussed, aggressive, non-aggressive, they are just all over the place.'*

On the other hand, lifestyles that could be characterized as structured and pro-social also presented issues for compliance. Conflicting pro-social personal obligations, mainly employment, were recognized by probation officers as a competing factor that often won over any obligation to corrections.

*PO2: 'Employment as well, again prioritizing other obligations above their sentence requirements.'*

### **Cognitive skills.**

Of the eight themes, cognitive issues generated the most discussion. Probation officers emphasized the importance of a variety of cognitive skills that supervisees needed to self-manage and be successful, including being able to meet their basic needs and develop new daily living skills. Probation officers believed that some offenders were just not capable of complying with certain conditions of their sentence due to not having the cognitive skills required to do so. Difficulties could show up from sentence induction onwards.

*PO3: 'Cognitive functioning for her, it was cognitive functioning full stop, she had been that way since she was 5.'*

*PO3: 'Understand what has been taken in and what is required and being able to comply with it.'*

Probation officers recognized that pre-existing conditions resulting from past injuries, or pre-existing diagnoses contributed to how well the supervisee could function, and in turn comply with a community sentence. Probation officers discussed their experiences with supervising individuals who have histories of traumatic brain injuries (TBI) with ongoing

cognitive and behavioral consequences, explaining that compliance with the sentence was nearly impossible without additional support from the probation officer.

*PO1: 'He [supervisee with a TBI] saw his doctor at ten [am] and told her he was coming straight to me, and between the doctor's room and my office he got distracted and went somewhere else, with someone else. It is that memory and easily distracted.'*

*PO12: '...he had actually been hospitalized and had a recent head injury... If you are living in a world that you just can't understand or a world that you just can't get a grip of you are going to get more increase of frustration, anger.'*

### **Skill deficits.**

In addition to lacking some necessary cognitive skills probation officers observed other skill deficits that they perceived made compliance with community sentences more difficult. The most frequent comments that came under this theme were communication skills. Probation officers really stressed the importance of a supervisee having and utilizing communication skills, along with time management skills, and other basic skills.

*PO8: 'Some of these sentences we are managing just risk, because there is an inability to actually involve them in the rehabilitative side... Because the skills they need are so void there is no starting point.'*

The ability to engage coping strategies to manage emotions in social settings was also described by a few probation officers as a necessary skill; supervisees who lacked coping strategies often struggled to deal with the stressors that a community sentence presented. An inability to cope often led to other issues that interfered with complying with conditions.

*PO12: 'They are going to spiral because they can't cope with it.'*

Some supervisees were noted to have become institutionalized. Probation officers suggested that supervisees who had all their basic needs met in prison may have lost the skills

necessary to live independently and thus would purposefully commit offenses or violate their conditions.

*PO3: 'He wasn't coping and robbed the bank... it is the fear of coming back into the community sometimes.'*

Probation officers also described literacy as contributing to non-compliance.

*PO7: 'Even things like literacy becomes a barrier, especially if it's not identified.'*

### **System constraints.**

Although staff made frequent use of flexibility within the system to support supervisees' compliance, they also saw the system as sometimes creating its own challenges to supervisees' ability to comply. For example, probation officers noted that sometimes a supervisee and a probation officer are unable to build a high quality relationship that could lead to enhanced compliance, but it was not always possible for the supervisee to change probation officer in these instances.

*PO10: 'Personality clashes. Sometimes some people just don't get on so they try to mix them around, but there are only so many probation officers you can put them around.'*

Lack of access to mental health services was also reported as a significant systems barrier for supervisees' compliance.

*PO4: 'We have, barriers, gaps in the community as well. Community mental health (access) is a huge gap for us...the offenders are not getting anything out of this [supervision sentence] because we are missing a vital part of their rehab.'*

### **Relationship dynamics.**

Supervisees' relationships with people who were unsupportive—particularly of their sentence requirements—could be an impetus for non-compliant behaviors.

*PO1: '...their bosses say we want you doing this so their priorities go that way.'*

Involvement in an intimate relationship where the supervisee was a victim of controlling or violent behaviors was another reported source of non-compliant behaviors (e.g., not reporting in, or consuming substances).

*PO13: 'Victims will fail to report or report in only with a partner... I have had some who failed to report and failed to talk without their partners...'*

### **Mental health problems.**

Probation officers observed symptoms of mental disorder as an obstacle to successfully engaging in a community sentence, particularly when system constraints make access to mental health services difficult. For example, supervisees with a diagnosis of schizophrenia could be destabilized by medication changes upon release from prison, or a supervisee with a social phobia couldn't engage with group treatment conditions. In some cases anxiety and depression disrupted compliance.

*PO7: 'You get people with anxiety disorder that just can't cope with coming in or going to community work.'*

Concurrent and long-term consequences of family violence dominated conversation related to the mental health theme. Probation officers noted that post-traumatic stress disorder (PTSD), depression, and anxiety symptoms attributed to family violence created a substantial constraint to supervisees' functioning on sentence.

*PO16: '... you come across a lot of PTSD...when you got stuff like [family violence] and got counseling for sexual abuse. For them it is just everything, and they really don't mean to miss [reporting in] at that point, and they can get really upset that they have, but it is all just piling on top of them.'*

### **Attitudes.**

An anti-social or negative attitude towards probation and accountability to the sentence imposed could lead to low motivation to comply with sentence conditions. For

some, this attitude was part of a wider sense of entitlement, where reporting was seen as an inconvenience, and rules more generally did not apply to them.

*PO3: 'Sense of entitlement. It's basically just like no that doesn't fit with my schedule, you work around me.'*

On the other hand, some supervisees were indifferent to the negative consequences of non-compliance.

*PO17: 'Anti-social attitudes. There is an attitude there that they just don't care about the consequences.'*

Finally, probation officers mentioned that some supervisees did not view themselves as having agency over complying with their sentence. They blamed other people rather than themselves, or—due to bad previous experiences with probation—believed that the system was set up against them.

*PO3: 'I suppose ownership too, it is everyone else's fault. Not my fault, they just don't, it is the system, everyone gangs up on me, not my fault.'*

### **Acute circumstances that lead to non-compliance**

Four themes were identified that described probation officers' perspectives of acute events that triggered non-compliance for supervisees who had otherwise been compliant with their sentence (Table 1). All of the themes, with the exception of 'losses', mirrored those in the section describing chronic causes of non-compliance, emphasizing the deleterious impact some circumstances could have on a supervisee's ability to comply with sentence conditions.

#### **Losses.**

Losses inhibited supervisees' ability to engage with their probation officer and their conditions. Whereas chronic housing or employment problems could be a *basic need* that created ongoing problems with compliance (see above), a sudden loss of housing,



employment or someone from their support system functioned as a catalyst for non-compliance in formerly compliant people.

*PO5: 'Well their lives starts to go chaotic, where they once had structure with employment, they now have no need to get up in the morning. It's simple.'*

Relationship breakdowns or the loss of significant social supports also affected a supervisee's compliance. The most influential losses revolved around the death of an immediate family member (e.g., partner, parent, child) which rendered obligations to probation no longer a priority; typically their motivation extinguished as a result.

*PO8: '[when] key support people have left them, quite often we see them fallen flat.'*

Coping with suicide by individuals in the supervisees' life was also identified as a significant trigger for loss of focus and disengagement with probation.

*PO14: 'Suicide is a biggie that trigger people really quickly. They start going down the what ifs and like you say their focus just goes that way...'*

### **Social.**

Otherwise compliant supervisees could become non-compliant in the face of abrupt changes in their social environments, such as family issues.

*PO4: '...his partner who [took off], they have a tribe of kids... it leaves it down to him and he works really long hours.'*

Another example was changes in associations with anti-social peers, whether that was being patched into a gang which then gave them new obligations, or an old anti-social peer re-emerging, resulting in attitude changes. As previously described, ongoing intimate partner violence was seen by probation officers as a reason for chronic non-compliance with sentence requirements, and IPV was also identified as a cause for acute non-compliance.

*PO6: '...this lady (who had been compliant the entire sentence) was non-compliant with her sentence... the PO went around to see her, and the look on her face and her*

*ex-partner was in there, he actually had her in the garage, and wouldn't let her out, basically kidnapped her...'*

### **The system.**

A forced change in the probation officer managing the sentence, often due to staff changes (e.g., staff leaving position) could have two effects: (a) reduced supervisee motivation to comply, stemming from a negative emotional reaction associated with their developmental experiences of chronic instability in support people, and (b) loss of the relationship-based accommodations the previous probation officer may have put in place to support compliance.

*PO3: 'Sometimes they have abandonment issues with that type of stuff. Because you might be the one stable thing in their life, and suddenly there is a big switch, somebody else is coming in they might be just as good as a PO but it is the emotional impact it has on the offender.'*

*PO3: '...one PO is doing it this way another [PO] is doing it that way... this one [the initial PO] was flexible with reporting and this one [the new PO] has taken a harder line... and suddenly the barrier goes up, they don't want to comply with that one [new PO]'*

The requirements of the sentence were described by probation officers as an impetus for non-compliance through a number of pathways. Supervisees' inflexibility in adapting to changes in requirements, or confronting past traumas in treatment consequently obstructed their compliance. Supervisees who have been released from prison had the additional burden of re-integrating into society. These extra responsibilities of finding housing and income compounded with potentially other issues (e.g., social, mental health, cognitive) interfered with obligations to corrections. Those who were overwhelmed and could not cope effectively had a more difficult time with compliance.

*PO12: 'And the stress involved with working with agencies as well, with work and income[WINZ], housing issues, they can all impact and send people into a lower spiral because they're not used to doing that.'*

### **Physical and mental health.**

Those serving community sentences get sick, have mental health episodes, and are faced with sudden serious medical issues. Probation officers understood that these events were a part of life. But non-compliance could occur as a result of not communicating with probation, or being unable to cope with an additional stressor.

*PO15: '...any amount of external or internal factors can throw someone into a low mood and that depression or anxiety sets in and that is quite huge.'*

Probation officers described that in their experience sudden health issues also resulted in non-compliance with community sentences because of the changes to supervisees' lives. Recent head injuries or a cancer diagnosis left some supervisees no longer capable of fulfilling their sentence requirements.

*PO16: 'I have a guy at the moment who was incredibly compliant with his community work then he had a brain injury, two[head] injuries... and is incapable of doing community work...'*

Additionally, probation officers pointed to drug or alcohol relapse as a trigger for non-compliance: not surprising as substance dependence was noted as a significant chronic barrier to compliance with community sentences because of the power substance use can have over the structure of a supervisees' life.

### **Probation officers' responses to supervisee's non-compliance**

Our analysis identified five key themes that constituted the central strategies probation officers used when faced with a non-compliant supervisee (see Table 1). These themes reflect their dual roles of sentence enforcement and support with desistance.

Probation officers described their strong commitment to helping supervisees achieve compliance and build prosocial lives. When and how each of the available strategies was deployed was ultimately dependent on both the supervisee and the probation officer, and therefore also dependent on how the probation officer conceptualized the contributing causes to the supervisee's non-compliance.

*PO6: 'I think dealing with non-compliance, it depends on the offender.'*

*'And I think it depends on the PO, it comes down to your professional decision making.'*

*PO3: 'So, there are a lot of different ways to address the non-compliance, it could be just as simple as a discussion or you might be writing to [the] parole board...It really just depends on the situation.'*

### **Prompting compliance.**

Probation officers prompted supervisees about sentence conditions to increase their compliance. Probation officers made a lot of effort to ensure that their supervisees were aware of when they need to report or when they need to be at a program appointment. It was a common practice among all interviewees to use text message prompts, print out schedules to give to supervisees, and put appointments in the supervisees' calendars or diaries.

*PO14: 'We will send text reminder, phone them.'*

*PO1: '...print out their reporting schedule and place it on their refrigerator during a home visit.'*

### **Brief interventions.**

Probation officers have been trained to do brief interventions to support desistance, and these were used to enhance engagement with sentence compliance.

*PO8: 'Some of our strategies is to use motivational interviewing, build the self-esteem up, and work with that as a building block.'*

**Using the system.**

The codes that underpinned this theme were a variety of actions probation officers had available to them: verbal or written warnings, seeking to lay new charges (e.g., for breaching the sentence), and modifying the sentence requirements. Punitive responses to enhancing compliance ranged from verbal warnings—usually for a minor issue occurring for the first time—to completing an application to have a parolee recalled to prison.

*PO11: 'We might recommend imprisonment with no release conditions. Get straight out of the system.'*

Probation officers also went through 'official channels' when it became clear that a particular sentence was difficult for supervisees to comply with (i.e., they could not comply with their sentence), or that outcomes might be improved with a modification. In these cases, the staff member can request that the parole board or sentencing judge cancel the sentence, or modify it.

*PO12: '...if you are doing the work and have evidence that this is an individual is not able to complete the sentence...you can go back to court and have the end date of that sentence varied.'*

*PO16: 'He got a brain injury now and is incapable of doing community work so it is back to court to get those last thirteen and half hours cancelled.'*

*PO7: 'In some cases the home detention... knowing that this person is going to struggle with being locked down 24/7, so going on we need him to have some community work so that we can get him out...'*

**Developing high-quality relationships.**

Probation officers described dedicating a lot of time and effort to building a high-quality relationship with supervisees in order to engage them in fulfilling the sentence conditions. It was obvious that probation officers wanted their supervisees to succeed. To

support success, they made efforts to establish a high-quality relationship with the supervisee through rapport building (e.g. conversations, genuineness, encouragement, active listening, being flexible).

*PO3: '[supervisees] are really overwhelmed and quite surprised about how rehabilitative we are now and how we are more supportive and how willing we are to work with them. And that is quite encouraging to see that from them, and that is a little buy in for that relationship building.'*

### **Flexibility.**

Probation officers reported being flexible when working with supervisees to ensure that supervisees had the best opportunity to be compliant with their sentence conditions. This theme reflected the diverse ways in which staff worked to accommodate supervisees in order to enhance compliance. Common strategies included coordinating locations or times or schedules in order to make reporting more convenient for the supervisee. Probation officers also used discretion to address factors they thought would give supervisees extra chances to be successful: for example, by re-inducting supervisees later in their sentence, to remind them what their requirements were, or staggering implementation of sentence conditions.

*PO2: 'Often times we bend over backwards to ensure that they have every chance to comply.'*

Table 1. Themes and codes describing probation officer's perspectives on issues related to non-compliance

Themes	Codes
<b>Chronic issues/conditions that facilitate non-compliance</b>	
Basic needs	Food issues; Access to transport; Access to childcare; Phones; Housing; Money
Lifestyles	Homelessness; Unstructured lives; Substance dependence; Other obligations

Cognitive skills	Memory issues; Attentional issues; Inability to manage self; Unable to problem-solve; Inability to learn new skills/strategies; Difficulty with planning and organizing
Skills deficits	Coping strategies; Life skills; Communication skills; Literacy
System constraints	Probation officer relationship; Access to mental health services; Risk level of supervisee
Relationship dynamics	Lacking social support; Gang involvement; Interpersonal partner abuse
Mental health/substance use	Impulsivity; Low self-esteem; Anxiety; Depression; PTSD; Addiction
Attitudes	Anti-social attitudes; Entitlement; Negative attitude toward probation; Lack accountability; Resistant to certain topics; Jail is not a consequence
<b>Acute issues/circumstances that lead to non-compliance</b>	
Losses	Loss of a support person; Suicide; Death in family; Employment; Housing
Social	Anti-social associates; Family issues; Interpersonal partner abuse
The system	Change of probation officer; Working with different agencies; Sentence requirements
Physical/mental health	Unwell physically (i.e., sick); Sudden serious medical issue; Relapse on drugs; Mentally unwell
<b>Strategies probation officers use to respond to supervisees' non-compliance</b>	
Prompting compliance	Using technology (e.g., texts); Doing home visit; Put reminders in the supervisees' environment
Brief interventions	Teach strategies; Challenge behaviors; Motivational interviewing
Using the system	Warnings; Breach; Involving courts or parole board; Varying sentence or conditions; Utilizing external agencies

Developing high quality relationships	Having conversations with the supervisee; Being flexible (see below); Giving them chances; Encourage compliance; Providing help and assistance
Flexibility	Using discretion; Removing barriers to compliance; Setting them up to comply; Trying something different

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### Discussion

This study used thematic analysis to explore probation officers' reported experiences with non-compliant supervisees: specifically their view on the underlying mechanisms that lead to supervisees' non-compliance. We also described the strategies probation officers employed when responding to non-compliant acts. Chronic issues that probation officers noted as hindering a supervisee's compliance included lacking basic needs, social dynamics, mental health symptoms or substance dependence, skill deficits, cognitive problems, unstructured lifestyles or competing pro-social obligations (e.g., employment), system constraints, and anti-social attitudes. Themes from the acute causes of non-compliance mirrored the chronic issues: system constraints, mental health, substance use, and social dynamics caused otherwise compliant supervisees to suddenly become non-compliant. The theme of 'losses' was the only theme for acute causes of non-compliance that did not mirror a chronic cause. Strategies probation officers employed to increase compliance or respond to non-compliance included prompting compliance (e.g., text messages), using the system, building high-quality relationships, brief interventions, and flexibility.

Probation officers recognized that causes of non-compliance can be traced back to anti-social attitudes, criminal thinking patterns, and intentional disregard for obligations to corrections; however, there was consensus that circumstances—often out of the control of the supervisee—also led to non-compliance. This view is consistent with compliance scholars, who have noted that non-compliance with sentences can be the result of the life



circumstances in which supervisees' find themselves regardless of their commitment to compliance (Robinson & McNeill, 2008), not a lack of motivation to comply. In fact, previous research suggests that a more rehabilitative sentence strategy, characterized by flexibility and discretion, is more likely when a judge or probation officer knows more about a supervisee's circumstances and abilities (Bracken, 2007; Hughes, 2012). Probation officers in New Zealand described barriers to successful completion of a community sentence that were consistent with previous research; not meeting basic needs (Luther et al., 2011; Travis et al., 2001), being institutionalized (Petersilia, 2004), lacking social supports (Denney et al., 2014), and substance use (Gunnison & Helfgott, 2011; Scott et al., 2014). However, the probation officers in the current study also identified poor cognitive skills as contributing to non-compliance. They suggested that poor cognitive skills were linked to a number of the barriers to supervisees' ability to comply with their sentence, including meeting basic needs, skill acquisition, and engagement with sentence conditions.

The ability to learn daily living skills or new strategies to manage responsibilities (e.g., time management, planning, organizing, communication, coping) was an issue discussed among the probation officers; the lack of cognitive skills was a significant barrier needed to formulating new pro-social patterns that can increase compliance. The novelty of needing to schedule requirements into their lives was a challenge, but probation officers suggest that these deficits in rudimentary self-management skills persist for some supervisees because of deficits in cognitive skills (e.g., planning, organizing, task monitoring, memory). In fact, some supervisees engagement with their sentence was difficult because they simply were not able to learn or remember the conditions with which they were expected to comply. Probation officers agreed that some supervisees were just not able to comply due to limited cognitive skills, whether they had not yet learned certain skills, such as problem-solving and planning/organizing, or had acquired them earlier in life, but then subsequently lost them as a

result of a brain injury. Regardless of the source, probation officers considered poor cognitive skills as a pivotal cause of non-compliance for some supervisees.

Individuals who commit criminal offenses are exposed more than the general population to circumstances that are often associated with decreased neuropsychological functioning, such as substance use (James, 2004; Staton-Tindall et al., 2011), mental health problems (Prins, 2014), and traumatic brain injury (Durand et al., 2017). Neuropsychological deficits significantly associated with re-convictions include deficits in planning, mental flexibility, problem solving, visual memory and inhibitory control (Meijers et al., 2017; Ouimet et al., 2007; Roszyk et al., 2013; Seruca & Silva, 2015). Our findings suggest that probation officers identified a number of these same cognitive deficits—planning, problem solving, and memory—as contributing factors for non-compliance with community sentences as well. Neuropsychological dysfunction is an important responsibility issue (Bonta, 1995; Bourgon & Bonta, 2014), which potentially denies the supervisee an opportunity for successful sentence compliance or rehabilitation through a number of different pathways including lack of skill development, inability to meet basic needs, and inability to secure employment. Nevertheless, the impact neuropsychological issues potentially have on community sentence outcomes has been overlooked in the compliance literature. This study suggests that the supervisees' cognitive capabilities are clearly at the forefront of New Zealand probation officers' minds when engaging a supervisee in the sentence and deciding on what strategies to employ when responding to non-compliance.

Strategies mentioned by our participants are consistent with the literature that has reported the use of professional discretion, relational skills, reminding supervisees of appointments, and being flexible (Bracken, 2003; Grant & McNeill, 2014; Raynor et al., 2014; Trotter & Evans, 2012; Ugwuodike, 2010) when responding to non-compliance. However, participants in this study also discussed the use of the 'system' to promote

compliance. Requesting variation in the sentence length or discerning when and what conditions to require of the supervisee at different points in the sentence allowed probation officers to better support the compliance of a supervisee, particularly those with poor cognitive skills. Probation officers acknowledge that they need to be realistic about what their supervisees can achieve when setting goals and collaborating on outcomes (Grant & McNeill, 2014; Hughes, 2012), and our study expanded on this recognition by identifying ways in which probation officers use the discretion they have and the sentencing options they can request to create achievable goals for supervisees who do not have the abilities to fully engage with sentence requirements. Notwithstanding this flexibility, probation officers reported that decision making around non-compliance is, first and foremost, based on the risk level of the supervisee; serious action (e.g., breach actions, formal sanctions) is often taken when a supervisee has a high-risk level; the priority is the safety of the community and reducing harm to others. However, for those other supervisees whose risk level does not meet a certain threshold—the exact threshold was not specified—probation officers were able to use more evidence-based practices, such as being flexible to meet a specific client’s needs (Gannon & Ward, 2014).

In some jurisdictions, probation officers have been reported to take a more surveillance or law enforcement approach to supervising offenders, due to agency policies or sentence restrictions (Purkiss et al., 2003; West & Seiter, 2004). The discussions from these focus groups indicate that probation officers in New Zealand currently adopt the hybrid approach of law enforcer and social worker (Klockars, 1972), a trend in community supervision aimed at reducing prison populations and implementing more evidence-based practices (Cullen & Gendreau, 2000; Grattet et al., 2018). For example, probation officers described being able to use professional discretion, often choosing to be flexible and client centered in their response to non-compliance. However, probation officers described taking a

more law enforcement approach in response to high-risk supervisees' non-compliance. With high-risk supervisees probation officers utilized punitive strategies or increased restrictions (e.g., formal sanctions, breaches, return to custody) to manage non-compliance. Ultimately, when and how each of the available strategies discussed by the probation officers in this study were deployed was dependent on both the supervisee and the probation officer, and therefore (if the risk level allowed) also dependent on how the probation officer conceptualized the contributing chronic and acute causes to the supervisee's non-compliance.

The findings from this study fill a gap in the compliance literature by being the first to detail probation officers' insights into the ways cognitive issues impact individuals' compliance when serving community sentences: identifying that poor cognitive skills are observed as being a potential reason for non-compliance, and probation officers employ various strategies to reduce non-compliance for these supervisees, including putting an application to court for a sentence reconsideration. Probation officers were mindful that a number of obstacles to compliance that have nothing to do with criminality existed for their supervisees. This is consistent with previous research that suggests non-compliance with sentence conditions is not always deliberate or intentional, but can be a result of chaotic lifestyles, substance use, poor planning or practical problems such as lack of transportation (Denney et al., 2014; Hucklesby, 2009; Weaver et al., 2020). Even supervisees who were committed to desisting from criminal behaviors still struggled to comply with their sentence conditions due to cognitive or skill deficits. Additionally, this study suggests that probation officers in New Zealand demonstrate high levels of awareness and skill in the ways that they adapt their practices and responses based on the individual in front of them, providing additional supports to those they identify as having difficulties with meeting the requirements of the sentence.

### **Study strengths and limitations**

This is the first focus group study to investigate probation officers' views of non-compliance, to identify the chronic and acute reasons for non-compliance, and to document probation officer responses. The use of a focus group allowed us to unravel important information regarding how non-compliance is interpreted by and responded to by probation officers, advancing the literature beyond probation officers acknowledging that basic needs, employment, and substance dependence impact successful re-entry (Brown, 2004; Gunnison & Helfgott, 2011).

For a number of reasons our results cannot be generalized to all probation officers. For one, the sample size is small, and only includes staff from a small area of New Zealand. Second, the behavior of probation officers is determined in part by legislation and local and national policies and practices. For instance, the ability to request a modification of a sentence may be an available strategy in some jurisdictions and not others. Also, some communities potentially present more obstacles to compliance for supervisees; for instance some communities have no public transportation or have minimal mental health support services, while others may be better resourced.

### **Future research**

Many of the skills probation officers mentioned as important to successful completion of a supervision sentence included behavioral and cognitive skills. Future research should investigate whether neuropsychological deficits and the potential sources (e.g., head injuries) of these deficits are associated with increased risk of non-compliance with sentence conditions and the law. Additionally, probation officers revealed they provide additional supports by means of text reminders or home visits or varying the sentence to decrease non-compliance. Future research should investigate whether probation officers' recognition of their supervisees' cognitive skills deficits affects the support they offer.

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## References

- Annison J, Eadie T and Knight C (2008) People first: Probation officer perspectives on probation work. *Probation Journal* 55(3): 259-271.
- Atkinson DF and Mann RE (2012) Prison officers as observers of offence paralleling behaviours: An untapped resource? *The Journal of Forensic Psychiatry & Psychology* 23(2): 139-155.
- Bonta J (1995) The responsivity principle and offender rehabilitation. *Forum on Corrections Research* 7(3): 34-37.
- Bonta J and Andrews DA (2016) *The Psychology of Criminal Conduct*. Oxfordshire: Taylor & Francis.
- Boone M and Herzog-Evans M (2013) Decision-making and offender supervision. In: McNeill F and Beyens K (eds) *Offender Supervision in Europe*. London: Palgrave Macmillan, 51-96.
- Boone M and Maguire N (2017) *The enforcement of offender supervision in Europe: understanding breach processes*. Oxfordshire: Routledge.
- Bottoms A (2001) Compliance and community penalties. In: Bottoms A, Gelsthorpe L and Rex S (eds) *Community penalties: Change and Challenges*. London, Willan: Cullompton, 87-116.
- Bourgon G and Bonta J (2014) Reconsidering the responsibility principle: A way to move forward. *Federal Probation* 78(2): 3-10.
- Bracken D (2003) Skills and knowledge for contemporary probation practice. *Probation Journal* 50(2): 101-114.
- Bracken DC (2007) Risk management and/or punishment in the community: Supervising conditional sentences. *British Journal of Community Justice* 5(2): 71-82.
- Braithwaite V (2003) Dancing with tax authorities: Motivational postures and non-compliant actions. *Taxing Democracy* 3: 15-39.
- Braun V and Clark V (2006) Using thematic analysis in psychology. *Qualitative research in psychology* 3(2): 77-101.
- Brown JD (2004) Managing the transition from institution to community: A Canadian parole officer perspective on the needs of newly released federal offenders. *Western Criminology Review* 5(2): 97-107.
- Cullen FT and Gendreau P (2000) Assessing correctional rehabilitation: Policy, practice, and prospects. *Criminal Justice* 3: 109-175.
- Deering J (2010) Attitudes and beliefs of trainee probation officers: A 'new breed'? *Probation Journal* 57(1): 9-26.
- DeLisi M, Drury A and Elbert M (2021) Who are the compliant correctional clients? New evidence on protective factors among federal supervised releases. *International Journal of Offender Therapy and Comparative Criminology* 65(13-14): 1536-1553
- Denney AS, Tewksbury R and Jones RS (2014) Beyond basic needs: Social support and structure for successful offender reentry. *Journal of Quantitative Criminal Justice & Criminology* 2(1): 39-67.
- Durand E, Chevignard M, Ruet A, et al. (2017) History of traumatic brain injury in prison populations: A systematic review. *Annals of Physical and Rehabilitation Medicine* 60(2): 95-101.
- Epperson MW, Canada K, Thompson J, et al. (2014) Walking the line: Specialized and standard probation officer perspectives on supervising probationers with serious mental illnesses. *International Journal of Law and Psychiatry* 37(5): 473-483.
- Farrall S (2002) Long-term absences from probation: Officers' and probationers' accounts. *The Howard Journal of Criminal Justice* 41(3): 263-278.

- Gannon TA and Ward T (2014) Where has all the psychology gone?: A critical review of evidence-based psychological practice in correctional settings. *Aggression and Violent Behavior* 19(4): 435-446.
- Garland B, Wodahl EJ and Mayfield J (2011) Prisoner reentry in a small metropolitan community: Obstacles and policy recommendations. *Criminal Justice Policy Review* 22(1): 90-110.
- Goldstein H (1963) Police discretion: The ideal versus the real. *Public Administration Review* 23(3): 140-148.
- Grant S and McNeill F (2014) The quality of probation supervision: Comparing practitioner accounts in England and Scotland. *European Journal of Probation* 6(2): 147-168.
- Grattet R, Nguyen V, Bird M, et al. (2018) Probation's changing role in California: Challenges and opportunities for hybrid supervision. *Federal Probation* 82(1): 20-25.
- Gunnison E and Helfgott JB (2011) Factors that hinder offender reentry success: A view from community corrections officers. *International Journal of Offender Therapy and Comparative Criminology* 55(2): 287-304.
- Haggerty KD and Bucierius SM (2020) Picking battles: Correctional officers, rules, and discretion in prison. *Criminology: An interdisciplinary Journal* 59(1):137-157.
- Herbert CW, Morenoff JD and Harding DJ (2015) Homelessness and housing insecurity among former prisoners. *RSF: The Russell Sage Foundation Journal of the Social Sciences* 1(2): 44-79.
- Hucklesby A (2009) Understanding offenders' compliance: A case study of electronically monitored curfew orders. *Journal of Law and Society* 36(2): 248-271.
- Hughes W (2012) Promoting offender engagement and compliance in sentence planning: Practitioner and service user perspectives in Hertfordshire. *Probation Journal* 59(1): 49-65.
- James DJ (2004) *Profile of Jail Inmates, 2002*. Washington D.C: US Department of Justice, Office of Justice Programs, Bureau of Justice.
- Jones M and Kerbs JJ (2007) Probation and parole officers and discretionary decision-making: Responses to technical and criminal violations. *Federal Probation* 71: 9.
- Klockars CB (1972) A theory of probation supervision. *The Journal of Criminal Law, Criminology, and Police Science* 63(4): 550-557.
- Luther JB, Reichert ES, Holloway ED, et al. (2011) An exploration of community reentry needs and services for prisoners: A focus on care to limit return to high-risk behavior. *AIDS Patient Care and STDs* 25(8): 475-481.
- Meijers J, Harte JM, Meynen G, et al. (2017) Differences in executive functioning between violent and non-violent offenders. *Psychological Medicine* 47(10): 1784-1793.
- Mowen TJ, Wodahl E, Brent JJ, et al. (2018) The role of sanctions and incentives in promoting successful reentry: Evidence from the SVORI data. *Criminal Justice and Behavior* 45(8): 1288-1307.
- Nellis M (2006) Surveillance, rehabilitation, and electronic monitoring: Getting the issues clear. *Criminology & Public Policy* 5(1): 103-108.
- Ouimet MC, Brown TG, Nadeau L, et al. (2007) Neurocognitive characteristics of DUI recidivists. *Accident Analysis & Prevention* 39(4): 743-750.
- Petersilia J (2004) What works in prisoner reentry-reviewing and questioning the evidence. *Federal Probation* 68(2): 4-8.
- Prins SJ (2014) Prevalence of mental illnesses in US state prisons: A systematic review. *Psychiatric Services* 65(7): 862-872.
- Purkiss M, Kifer M, Hemmens C, et al. (2003) Probation officer functions- A statutory analysis. *Federal Probation* 67(1): 12-23.



- Raynor P, Ugwudike P and Vanstone M (2014) The impact of skills in probation work: A reconversion study. *Criminology & Criminal Justice* 14(2): 235-249.
- Robinson G and McNeill F (2008) Exploring the dynamics of compliance with community penalties. *Theoretical Criminology* 12(4): 431-449.
- Roszyk A, Izdebska A and Peichert K (2013) Planning and inhibitory abilities in criminals with antisocial personality disorder. *Acta Neuropsychologica* 11(2): 193-205.
- Schaefer L and Williams GC (2018) The impact of probation and parole officers' attitudes about offenders on professional practices. *Corrections* 5(4) 1-18.
- Scott CK, Grella CE, Dennis ML, et al. (2014) Predictors of recidivism over 3 years among substance-using women released from jail. *Criminal Justice and Behavior* 41(11): 1257-1289.
- Seruca T and Silva CF (2015) Recidivist criminal behaviour and executive functions: A comparative study. *The Journal of Forensic Psychiatry & Psychology* 26(5): 699-717.
- Sloas L, Murphy A, Wooditch A, et al. (2019) Assessing the use and impact of points and rewards across four federal probation districts: A contingency management approach. *Victims & Offenders* 14(7): 811-831.
- Staton-Tindall M, Havens JR, Oser CB, et al. (2011) Substance use prevalence in criminal justice settings. In: Leukefeld C, Gullotta T and Gregich J (eds) *Handbook of Evidence-Based Substance Abuse Treatment in Criminal Justice Settings*. New York: Springer, 81-101.
- Steiner B, Travis III LF, Makarios MD, et al. (2011) The influence of parole officers' attitudes on supervision practices. *Justice Quarterly* 28(6): 903-927.
- Travis J, Solomon AL and Waul M (2001) From prison to home: The dimensions and consequences of prisoner reentry. Washington D.D: Urban Institute.
- Trotter C and Evans P (2012) An analysis of supervision skills in youth probation. *Australian & New Zealand Journal of Criminology* 45(2): 255-273.
- Ugwudike P (2010) *Compliance with community penalties: The importance of interactional dynamics*. In: McNeill F, Raynore P and Trotter C (eds) *Offender Supervision*. London, Willan: Cullompton, 351-369.
- Ugwudike P (2013) Compliance with community orders: Front-line perspectives and evidence-based practices. In: Ugwudike P and Raynor P (eds) *What works in offender compliance*. New York: Springer, 165-182.
- Van Deirse TB, Cuddeback GS, Wilson AB, et al. (2018) Probation officers' perceptions of supervising probationers with mental illness in rural and urban settings. *American Journal of Criminal Justice* 43(2): 267-277.
- Weaver B, Piacentini L, Moodie K, et al. (2020) Exploring and explaining non-compliance with community supervision. *The British Journal of Criminology* 61(2): 434-455.
- West AD and Seiter RP (2004) Social worker or cop? Measuring the supervision styles of probation & parole officers in Kentucky and Missouri. *Journal of Crime and Justice* 27(2): 27-57.
- Whitehead JT and Lindquist CA (1992) Determinants of probation and parole officer professional orientation. *Journal of Criminal Justice* 20(1): 13-24.

**Chapter 4: Manuscript 2**

Executive function in individuals who are compliant and non-compliant with the conditions  
of a community-based sentence

### **Abstract**

Executive function encompasses multiple processes (e.g., regulating emotions, managing behaviours, problem-solving) essential in daily living. A growing body of neuropsychological research shows a relationship between executive dysfunction and criminal behaviour. However, is executive functioning relevant to sentence management? We examined relationships between self-reported executive functioning and community supervision sentence compliance. Sixty-four individuals serving community-based supervision sentences completed the Behavior Rating Inventory of Executive Function- Adult Version and their compliance data for six months was collected from probation officer notes. The samples mean scores were significantly higher (i.e., poorer executive functioning) than the normative sample. Those who complied with sentence conditions had higher mean scores related to those who were non-compliant. Subsequent exploratory analyses showed that those with poorer executive functioning received more probation officer support to comply with sentence conditions. Attention to responsivity issues like executive function problems may help avoid entrapping people in the criminal justice system.

**Keywords** offenders; probation officers; executive functioning; BRIEF-A; compliance; community-based sentences; probation; responsivity;

## Introduction

Executive functions are necessary for self-regulation and goal-directed behaviours, essential for efficient day-to-day functioning (Lezak, 1982). People in prison have poorer executive functioning than those in the general population, with meta-analyses showing a strong relationship between executive dysfunction and criminality (Morgan & Lilienfeld, 2000; Ogilvie et al., 2011). In addition, research suggests that poor executive functioning is associated with correctional program attrition (Fishbein et al., 2009) and recidivism (Olson, 2014; Ross & Hoaken, 2011). Impairments in executive functions in a community corrections setting may be more likely to manifest as compliance and engagement issues, especially when the requirements of the sentence are undertaken in tandem with the duties, responsibilities, and difficulties of everyday life (e.g., family, work, and social commitments). Imprisonment ordinarily entails a temporary suspension of—and separation from—'normal life': the life of most prisoners is highly regimented and requires little in the way of personal self-regulation skills. By contrast, a community-based sentence can be both less structured and more complex. Certainly, adhering to a community-based sentence against a backdrop of other life obligations is taxing on executive functions, and any executive dysfunction has the potential to negatively influence a supervisees' ability to meet their sentence obligations. However, no studies have explored the relationship between the executive functioning of offenders serving community-based sentences and their compliance with sentence conditions, despite the important implications for community corrections programs and supervision practices.

'Executive function' is an umbrella term to describe a set of self-regulatory functions that direct, manage, and organize cognitive activities, emotional responses, and overt behaviours (Alexander & Stuss, 2000; Gioia et al., 2001). The operational definition of executive functions and the different cognitive processes involved have varied somewhat

among authors (Diamond, 2013; Jurado & Rosselli, 2007; Lezak et al., 2004). However, standard processes that fall under the umbrella of executive functions include initiating behaviour, inhibiting competing actions or stimuli, selecting relevant task goals, planning and organizing to solve problems, shifting problem-solving strategies when necessary, regulating emotions, and evaluating one's behaviour (Roth et al., 2005). The intact frontal /prefrontal cortex is crucial for efficient executive functions (Lezak, 1982). The prefrontal cortex is the largest region in the human brain and the last region of the brain to develop (Fuster, 2015; Stuss, 1992), making it especially vulnerable to injury due to its long developmental trajectory. Damage to the frontal lobe is associated with executive dysfunction (Morgan & Lilienfeld, 2000; Ogilvie et al., 2011) and criminal behaviour (Brower & Price, 2001).

A growing body of neuropsychological research shows a relationship between impairments in executive functioning and various operationalizations of criminality, including delinquency, physical aggression, conduct disorder, psychopathy, and antisocial personality disorder (Morgan & Lilienfeld, 2000). Morgan and Lilienfeld (2000) reviewed 39 studies comprising 4,589 male participants for a meta-analysis on executive function and antisocial behaviour. The studies included in the meta-analysis all utilized performance-based measures of executive functioning (i.e., standardized neuropsychological tests). The participants had been convicted of a criminal offence and diagnosed with either conduct disorder or antisocial personality disorder. The findings indicated that antisocial individuals performed significantly more poorly on executive functioning measures, particularly in planning and impulse control, than non-offender groups. Ogilvie et al. (2011) also found a robust and statistically significant association between criminal conduct and poorer executive functioning (assessed by performance-based measures of executive function) in a meta-analysis, including 126 studies involving 14,786 men and women participants (5,847 offenders and 6,904 non-offenders). Additionally, Meijers et al. (2015) reviewed seven

published studies investigating the differences in executive functioning of adult male prisoners versus adult men who had no criminal history. They found that prisoners' performances were significantly poorer than the comparison sample on tasks measuring attention and set-shifting.

Poor executive functions have been identified as a risk factor for recidivism amongst incarcerated samples (Hancock et al., 2010; Ross & Hoaken, 2011; Valliant et al., 2003) with deficits in areas of planning, mental flexibility, problem-solving, memory, and inhibitory control found to be most associated with re-convictions (Meijers et al., 2017; Roszyk et al., 2013; Seruca & Silva, 2015). There is also evidence that executive function problems may impair incarcerated offenders' ability to respond to rehabilitative programs as measured by treatment readiness, responsivity, program completion, and behaviour improvement (Fishbein et al., 2009). Amongst incarcerated offenders, those who drop out of treatment programs have poorer inhibitory control (Fishbein et al., 2009), poorer attention skills (Cornet et al., 2015), and score lower on memory tasks (Overend, 2011) compared to those who complete treatment programs. In fact, treatment attrition is better predicted by attention measures than by motivation to change (Cornet et al., 2015). Findings also indicate that offenders who are unable to shift their thinking or responses based on novel information struggle to meet treatment objectives (Fishbein et al., 2009); higher scores on attention and memory tasks predict achievement of treatment objectives (Overend, 2011). Taken together, this body of research suggests that executive dysfunction may play a role in the successful rehabilitation of an incarcerated individual. However, the importance of executive functioning relative to compliance outcomes amongst offenders while serving non-custodial sentences (i.e., community-based sentences) has received little attention.

Offenders who serve sentences or portions of their sentences in the community—referred to here as supervisees—have a mix of requirements based on their offence and

sentence type (e.g., parole, intensive supervision, supervision). In New Zealand, all supervisees are given standard conditions that include reporting to a probation officer, advising the probation officer of changes in residence or employment, and attending any correctional program recommended by the probation officer (Corrections, 2016). Depending on the sentence, supervisees may have additional special conditions, including electronic monitoring, curfews, non-association requirements, and prohibitions of substance or alcohol use (Corrections, 2016). Violating a standard or special condition of a supervision sentence is defined as non-compliance (Bottoms, 2001). Non-compliance with the requirements of community-based sentences can impose a substantial social and monetary burden on the community and the supervisee, particularly when it results in incarceration (Liebling & Maruna, 2013). Executive functions enable individuals to engage effectively in purposeful and self-directed behaviour (Lezak et al., 2004), which are likely important competencies for successful compliance with a supervision sentence. Thus, those who serve sentences in the community and present with executive dysfunction may have difficulties complying with sentence conditions and benefitting from rehabilitative programmes that are part of the sentence (Ross & Hoaken, 2011).

In a recent study, community-based sentenced perpetrators of interpersonal violence against women who performed poorly on cognitive flexibility measures had higher rates of treatment attrition and recidivism than perpetrators with better cognitive flexibility performance (Romero-Martínez et al., 2021). The findings suggest offenders in the community are unable to adapt behaviour or thinking in response to changing situations are likely not engaging or benefitting from programs aimed at rehabilitation which then leads to cycling back into the system (i.e., recidivism). Executive function deficits could also make compliance with other conditions of a sentence such as reporting to probation or non-association or curfews difficult. However, findings from one study which investigated

compliance with the conditions of a supervised sentence as opposed to treatment compliance found that scores on traditional performance-based executive functioning tests (Colour Word Inference Test and the Trail Making)—which includes a measure of cognitive flexibility—were not significantly different between those who were non-compliant and those who were compliant with conditions of their sentence or re-arrest (Norman, Starkey, et al., 2021). Like most previous studies, Norman, Starkey, et al. (2021) used performance-based measures of executive function. Traditional measures of executive function have low ecological validity (Chan et al., 2008; Gioia & Isquith, 2004), and individuals who do not display impairment on traditional executive function tasks still may encounter difficulties in everyday duties that require executive control, which may in turn influence adherence to the requirements of a community-based supervision sentence (e.g., attending appointments). A limited number of studies have utilized more ecologically valid tools (e.g., the Behavior Rating Inventory of Executive Function- Adult Version, BRIEF-A; Roth, Isquith, & Gioia, 2005) to assess executive function amongst offenders.

The Behavior Rating Inventory of Executive Function- Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005) is an ecologically valid measure of nine domains of executive function that asks participants to rate difficulties with everyday activities (see Methods section for more details). Brunton and Hartley (2013) used the BRIEF-A to measure the overall executive functioning of incarcerated adult male offenders ( $n = 30$ ). The study aimed to explore if executive function predicted changes in antisocial behaviour as measured by the Adult Behaviour Checklist (ABCL; Achenbach et al., 2003) following a treatment intervention (Enhanced Thinking Skills; ETS) designed to reduce antisocial behaviours. Participants' antisocial behaviour scores were lower after completion of the intervention, and those participants with poorer executive functioning prior to the intervention showed more considerable reductions in antisocial behaviour scores (i.e., ABCL scores) following ETS. In



addition, the authors compared their sample's scores with that of the BRIEF-A normative sample and did not find any significant difference in overall executive functioning (Brunton & Hartley, 2013). However, the study had a small sample size ( $n = 30$ ) and only included offenders capable of completing a treatment program.

In contrast, Sanchez de Ribera et al. (2020) found that adult male incarcerated offenders ( $n = 334$ ) obtained significantly higher (i.e., poorer executive functioning) BRIEF-A scores compared to the normative sample in all domains (apart from initiate), indices, and overall global score (GEC). Recidivist offenders had significantly more widespread executive dysfunction in several domains (inhibition, emotional control, self-monitor, plan/organize, and task monitor) and in the behavioural regulation index and GEC compared to first-time offenders (Sánchez de Ribera et al., 2020). The studies demonstrate that more ecologically valid measures can be used in offender samples and indicate they are related to variables predictive of outcomes such as recidivism. However, the research utilizing these tools is limited and, as of this writing, only involves incarcerated samples.

More studies using measures to detect real-life difficulties with the planning, organization, and emotional regulation not easily identified using traditional measures are needed (Barbosa & Monteiro, 2008). While studies have looked at treatment attrition and reoffending, to our knowledge, no published studies have evaluated the relationship between the self-reported executive functioning of individuals serving community-based sentences and compliance with the general conditions of their supervision order. Consequently, little is known about whether problems with executive function manifest into difficulties complying with conditions of a supervised community sentence. In the present study, we explore the association between executive function and compliance by asking a sample of supervisees on community-based sentences to complete the BRIEF-A. We also interviewed their probation officer, and retrieved their compliance data for a six-month period from probation officer

notes located in the New Zealand Corrections data system. The aims of this study were: (1) to describe the self-reported executive functioning of individuals who served a criminal sentence in the community in comparison to a normative sample and (2) to determine if there was an association between executive functioning and compliance with community-based sentence conditions. We hypothesized that community-based offenders would report significantly poorer executive functioning in all areas when compared to the normative sample. We also hypothesized that poorer executive functioning would be related to non-compliance.

## **Method**

### **Ethics**

All procedures were in accordance with the ethical standards of the institutional research committee (University of Waikato Human Ethics Committee, HREC[Health] 2018#69) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### **Study design and setting**

Individuals serving community-based sentences, (supervisees), were recruited from two community probation sites in the North Island of New Zealand during a 6-month period (February-August) in 2019. Supervisees met the criteria to participate in the study if they were serving a community-based sentence of six months or more that included a requirement of supervision by a probation officer and were proficient in spoken English. There were two parts to this study, a semi-structured interview and a neuropsychological assessment session. Additional eligibility criteria for the neuropsychological portion of the study were that the participant had not left school before the age of 11 years old and did not report any neurodevelopmental disorders or hearing or sight impairment that would impede their ability

to complete the neuropsychological assessments. The focus of this paper is the data from the self-report executive function inventory.

### **Participants**

The participants' demographic characteristics are presented in Table 1. Supervisees ( $n = 64$ ; 47 men and 17 women) had a mean age of 37.42 years. The majority of the sample identified as New Zealand Māori ( $n = 45$ , 70%); 16 (25%) participants identified as New Zealand European, and one each ( $n = 3$ , 5%) identified as Samoan, Indian, and Australian, respectively. Thirty-seven (58%) were serving a community supervision order following a term in prison (i.e., parole), and 27 (42%) were serving a community-based sentence only (i.e., no term in prison for the current offence). We divided the supervisees into groups based on their compliance with sentence conditions to compare those with at least one incident of non-compliance ( $n = 37$ ) with those with no incidents of non-compliance ( $n = 27$ ).

### **Procedure**

During meetings with the primary researcher, probation officers were informed about the general purpose of the research project and asked to pass on information about the study during routine reporting with their supervisees. If supervisees indicated they were interested, the probation officer introduced the primary researcher to the potential participant. The probation officer then left the meeting room. The primary researcher read the information sheet to the potential participant and asked if they had any questions and agreed to continue with the study. The first author gained informed consent from participants who agreed to participate, which included consent to access their information in the New Zealand Corrections' electronic database (the Integrated Offender Management System [IOMS]) and to interview their probation officer regarding their sentence compliance. Participants participated in an initial interview that included questions regarding demographics, psycho-social history, and current sentence compliance. Supervisees returned for a second session during which they

completed various neuropsychological tests and the BRIEF-A, a self-report inventory of executive functioning. The researcher read each of the questions from the BRIEF-A to the participant, who responded verbally to each question.

### **Sources of information**

#### **Executive functioning**

The Behavior Rating Inventory of Executive Function Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005) is a self-report inventory that asks 75 questions designed to capture real-world manifestations of executive functioning to determine current functioning. The BRIEF-A generates an overall score (Global Executive Composite [GEC]), which is the composite of two index scales (the Behavioral Regulation Index [BRI], and the Metacognitive Index, [MI]). The BRI includes four scales (inhibit, shift, emotional control, and self-monitor), and the MI includes five scales (initiate, working memory, plan/organize, task monitor, and organization of materials).

Participants rated how often each of the 75 items has been a problem in the past month using a 3-point Likert scale (1 = never, 2 = sometimes, or 3 = often; Roth, Isquith, & Gioia, 2005). Raw scores were converted into standardized age-adjusted T scores ( $M = 50$ ,  $SD = 10$ ). Higher scores indicate a greater degree of dysfunction, T -scores  $\geq 1.5$  SDs above the mean ( $\geq 65$ ) are considered to indicate clinical impairment (Roth et al., 2005). The BRIEF-A includes three validity scales measuring negativity, infrequency, and inconsistency. Participants were excluded from analysis if they scored above the cut-off on any validity scales. The self-report questionnaire took no more than 20 minutes to complete.

#### **Criminal justice data**

We extracted data about the participants' current offences, type of supervision order (i.e., following a term in prison or community sentence only), arrests while on sentence, number of special conditions, and actuarial risk of re-imprisonment for a new conviction

(RoC\*RoI; Bakker et al., 1999) from the Integrated Offender Management System (IOMS): a New Zealand Corrections' electronic database. The RoC\*RoI is used in New Zealand by the Department of Corrections to estimate an offender's actuarial risk over the next five years in the community of a re-conviction that results in re-imprisonment. The score is generated by a computer algorithm based on criminal history and demographic variables. The score is expressed as a probability and ranges from 0 to 1. Studies have demonstrated the RoC\*RoI's predictive validity (Bakker et al., 1999).

The primary researcher reviewed probation officers' documentation of non-compliance in IOMS for a 6-month period—typically the three months prior to entering the study and the three months post entering the study—for each participant. We created a dichotomous variable to identify those with one or more incidents of non-compliance and those without (1 = non-compliant, 0 = compliant). Non-compliance was counted regardless of whether any action was taken by the probation officer (i.e., warnings, sanctions, formal charges). Other information gathered from probation officers' notes in IOMS included the supervisees' substance use or mental health issues.

### **Semi-structured interview with probation officer**

We asked probation officers open-ended questions about each of the supervisees on their caseload who participated in the study including, issues around compliance with their current sentence (e.g., barriers to compliance, incidents of non-compliance), and any strategies the probation officer used to support the particular supervisees' compliance with sentence conditions.

We coded probation officers as 'providing additional supports' when they described utilizing other strategies—such as text reminders, actively involving supervisees' support people, modifying the implementation of sentence conditions—to support the compliance of the supervisee being discussed. A dichotomous code was created, with 1 representing

‘additional supports’ and 0 indicating ‘no additional supports’ provided. Based on guidelines on selecting and reporting intraclass correlations (Koo & Li, 2016), all three authors coded for 30 of the 64 cases whether the probation officer reported using additional strategies to support the compliance of a particular supervisee. To measure the inter-rater reliability of the ‘additional supports’ variable between the three reviewers, the single measures intraclass correlation coefficient (ICC) and 95% confidence intervals were calculated, using absolute agreement and a two-way mixed-effects model. The resulting ICC of 0.79 (95% CI 0.65-0.89) demonstrated moderate to good inter-rater reliability between the three authors on the ‘additional supports’ variable.

### **Data preparation and planned analyses**

We entered data into SPSS 27 for statistical analysis. Prior to any analysis, we performed Kolmogorov-Smirnov and Shapiro-Wilks tests on the variables to test for normal distributions. We used non-parametric tests for variables that were not normally distributed (Mann-Whitney U Test).

We conducted descriptive statistics for demographic characteristics and criminal justice variables. Next, we calculated univariate statistics to determine any differences between those who were compliant with their sentence conditions and those who were not on each variable to establish if any other co-variables were associated with compliance.

We used single sample t-tests to compare our community sentenced sample with the BRIEF-A normative sample (Roth et al., 2005). Then we calculated independent sample t-tests to compare those supervisees who were compliant with their sentence conditions and those supervisees who were not on the scores for the nine domains, two indices, and global score of the BRIEF-A. For each participant, we counted the number of domains in which they scored in the clinical impairment range (i.e.,  $\geq 65$ ) and performed independent sample t-tests to compare those supervisees who were compliant with their sentence conditions and those

supervisees who were not on the number of domains in clinical impairment range. We estimated effect sizes for the univariate analysis by means of Cohen's *d* (Cohen, 1988), and the 95% Confidence Intervals around the effect size estimates were also computed (Cumming, 2013). Using Cohen's criteria, we described these effect sizes qualitatively as small (.20), medium (.50), and large ( $\geq .80$ ).

## **Results**

### **Demographic and criminal justice characteristics**

Table 1 shows the descriptive statistics, demographic and criminal justice characteristics, for the sample overall and for those supervisees who were and were not compliant with their sentence conditions. Over half the sample had a mental health diagnosis, and over a third had a substance use problem identified by the probation officer. Just under half received additional supports from their probation officers to comply with their sentence conditions. Overall, this sample was at low risk for re-conviction/re-imprisonment based on RoC\*RoI scores.

On average, sample members' sentences included 4.73 special conditions in addition to the standard conditions. Thirty-seven supervisees were non-compliant at least once, with some supervisees having multiple incidents and types of non-compliance during the 6-month review period. Failure to report to the probation officer was the most common non-compliant activity; 95% ( $n = 35$ ) of non-compliant supervisees violated this condition. Other acts of non-compliance included curfew violations, alcohol/substance use violations, failure to attend a program, non-association violations, and not advising the supervising probation officer of an address change. Analyses showed no significant differences or associations between those who were compliant and those who were non-compliant regarding demographic or criminal justice variables described in Table 1.

Table 1. Supervisee demographic and criminal justice characteristics

Variable	Total sample <i>n</i> = 64	Compliant <i>n</i> = 27(42%)	Non-compliant <i>n</i> = 37(58%)	<i>t</i> (63)/ <i>U</i> <sup>a</sup>	<i>X</i> <sup>2</sup> (62)	<i>p</i>	<i>d</i>	95% CI for <i>d</i>	
								Lower	Upper
Gender <i>n</i> (%)									
Men	47 (73.44)	19(70.40)	28(75.70)		0.23	.64			
Women	17 (26.56)	8(29.60)	9(24.30)						
Ethnicity <i>n</i> (%)									
Māori	45 (70.31)	16(59.30)	29(78.40)		5.32	.07			
European	16 (25.00)	8(29.60)	8(21.60)						
Other	3 (4.69)	3(11.10)	0(0.00)						
Age <sup>a</sup> (years) <i>M</i> ( <i>SD</i> )	37.42(10.75)	39.74(11.94)	35.73(9.60)	410.00		.22	0.38	-0.13	0.88
Number of special conditions <sup>a</sup> <i>M</i> ( <i>SD</i> )	4.73(3.28)	5.56(3.74)	4.14(2.80)	397.50		.16	0.44	-0.06	0.94
Substance use <i>n</i> (%)	24(37.50)	12(44.40)	12(32.40)		0.96	.33			
Mental health <i>n</i> (%)	36(56.30)	17(63.00)	19(51.40)		0.86	.36			
Received additional supports to comply <i>n</i> (%)	27(42.20)	12(44.40)	15(40.50)		0.10	.76			
Supervision order <i>n</i> (%)					1.50	.22			
Parole	37(57.80)	18(66.70)	19(51.40)						
Community sentence	27(42.20)	9(33.30)	18(48.60)						
RoC*RoI <sup>a</sup> <i>M</i> ( <i>SD</i> )	.34(.24)	0.32(0.25)	0.36(0.23)	559.50		.41	-0.15	-0.65	0.35

Note. CI = Confidence Interval, RoC\*RoI = Actuarial risk of re-conviction/re-imprisonment (Low = .00-.40, Medium = .41-.70, High = .71-1.00) <sup>a</sup>Note variables are not normally distributed so non-parametric test is reported



**Executive functioning of the community sentenced sample versus the normative sample**

Table 2 presents executive function scores (from the BRIEF-A) of the supervisees' and the normative sample (Roth et al., 2005). The supervisees obtained significantly higher mean scores (indicative of poorer executive function), with large effect sizes across all domains and indices compared to the normative sample, with the exception of organization of materials. On average, supervisees' mean scores were above the cut-off indicative of clinical impairment (i.e.,  $\geq 65$ ) for working memory and were very close to the cut-off for clinical impairment for inhibitory control and the behavioural regulation index. In the domains of shift, self-monitor, planning/organizing, and the overall global executive composite (GEC), the supervisee sample was at least one standard deviation ( $SD = 10$ ) above the mean, a difference that would likely result in executive functioning issues that impact day-to-day life (Lezak et al., 2004).

Table 2. Mean BRIEF scores for the current sample and normative sample

Domains of executive functioning	Current sample <i>n</i> = 64 <i>M</i> ( <i>SD</i> )	Normative sample <i>n</i> = 377 <sup>c</sup> <i>M</i> ( <i>SD</i> )	<i>t</i> (63)	<i>p</i>	<i>d</i>	95% <i>CI</i> for <i>d</i>	
						Lower	Upper
Behavioral Index	64.31(10.28)	50.00(10.00)	11.14	<.001	1.39	1.05	1.73
Inhibitory control	64.89(9.24)	—	12.00	<.001	1.50	1.14	1.86
Shift	61.14(9.53)	—	9.35	<.001	1.17	0.85	1.49
Emotional control	59.83(10.27)	—	7.66	<.001	0.96	0.66	1.25
Self-Monitor	63.83(12.02)	—	9.20	<.001	1.15	0.83	1.46
Metacognition Index	59.66(10.04)	—	7.69	<.001	0.96	0.66	1.27
Initiate	57.66(10.63)	—	5.76	<.001	0.72	0.44	0.99
Working Memory	65.59(11.72)	—	10.65	<.001	1.33	0.99	1.67
Planning/Organizing	62.50(12.00)	—	8.33	<.001	1.04	0.73	1.34
Task-Monitor	59.09(9.28)	—	7.84	<.001	0.98	0.68	1.28
Organization of Materials	50.11(9.36)	—	0.09	.93	0.01	-0.23	0.25
Global executive composite	62.62(10.31)	—	9.80	<.001	1.22	0.90	1.55

Note. CI = Confidence Interval

Mean (*M*) = 50, standard deviation (*SD*) = 10, Clinical impairment range =  $\geq 65$

<sup>c</sup>The original normative sample from the BRIEF-A (Roth, Gioia, & Isquith, 2005) is *n* = 525, we excluded age groups 70-79 years (*n* = 70) and 80-90 years (*n* = 78) because our sample did not include participants older than 65 years

**Executive functioning of compliant versus non-compliant supervisees**

Table 3 presents the differences in mean scores on the BRIEF between those supervisees who were and those who were not compliant with sentence conditions. Compliant supervisees obtained higher scores—indicating poorer functioning—in all the domains and indices on the BRIEF-A compared to those who were non-compliant. Supervisees who were compliant obtained mean scores in the clinical impairment range (i.e.,  $\geq 65$ ) in three domains (inhibitory control, self-monitor, working memory), on the behavioural regulation index, and the overall global executive composite (GEC) measure. On average, supervisees who were non-compliant did not score in the clinical impairment range on any of the indices or domains. However, in some domains—inhibitory control, shift, self-monitor, working memory, planning-organizing—and on the BRI index and GEC, the scores were above 60 (i.e., 1 SD above the mean). Analyses revealed that those who were compliant had significantly higher mean scores, with medium effect sizes, in three areas of executive functioning; initiate, task-monitor, and organization of materials compared to those supervisees who were non-compliant.

Table 3. Mean BRIEF-A scores for of supervisees who were compliant vs. non-compliant with sentence conditions

Domains of executive functioning	Compliant <i>n</i> = 27  <i>M</i> ( <i>SD</i> )	Non-compliant <i>n</i> = 37  <i>M</i> ( <i>SD</i> )	<i>t</i> (63)	<i>U</i>	<i>p</i>	<i>d</i>	95% <i>CI</i> for <i>d</i>	
							Lower	Upper
Behavioral Index	66.04(11.22)	63.05(9.49)	1.15		.26	0.29	-0.21	0.79
Inhibitory control	67.48(9.67)	63.00(9.81)	1.82		.07	0.46	-0.05	0.96
Shift	61.78(10.43)	60.68(8.93)	0.45		.65	0.12	-0.38	0.61
Emotional control	60.70(10.96)	59.19(9.84)	0.58		.56	0.15	-0.35	0.64
Self-Monitor	66.19(11.48)	62.11(12.27)	1.35		.18	0.34	-0.16	0.84
Metacognition Index	62.41(11.00)	57.65(8.91)	1.91		.06	0.48	-0.02	0.99
Initiate	61.44(11.26)	54.89(9.35)	2.54		.01	0.64	0.13	1.15
Working Memory <sup>a</sup>	66.74(12.36)	64.76(11.33)		446.50	.51	0.17	-0.33	0.67
Planning/Organizing	64.56(12.73)	61.00(11.38)	1.17		.25	0.30	-0.20	0.80
Task-Monitor <sup>a</sup>	62.33(8.86)	56.73(8.96)		321.50	.02	0.62	0.12	1.13
Organization of Materials <sup>a</sup>	52.96(10.11)	48.03(8.30)		348.50	.04	0.54	0.04	1.05
Global executive composite (GEC)	65.26(11.22)	60.70(9.29)	1.78		.08	0.45	-0.06	0.95
Total number of domains in the clinical impairment range	4.00(3.08)	2.86(2.56)	1.61		.11	0.41	-0.10	0.91

Note. CI = Confidence Interval

Mean (*M*) = 50, standard deviation (*SD*) = 10, Clinical impairment range =  $\geq 65$

<sup>a</sup>Results were not normally distributed so non-parametric test statistic (Mann-Whitney U) is reported

We undertook further analyses to explore why, contrary to expectations, non-compliant supervisees obtained lower scores on the BRIEF-A, indicating better executive function. Researchers of compliance with community-based sentence conditions have suggested that probation officers' case-management strategies (e.g., relationship building, modifying condition requirements, text reminders) influence the compliance of supervisees (Blasko et al., 2015; Norman et al., 2021; Ostermann & Hyatt, 2020). In fact, in a study that found no differences in the executive functioning of compliant and non-compliant supervisees with intellectual disabilities, the authors conjectured these results were because the probation officers' management of the supervisees lessened the impact of executive dysfunction on compliance outcomes (Mason & Murphy, 2002). Thus, we investigated whether supervisees who received additional supports to comply had significantly different executive functioning from those supervisees who did not receive additional supports to comply.

The BRIEF-A scores comparing those supervisees who did and did not receive additional support from their probation officers are presented in Table 4. Supervisees who received additional support to comply obtained significantly higher scores (indicating more dysfunction) on the domains of inhibitory control, initiate, working memory, planning/organizing, organization of materials, and the metacognition index and the GEC when compared to those who did not, with medium to large effect sizes. Those with additional supports to comply scored in the clinically impaired range in significantly more domains than those without additional supports to comply, producing a medium effect size.

Table 4. Mean BRIEF-A scores for supervisees who did and did not receive additional support to comply from the probation officer

Variable	Additional support <i>n</i> = 27	No additional support <i>n</i> = 37	<i>t</i> (63)	<i>U</i>	<i>p</i>	<i>d</i>	95% CI for <i>d</i>	
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )					Lower	Upper
Behavioral Index	66.04(9.73)	63.05(10.61)	-1.15		.26	-0.29	-0.79	0.21
Inhibitory control	67.93(9.60)	62.68(9.68)	-2.15		.04	-0.54	-1.05	-0.37
Shift	62.89(9.67)	59.86(9.35)	-1.26		.21	-0.32	-0.82	0.18
Emotional control	59.22(10.10)	60.27(10.51)	0.40		.69	0.10	-0.40	0.60
Self-Monitor	67.19(11.67)	61.38(11.83)	-1.95		.06	-0.49	-1.00	0.01
Metacognition Index	63.74(9.07)	56.68(9.77)	-2.94		.01	-0.75	-1.26	-0.23
Initiate	61.48(9.94)	54.86(10.36)	-2.57		.01	-0.65	-1.16	-0.14
Working Memory <sup>a</sup>	69.37(9.63)	62.84(12.44)		677.50	.02	-0.58	-1.08	-0.07
Planning/Organize	68.19(10.27)	58.35(11.57)	-3.52		<.001	-0.89	-1.41	-0.37
Task-Monitor <sup>a</sup>	61.04(8.99)	57.68(9.35)		597.00	.18	-0.37	-0.86	0.14
Organization of Materials <sup>a</sup>	54.37(10.08)	47.00(7.50)		732.50	.002	-0.85	-1.36	-0.33
Global executive control	66.15(9.71)	60.05(10.10)	-2.42		.02	-0.61	-1.12	-0.10
Total number of domains in the clinical impairment range	4.22(2.36)	2.70(2.99)	-2.19		.03	-0.55	-1.05	-0.05

Note. CI = Confidence Interval

Mean (*M*) = 50, standard deviation (*SD*) = 10, Clinical impairment range =  $\geq 65$

<sup>a</sup>Note variables are not normally distributed so non-parametric test statistic (Mann-Whitney U) is reported

## Discussion

The main purpose of this study was to assess the self-reported executive functioning of individuals who served a criminal sentence in the community compared to a normative sample and determine if there was an association between executive functioning and compliance with community-based sentence conditions. In addition, we examined differences between those supervisees who were compliant with their sentence conditions and those who were not on a variety of demographic and criminal justice characteristics. We found no significant differences between those supervisees who were compliant with their sentence conditions and those not on demographic and criminal justice characteristics. Compared to the BRIEF-A normative sample, our community-based sample had significantly poorer executive function in all domains, apart from the organization of materials domain. In contrast to our expectations, non-compliant supervisees reported better executive functioning in the domains of initiate, task-monitor, and organization of materials than the compliant group. Our findings failed to support the hypothesis that non-compliant supervisees would report poorer executive functioning than those who were compliant. Further analysis found that those supervisees who received additional support to comply from their probation officer had significantly poorer executive functioning in the areas of inhibitory control, initiate, working memory, planning/organizing, organization of materials, and the metacognition index and the GEC, when compared to those supervisees who did not receive additional support to comply.

In sum, our study did not find that executive dysfunction was associated with non-compliance with sentence conditions amongst individuals serving community-based sentences. Instead, our findings indicate that executive dysfunction—in several of the domains—was related to receiving additional support from the supervising probation officer, suggesting that the impact of executive dysfunction on compliance outcomes may be

compensated for by probation officers' support. In our study, on average, supervisees without additional supports to comply obtained scores in the non-clinical range (i.e., less than 1.5 SD above the normative mean of 50) in all domains and indices. Meanwhile, supervisees who received additional supports to comply obtained scores in the clinical impairment range in four domains—inhibitory control, self-monitor, working memory, planning/organizing—and the behavioural index and GEC. Supervisees with these executive impairments (inhibitory control, self-monitor, working memory, planning/organizing) are likely to have difficulties with, for example, appreciating how one's behaviour impacts others, following complex instructions, setting goals, and consuming large amounts of information, each of which presumably affects day-to-day functioning (Roth et al., 2005), and research has shown is related to recidivism (Meijers et al., 2017; Roszyk et al., 2013; Seruca & Silva, 2015). Our findings support previous speculations that probation officers who supervise those with cognitive deficits detect and compensate for the difficulties experienced by the supervisee, potentially influencing compliance with sentence conditions outcomes (Mason & Murphy, 2002).

Probation officers' effectiveness in ensuring compliance lies in their ability to be flexible and meet the supervisee's complex needs (Barklage et al., 2006), which in some cases includes cognitive problems. However, cognitive problems can pose a substantial obstacle to overcoming offending behaviours and being successful on a sentence. Studies show that cognitive problems are associated with treatment attrition and reoffending for those receiving rehabilitative services in the community (Romero-Martínez et al., 2021), which suggest these individual level cognitive factors are important responsivity issues for offenders in the community. In New Zealand, probation officers have reported that supervisees who display poor cognitive skills in areas including planning, memory, and problem-solving have difficulties understanding and abiding by sentence conditions, including participating in



required correctional interventions (Norman, Wilson, et al., 2021). In cases where a supervisee is viewed as having cognitive problems, some probation officers have described utilizing different strategies such as text message reminders and even referring the sentence back to the court to support sentence compliance (Norman et al., 2021). These reports from probation officers parallel research that has suggested that amongst incarcerated offenders, poorer functioning in planning, problem-solving, memory, and inhibitory control are associated with re-convictions (Meijers et al., 2017; Roszyk et al., 2013; Seruca & Silva, 2015) and executive dysfunction is associated with decreased treatment readiness, responsivity, and completion (Fishbein et al., 2009). Indeed, dysfunction in inhibitory control and self-monitor are argued to underlie criminogenic risks such as substance use and poor academic or career achievement (Cheng et al., 2019), and neuropsychological functioning has been raised as a responsivity issue in the criminal justice literature (Dowden & Andrews, 2004). The probation officer's role is to promote compliance and address offending related needs to reduce recidivism. Our study suggests that probation officers, can identify supervisees with problems related to poor executive function that without additional support could hamper compliance.

Consistent with studies that include incarcerated samples (Sánchez de Ribera et al., 2020), our sample reported poorer executive functioning on each of the BRIEF domains and indices, apart from organization of materials, compared to the normative BRIEF sample. Half the sample obtained scores that met the clinical cut-offs for impairment in inhibitory control and self-monitor. In addition, nearly half of the sample obtained scores that suggest impairment in working memory and planning/organizing. These results indicate a number of supervisees in the community have executive function problems that are potentially compromising their ability to comply. However, due to probation officer support it is difficult

to make any conclusions; other than that, probation officers utilize additional supports in an effort to ensure compliance, likely influencing compliance outcomes.

### **Implications**

Our findings indicate that individuals serving community sentences have significantly poorer executive functioning than normative samples. In addition, while our results regarding executive functioning and compliance were the opposite to what we had predicted, our exploratory analysis suggests that this unexpected pattern may result from probation officers offering additional support to supervisees with poorer executive functioning to improve compliance. While responsiveness is necessary, where the priority is to ensure compliance rather than engagement in change or addressing offending related needs, the efforts may be futile. Corrections departments need to invest in developing services that offenders with cognitive problems can engage with and learn from, along with training and support for probation officers who manage these needs. For instance, it may be worthwhile to integrate assessment and skill building of executive functioning into probation services and training as part of the responsivity principle of the Risk Needs and Responsivity model of offender assessment and rehabilitation (Bonta & Andrews, 2016). In addition, assessment of executive function and cognitive skills would help probation officers provide the appropriate support to those with specific areas of dysfunction. For example, using a self-report measure such as the BRIEF-A could be a helpful, cost effective, and time efficient screening instrument for corrections departments to adopt. Community corrections is an alternative to prison. Reducing non-compliance through increased responsivity practices can help eliminate entrapping people in the criminal justice system and increasing prison populations.

### **Future research**

Our study indicates that many individuals serving community-based sentences have executive function problems. We suggest further research into how specific probation officer

practices used to support supervisees with executive dysfunction are related to compliance. Perhaps looking into how specific areas of dysfunction elicit specific strategies to ensure compliance. These additional supports could then become part of training and practice. It would be worthwhile for future research to investigate how specific deficits create barriers to engaging with and benefiting from the services, programs, or treatments offered by corrections. Findings from such research will have important policy and practice implications for probation services and quality of life implications for offenders.

### **Study limitations**

In terms of generalizing our results to other community-based correctional clients, limitations include (1) the small and non-representative nature of the sample. It is unlikely that the results are representative of all New Zealand community-based sentenced offenders (e.g., employed people were less likely to be available for recruitment); (2) comparison with the BRIEF-A normative sample, which is a United States sample, and thus does not match the characteristics of a New Zealand population; and (3) the use of compliance with sentence conditions is a difficult variable to assess because there may be variability in the compliance information recorded by the probation officers (Sorsby et al., 2017).

### **Conclusions**

In conclusion, despite the established association between poor executive function and antisocial behaviour, very little research has focused on exploring the impact of supervisee executive function on compliance with conditions of a supervised community-based sentence. This study expands on the small previous literature in this area by demonstrating that executive function amongst community-based offenders is significantly poorer than in a normative sample. Furthermore, probation officers appear to provide additional support to those supervisees with poorer executive functioning. Although more research is needed, our study signals that probation officers' behaviours are a mechanism

influencing compliance and that supervisees who have cognitive difficulties are helped by additional support and individualized management. These findings suggest that offenders' executive functioning needs to be considered by correctional services in their management of offenders to avoid punitive consequences, including imprisonment, for non-criminal acts (e.g., failing to report). Information on the supervisee's neuropsychological abilities can lead to more effective and efficient sentence management, including developing strategies that assist the supervisee in successfully engaging with and learning from their sentence conditions.

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## References

- Achenbach, T. M., Dumenci, L., & Rescorla, L. (2003). Ratings of relations between DSM-IV diagnostic categories and items of the Adult Self-Report (ASR) and Adult Behavior Checklist (ABCL). University of Vermont Research Center for Children, Youth and Families.
- Alexander, M. P., & Stuss, D. T. (2000). Disorders of frontal lobe functioning. *Seminars in Neurology*, 20(4), 427-438.
- Bakker, L. W., Riley, D., & O'Malley, J. (1999). *ROC, risk of reconviction: Statistical models predicting four types of re-offending*. New Zealand Department of Corrections.
- Barbosa, F., & Monteiro, L. C. (2008). Recurrent criminal behavior and executive dysfunction. *The Spanish Journal of Psychology*, 11(1), 259-265.
- Barklage, H., Miller, D., & Bonham Jr, G. (2006). Probation conditions vs. probation officer directives: Where the twain shall meet. *Federal Probation*, 70(3), 37-41.
- Blasko, B. L., Friedmann, P. D., Rhodes, A. G., & Taxman, F. S. (2015). The parolee–parole officer relationship as a mediator of criminal justice outcomes. *Criminal Justice and Behavior*, 42(7), 722-740.
- Bonta, J., & Andrews, D. A. (2016). *The Psychology of Criminal Conduct*. Oxfordshire: Taylor & Francis.
- Bottoms, A. (2001). Compliance and community penalties. In: Bottoms A, Gelsthorpe L and Rex S (eds) *Community Penalties: Change and Challenges*. London, Willan: Cullompton, 87-116.
- Brower, M. C., & Price, B. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal of Neurology, Neurosurgery & Psychiatry*, 71(6), 720-726.
- Brunton, I., & Hartley, T. (2013). Enhanced thinking skills and the association between executive function and antisocial behaviour in children and adult offenders: Scope for intervention? *The Journal of Forensic Practice*, 15(1), 68-77.
- Chan, R. C., Shum, D., Touloupoulou, T., & Chen, E. Y. (2008). Assessment of executive functions: Review of instruments and identification of critical issues. *Archives of Clinical Neuropsychology*, 23(2), 201-216.
- Cheng, J., O'Connell, M. E., & Wormith, J. S. (2019). Bridging neuropsychology and forensic psychology: Executive function overlaps with the central eight risk and need factors. *International Journal of Offender Therapy and Comparative Criminology*, 63(4), 558-573.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Cornet, L. J., van der Laan, P. H., Nijman, H. L., Tollenaar, N., & de Kogel, C. H. (2015). Neurobiological factors as predictors of prisoners' response to a cognitive skills training. *Journal of Criminal Justice*, 43(2), 122-132.
- Corrections, N. Z. D. (2016). *In the Community: Sentences and Orders*. Crown Copyright.
- Cumming, G. (2013). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Oxfordshire: Routledge.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135-168.
- Dowden, C., & Andrews, D. A. (2004). The importance of staff practice in delivering effective correctional treatment: A meta-analytic review of core correctional practice. *International Journal of Offender Therapy and Comparative Criminology*, 48(2), 203-214.

- Fishbein, D., Sheppard, M., Hyde, C., Hubal, R., Newlin, D., Serin, R., Chrousos, G., & Alesci, S. (2009). Deficits in behavioral inhibition predict treatment engagement in prison inmates. *Law and Human Behavior*, *33*(5), 419-435.
- Fuster, J. (2015). *The prefrontal cortex*. Academic Press.
- Gioia, G. A., & Isquith, P. K. (2004). Ecological assessment of executive function in traumatic brain injury. *Developmental Neuropsychology*, *25*(1-2), 135-158.
- Gioia, G. A., Isquith, P. K., & Guy, S. C. (2001). Assessment of executive functions in children with neurological impairment. In: Simeonsson R.J & Rosenthal S.L (eds), *Psychological and Developmental Assessment: Children with Disabilities and Chronic Conditions*. New York: The Guilford Press, 317-356.
- Hancock, M., Tapscott, J. L., & Hoaken, P. N. (2010). Role of executive dysfunction in predicting frequency and severity of violence. *Aggressive Behavior*, *36*(5), 338-349.
- Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: A review of our current understanding. *Neuropsychology Review*, *17*(3), 213-233.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155-163.
- Lezak, Howieson, D. B., Loring, D. W., & Fischer, J. S. (2004). *Neuropsychological assessment*. USA: Oxford University Press,.
- Lezak, M. D. (1982). The problem of assessing executive functions. *International Journal of Psychology*, *17*(1-4), 281-297.
- Liebling, A., & Maruna, S. (2013). *The Effects of Imprisonment*. Oxfordshire: Routledge.
- Mason, J., & Murphy, G. (2002). Intellectual disability amongst people on probation: Prevalence and outcome. *Journal of Intellectual Disability Research*, *46*(3), 230-238.
- Meijers, J., Harte, J. M., Meynen, G., & Cuijpers, P. (2017). Differences in executive functioning between violent and non-violent offenders. *Psychological Medicine*, *47*(10), 1784-1793.
- Morgan, A. B., & Lilienfeld, S. O. (2000). A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clinical Psychology Review*, *20*(1), 113-136.
- Norman, E. M., Wilson, L., Starkey, N., & Polaschek, D. L. L. (2021). How probation officers understand and work with people on community supervision sentences to enhance compliance. *Probation Journal*, *in press*.
- Norman, E. M., Starkey, N., & Polaschek, D. L. (2021). The association between self-reported traumatic brain injury, neuropsychological function, and compliance among people serving community sentences. *Brain Impairment*, *in press*.
- Ogilvie, J. M., Stewart, A. L., Chan, R. C., & Shum, D. H. (2011). Neuropsychological measures of executive function and antisocial behavior: A meta-analysis. *Criminology*, *49*(4), 1063-1107.
- Olson, D. (2014). Risk factors for prison recidivism. *Encyclopedia of Criminology and Criminal Justice*. New York, NY: Springer.
- Ostermann, M., & Hyatt, J. (2020). *Do text message reminders impact appointment behaviors for individuals under community supervision?* (Doctoral dissertation, Drexel University).
- Overend, C. O. (2011). *Investigation of the relationship between cognitive impairment and treatment responsivity in mentally disordered offenders*. (Doctoral dissertation, Edinburgh University).
- Romero-Martínez, Á., Lila, M., Gracia, E., Martín-Fernández, M., & Moya-Albiol, L. (2021). Generally antisocial batterers with high neuropsychological deficits present lower treatment compliance and higher recidivism. *Psychology of Violence*, *11*(3), 318-328.

- Ross, E. H., & Hoaken, P. N. (2011). Executive cognitive functioning abilities of male first time and return Canadian federal inmates. *Canadian Journal of Criminology and Criminal Justice*, 53(4), 377-403.
- Roszyk, A., Izdebska, A., & Peichert, K. (2013). Planning and inhibitory abilities in criminals with antisocial personality disorder. *Acta Neuropsychologica*, 11(2), 193-205.
- Roth, R. M., Gioia, G. A., & Isquith, P. K. (2005). *BRIEF-A: Behavior Rating Inventory of Executive Function--Adult Version*. Lutz, FL: Psychological Assessment Resources.
- Sánchez de Ribera, O., Trajtenberg, N., & Cook, S. (2020). Executive functioning among first time and recidivist inmates in Uruguay. *Applied Neuropsychology: Adult*, 1-9.
- Seruca, T., & Silva, C. F. (2015). Recidivist criminal behaviour and executive functions: A comparative study. *The Journal of Forensic Psychiatry & Psychology*, 26(5), 699-717.
- Sorsby, A., Shapland, J., & Robinson, G. (2017). Using compliance with probation supervision as an interim outcome measure in evaluating a probation initiative. *Criminology & Criminal Justice*, 17(1), 40-61.
- Stuss, D. T. (1992). Biological and psychological development of executive functions. *Brain and Cognition*, 20(1), 8-23.
- Valliant, P. M., Freeston, A., Pottier, D., & Kosmyna, R. (2003). Personality and executive functioning as risk factors in recidivists. *Psychological Reports*, 92(1), 299-306.

**Chapter 5: Manuscript 3**

The association between self-reported traumatic brain injury, neuropsychological function,  
and compliance among people serving community sentences



### **Abstract**

**Background:** Traumatic brain injury is overrepresented in incarcerated samples and has been linked to a number of poor correctional outcomes. Despite this, no research has explored the impact of a recent TBI on compliance outcomes for individuals serving community-based sentences.

**Method:** We screened for a history of TBI in 106 adults on community sentences and collected compliance (arrests, sentence violations) and related variables (e.g., risk scores, substance use) over 6 months. Sixty-four participants also completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), the Comprehensive Trail Making Test, and Color-Word Inference Test.

**Results:** A TBI in the last year predicted a significantly higher likelihood of arrest, even when controlling for risk of reconviction and current substance use, but was not associated with non-compliance with sentence conditions nor with performance on the neuropsychological tests. In addition, no significant associations were found between performance on neuropsychological tests and measures of non-compliance.

**Conclusions:** TBI in the last year was an independent predictor of arrest. This result suggests that those with a recent TBI on a community sentence may need additional monitoring or support to reduce the risk of reoffending.

## Introduction

Traumatic brain injury (TBI) is a significant public health issue in New Zealand; \$83.5 million in claims for TBI were made to the New Zealand Accident Compensation Corporation (ACC) in 2015 (Corporation, 2017). Lifetime prevalence of TBI in New Zealand's general population is reported to be as high as 31.7% for men, and 21.9% for women (McKinlay et al., 2008), and 14,000 people are treated each year for a TBI (Corporation, 2017). Men and women serving prison sentences have a higher prevalence of traumatic brain injury (TBI) than non-incarcerated populations (Durand et al., 2017; Perkes et al., 2011), with a meta-analysis concluding over half of incarcerated men (59.3%) and women (55.4%) had sustained a TBI with loss of consciousness (LOC) in their lifetime (Shiroma, Ferguson, et al., 2010). Two recent New Zealand studies found that 60.0% of incarcerated men and 94.7% of incarcerated women reported experiencing a TBI with LOC at some point in their lives (Mitchell et al., 2017; Woolhouse et al., 2018). The consequences of a TBI can be temporary, persistent, or lifelong depending in large part on the manner of the injury, such as severity or age at injury (Anderson et al., 2011; Fleminger & Ponsford, 2005; Silver et al., 2018; Theadom et al., 2016). A TBI at a younger age may disrupt attainment of typical developmental milestones (Anderson et al., 2011) and more severe injuries usually result in the greatest long-term impairment (Silver et al., 2018). Whilst the majority of those with mild TBI recover relatively quickly (1-3 months), there is evidence that a significant minority may have persistent symptoms, including poor neuropsychological functioning, for up to 12 months post injury (Barker-Collo et al., 2015; Theadom et al., 2016), and delayed recovery is particularly evident in those who have sustained repeated injuries (Theadom et al., 2015).

The neurobehavioral consequences following a TBI (Riggio & Wong, 2009) provide some explanation as to why those with TBI are overrepresented among incarcerated

populations. TBI can have a number of deleterious effects on cognitive, affective, and behavioral functioning related to decision-making, including impairments in memory and attention (Arciniegas et al., 2002), elevated levels of anger (Demark & Gemeinhardt, 2002; Lezak, 1987a; Rosenbaum & Hoge, 1989), and increased impulsivity (Bechara & Van Der Linden, 2005; Prigatano, 1986). Other factors common amongst offending populations, including adverse childhood experiences (Malarbi et al., 2017), mental illness (Ellwart et al., 2003; Vasterling et al., 1998), and substance use problems (Ramey & Regier, 2019), also contribute to poor neuropsychological function. Likewise, many co-occurring factors exist for both sustaining a TBI and offending, including substance use problems, unemployment and lower educational achievement. However, determining the individual contributions of each of these factors is challenging. Still, there is evidence that the neuropsychological performance of incarcerated samples who report a history of TBI is poor (O'Rourke et al., 2016; Pitman et al., 2015)—falling in the low average range. Poor neuropsychological performance in incarcerated samples has been linked to more admissions to segregation (Stewart et al., 2016), poorer treatment outcomes (Cornet et al., 2015), and recidivism (Seruca & Silva, 2015; Tuominen et al., 2017). Compared to incarcerated samples with no history of TBI, those with a history of TBI are more likely to be involved in disciplinary charges and violent infractions while in prison (Matheson et al., 2020; Shiroma, Pickelsimer, et al., 2010), and to have a higher rate of recidivism at 12 months post release after controlling for covariates such as age, ethnicity, education, and offense (Ray & Richardson, 2017). Although these studies demonstrate the increased interest in examining the effects of TBI in individuals serving custodial sentences, there have been no published studies examining the association between TBI and recidivism with individuals who serve criminal sentences in the community.

Compliance for community sentenced individuals includes two broad concepts: compliance with sentence conditions and compliance with criminal law (Bottoms, 2001). In New Zealand, people commonly serve community sentences with a condition that requires that they report regularly to a probation officer, either after a prison sentence—referred to here for convenience as “parole”—or because a judge imposes a community-based supervision sentence. In either circumstance, alongside reporting regularly to their probation officer, they are often required to comply with a number of other sentence conditions (e.g., to live and work in particular places, to attend assessment or treatment for alcohol and drugs; Corrections, 2016). While community and prison populations overlap we cannot assume that the rate and impact of TBI is the same for individuals in each setting. With reference to the latter, compliance in the community can be more complex than in prison; community life is both less structured, and more demanding. Sentence conditions can be complex and are undertaken in tandem with the duties, responsibilities, and difficulties of everyday life (e.g., family, work, and social commitments).

Given the nature of community-based sentences, neuropsychological impairments in this setting may manifest as compliance and engagement issues which can result in a number of costly outcomes (e.g., new criminal charges, returning to prison; McMurrin & Theodosi, 2007). Individuals with mild TBI ( $n = 341$ ) completed a computerised neuropsychological assessment (CNS-Vital signs) at baseline and 12-months post injury. At 12-months post injury, just over 10% of the sample obtained scores in the very low range ( $>70$ ; Theadom et al., 2016), with complex attention having the highest proportion of participants (16.3%) remaining in the very low range at 12-months post injury (Barker-Collo et al., 2015). Furthermore, no significant improvements in functioning were found in memory domains between baseline and 12-months post mild TBI injury, with 15.6% remaining in the very low range at 12-months post injury (Barker-Collo et al., 2015). Still, the prevalence of TBI and

the relationship between TBI and compliance is poorly understood among those serving *community-based* (i.e., non-custodial) sentences.

While there is evidence that a history of TBI is predictive of prison misconduct (Shiroma, Pickelsimer, et al., 2010) and re-arrest (Ray & Richardson, 2017) and neuropsychological consequences resulting from a TBI can last up to 12 months (Theadom et al., 2016), there is no empirical research on how a recent TBI relates to higher risk of non-compliance (with the law or conditions) while on community supervision sentences. Previous research has focused on incarcerated samples and histories of TBI, with no investigations into how a recent TBI and its neuropsychological consequences relate to disciplinary infractions in prison let alone the compliance of those serving their criminal sentences in the community. Therefore, to fill this gap in the literature we investigated whether a TBI in the last 12 months is related to participants compliance with their sentence conditions and the law, and also how current neuropsychological functioning relates to compliance.

The present study aimed to answer three research questions about the relationship between a recent TBI (i.e., last 12 months), neuropsychological functioning, and community compliance—defined as compliance with sentence conditions and compliance with the law (i.e., avoiding arrest)—among those serving community supervision sentences. First, is recent TBI associated with poorer neuropsychological functioning? Second, is there a relationship between recent TBI and community non-compliance? We expect that those with a TBI in the last year will be less likely to comply and have more instances of non-compliance with sentence conditions, and will be more likely to be arrested. Third, is there a relationship between neuropsychological performance and community non-compliance? We expect that lower scores on the neuropsychological assessments will be associated with more non-compliance.

## Method

### Study design and setting

The study was approved by the Human Ethics Committee at the University of Waikato (Ethics Approval Reference Number is HREC[Health] 2018#69), and by the New Zealand Department of Corrections.

A convenience sample of individuals serving community sentences was recruited from two sites in New Zealand during a 6-month period (February-August) in 2019. Probation officers told their supervisees about the study when they came into the office for routine reporting. Supervisees who were interested in the study were introduced to the primary researcher (EMN) by their probation officer.

There were two parts to this study: an initial interview and a neuropsychological assessment session. Information on TBI history and compliance was collected for each participant who completed the initial interview ( $N = 106$ ). Following the initial interview participants were invited to return to complete neuropsychological assessments.

Neuropsychological data for 64 participants were available for analysis (see Figure.1).

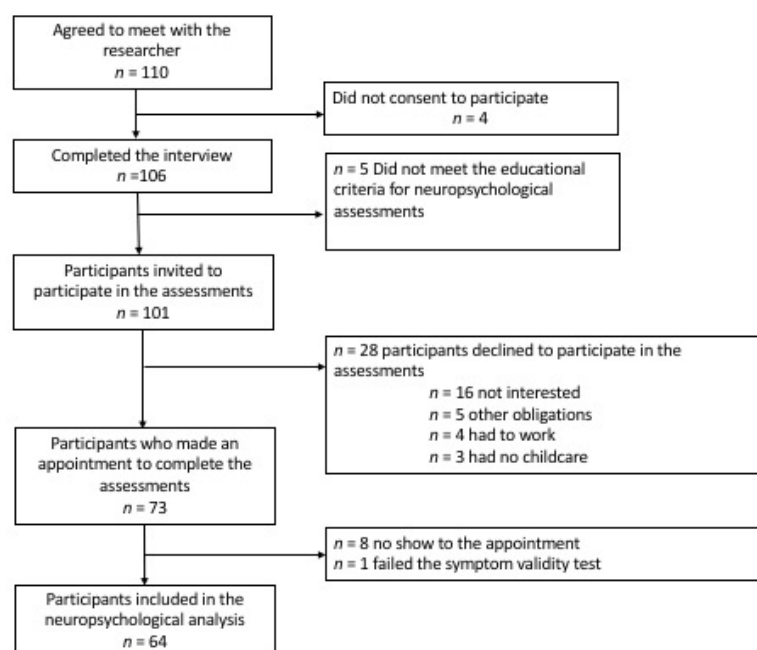


Figure 1. Participant flowchart

## Participants

The sample included 82 men and 24 women (Table 1) serving a community supervision sentence of six months or more. Participants ( $N = 106$ ) had a mean age of 37.59 years and predominately identified as New Zealand Māori. Forty-four participants reported sustaining a TBI in the year prior to entering the study. Over half had at least one incident of non-compliance with their sentence conditions, and a quarter had at least one arrest during the six-month review period. On average this sample was considered at low risk for reconviction (mean likelihood of reconviction leading to re-incarceration within the next five years of 35% based on the RoC\*RoI: see Table 1).

## Procedure

During group meetings with the primary researcher, probation officers were informed about the purpose of the research and asked to pass on information about the study to people they were supervising on community-based sentences (i.e., supervisees) during routine reporting. If supervisees indicated they were interested, the probation officer introduced the primary researcher and the potential participant. The probation officer then left the meeting room. The primary researcher read the information sheet to the potential participant, and asked if they had any questions and if they agreed to continue with the interview. Those who agreed to participate were then given a consent form to sign, which included consent to access their information in the New Zealand Corrections' electronic database (the Integrated Offender Management System [IOMS]).

Participants completed a semi-structured interview and following the interview, eligible participants—those who had remained in school beyond 11 years old, and did not report any neurodevelopmental disorders or hearing or sight impairment that would impede their ability to complete the neuropsychological measures—were invited to return and participate in the neuropsychological assessment session at a mutually convenient time. At

the start of this second session the primary researcher briefly explained what the session would encompass and answered any questions the participant had. Next, participants gave written informed consent. The assessments (see Sources of information) were administered in the same order for each participant and took approximately two hours to complete.

### **Sources of information**

#### **Semi-structured interview.**

A semi structured interview was used to gather information from participants about their demographic characteristics, education level, psycho-social histories, TBI histories, and community compliance. Participants were asked if they had a mental health diagnosis for a number of different mental health disorders, and questions related to the pattern of substance use (e.g., how often, for how long), including current problematic (e.g., unable to quit, interferes with obligations) substance use for a number of different substances (e.g., alcohol, marijuana, methamphetamine, opiates, hallucinogens, inhalants).

#### **Traumatic brain injury screen.**

The Ohio State University Traumatic Brain Injury Identification Method-Short Form (OSU-TBI-ID) was administered to assess for lifetime history of TBI (Corrigan & Bogner, 2007). The OSU-TBI-ID is a structured interview based on US Center of Disease Control and Prevention definitions and best practices in identifying and diagnosing TBI (Corrigan & Bogner, 2007). Questions cover injury aetiology, including cause of injury, age at incident, and any loss of consciousness (LOC), and its duration. We used this information to identify those who had or had not sustained a TBI in the year prior to their recruitment into the study.

#### **Neuropsychological assessments.**

Overall neuropsychological functioning was measured using The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; Randolph, 1998). The RBANS produces index scores for five domains: Immediate Memory, Language, Visuo-Spatial



Constructional, Attention, and Delayed Memory. A total score is calculated using these five domains. During the initial validation of the RBANS, a group of individuals with TBIs (of mixed severity) were assessed. Results indicated significant deficits across all indices, with the TBI population obtaining the lowest scores on the attention index and the total score (Randolph, 1998). In a study that compared a TBI population with a control group, the researchers demonstrated the clinical utility, and sensitivity of the RBANS with a TBI population, with the attention index showing the greatest sensitivity to TBI (McKay et al., 2008). Furthermore, individuals who have recently been concussed have obtained significantly lower scores on the RBANS total score and attention index than healthy controls, indicating that the RBANS is useful for assessing the effects of concussion (Moser & Schatz, 2002).

Two tests from the Delis Kaplan Executive Function System (Delis et al., 2001) were administered to assess areas of executive functioning. The Color-Word Interference Test (CWIT) inhibition and inhibition switching trials assessed participants' inhibitory control, and The Comprehensive Trail Making Test (CTMT), number letter switching trial assessed participants' mental flexibility and behavioral inhibition. The Word Memory Test (WMT; Green et al., 1996) was used to assess symptom validity.

### **Correctional data.**

New Zealand Corrections' electronic database, the Integrated Offender Management System (IOMS), holds information important to managing people on current sentences. Compliance data, amount of time on sentence, and estimated risk of re-conviction/re-imprisonment (RoC\*RoI) scores were obtained from the supervising probation officer's notes in IOMS.

Noncompliance information from probation officer notes and police records was collected for each participant over a six-month period: typically three months before and

three months after enrolment in the study. Any instance of non-compliance with sentence conditions, whether or not it resulted in formal action was recorded, and the total instances of non-compliance with sentence conditions for each person was calculated. Any record of an arrest was also recorded as “non-compliant with the law.”

Participants’ actuarial risk of recidivism was estimated using the Department of Corrections’ RoC\*RoI algorithm (Bakker et al., 1999). The RoC\*RoI estimates an offender’s five-year probability of a conviction serious enough to lead to a new prison sentence. The automatically-generated score is based on static criminal history and demographic variables—not dependent on clinical judgements or the offender’s current behaviors—with scores ranging from 0 to 1. It has very good predictive validity (Bakker et al., 1999).

### **Statistical analysis**

Data were entered into SPSS 25 for statistical analysis. One participant’s data was excluded from the neuropsychological analysis due to exceeding symptom validity cut-offs for the Word Memory Test (WMT); another participant was excluded from the CTMT analysis as they exceeded the test time limit. All neuropsychological scores were transformed into standard scores ( $M = 100$ ,  $SD = 15$ ). Prior to any further analysis, Kolmogorov-Smirnov and Shapiro-Wilks tests were performed on the neuropsychological test scores, age, instances of non-compliance with sentence conditions, length of time on sentence, years of education, and RoC\*RoI, to assess for normality. For the variables that were not normally distributed non-parametric tests were used (e.g., Mann-Whitney U Test).

Next, univariate statistical analyses were used to compare those who only participated in the interview ( $n = 42$ ) and those who participated in both the interview and neuropsychological assessments ( $n = 64$ ; see Appendix 1) on demographic characteristics, TBI histories, and compliance variables. Sample characteristics for the total sample ( $N = 106$ ) and those with or without a TBI in the last year were calculated. Univariate statistical

analyses were used to compare those who sustained a TBI in the last year and those who did not on demographic characteristics and compliance variables (Table 1). Then, for those completing the neuropsychological assessments, univariate statistical analyses were used to compare those with a TBI in the last year and those without on compliance and neuropsychological function, and to compare neuropsychological functioning of compliant and non-compliant participants. To investigate if other factors were related to neuropsychological scores, univariate statistical analyses were used to compare those with a current substance use problem with those without, and those with or without a current mental health diagnosis. Bivariate correlations were used to explore the association between years of education and neuropsychological function. Kendall's Tau ( $\tau$ ) was used for correlations involving the count of instances of non-compliance with sentence conditions and years of education, due to the small sample size and large number of tied ranks within these variables. Cohen's criteria (Cohen, 1988) was applied to interpret the effect size ( $d$  qualitatively described as small (.20), medium (.50), and large ( $\geq .80$ ; Cohen, 1988). Effect sizes for univariate analyses of continuous variables were estimated by means of Cohen's  $d$  (Cohen, 1988), and the 95% confidence intervals around the effect size estimates were also computed (Cumming, 2013).

## Results

We first compared those who only participated in the interview ( $n = 42$ ) and those who completed both the interview and neuropsychological assessments ( $n = 64$ ; see Appendix 1). There were no statistically significant differences with regard to demographic characteristics, TBI histories, or compliance with sentence conditions or the law.

### Traumatic brain injury

Eighty-four percent of participants reported sustaining a TBI with loss of consciousness (LOC) in their lifetime ( $M = 6.01$ ,  $SD = 15.60$ , range = 0-104). Four

participants reported never having sustained a TBI, while 13 reported experiencing a TBI but without LOC. Characteristics for those with and without a TBI in the last year and for the total sample are presented in Table 1; 41% ( $n = 44$ ) of the participants reported sustaining a TBI in the year prior to entering the study and 25% ( $n = 11$ ) of those sustained a TBI with LOC—nine participants reported a mild TBI (LOC = < 30 minutes), one reported a moderate TBI (LOC = 30 minutes to 24 hours), and one participant reported sustaining a severe TBI (LOC = > 24 hours). Those who sustained a TBI in the last year were significantly younger than those who did not sustain a TBI in the last year. The most common cause of a TBI in the last year reported by this sample was fighting ( $n = 28$ ), followed by motor vehicle crash ( $n = 9$ ), banging head on an object (self-harm;  $n = 8$ ), sports (rugby,  $n = 5$ ), interpersonal partner abuse (IPV;  $n = 5$ ), and being struck by an object (e.g., scaffolding;  $n = 5$ ).

Table 1. Demographic and other characteristics for the sample overall and those with and without TBI in last 12 months

Variable	Total sample <i>N</i> = 106	TBI in last year <i>n</i> = 44	No TBI in last year <i>n</i> = 62	<i>U</i>	$\chi^2$	<i>p</i>	<i>d</i>	95% <i>CI</i> for <i>d</i>	
								Lower	Upper
Gender <i>n</i> (%)									
Men	82 (77.40)	34(32.10)	48(45.30)		0.001	.99			
Women	24 (22.60)	10(9.40)	14(13.20)						
Ethnicity <i>n</i> (%)									
Māori	74 (69.80)	33(31.10)	41(38.70)		2.57	.28			
European	29 (27.40)	11(10.40)	18(17.00)						
Other	3 (2.80)	0(0.00)	3(2.80)						
Age (years) <i>M</i> ( <i>SD</i> )	37.59(11.43)	35.02(11.76)	39.42(10.93)	1023.00		.03	-0.39	-0.78	0.00
Years of education <i>M</i> ( <i>SD</i> )	9.37(1.85)	9.68(2.38)	9.15(1.33)	1548.00		.23	-0.29	-0.68	0.10
Mental health diagnosis <i>n</i> (%)	31(29.20)	13(29.50)	18(29.00)		0.003	.95			
Substance use <i>n</i> (%)	58(54.70)	24(54.50)	34(54.80)		0.001	.98			
Months on sentence when recruited <i>M</i> ( <i>SD</i> )	11.59(24.56)	6.50(6.20)	15.21(31.29)	1282.50		.60	-0.36	-0.75	0.03
Non-compliance with sentence conditions <i>n</i> (%)	63(59.40)	26(59.10)	37(59.70)		0.004	.95			
Arrest <i>n</i> (%)	26(24.50)	16(36.40)	10(16.10)		4.65	.03			
Instances of sentence non-compliance <i>M</i> ( <i>SD</i> )	1.74(2.30)	2.00(2.43)	1.55(2.20)	1459.00		.53	0.20	-0.19	0.58
RoC*RoI <i>M</i> ( <i>SD</i> )	.35(.24)	.36(.24)	.35(.23)	1374.00		.95	0.04	-0.34	0.43

Note. CI = Confidence Interval, TBI = Traumatic brain injury, RoC\*RoI = Actuarial risk of re-conviction leading to re-imprisonment (Low = .00-.40, Medium = .41-.70, High = .71-1.00)

### **Neuropsychological performance**

For the 64 participants assessed, overall neuropsychological performance was poor (Table 2). Performance on the RBANS was in the ‘borderline’ range as indicated by a total score of 79. Scores on the immediate memory domain and visual spatial construction domains were also in the borderline category. Performance on the attention and delayed memory domains were slightly higher, falling into the low average range. In contrast, the mean score on the language domain was in the average score range. Standard scores on the executive functioning measures were mixed, falling into the ranges qualitatively described as average (90-110) and low average (80-89). The CWIT—inhibition and inhibition switching trials—were in the average and low average categories, respectively, while mean scores on the CTMT number letter switching were in the average range. There were no statistically significant differences in neuropsychological scores between those with or without a current substance use problem or between those with or without a mental health diagnosis (data not shown for brevity). More years of education were significantly associated with better scores on RBANS total score ( $\tau = .23, p = .01$ ), immediate memory ( $\tau = .27, p = .004$ ), language ( $\tau = .21, p = .02$ ), and CTMT number letter switching ( $\tau = .22, p = .03$ ). Years of education was not significantly associated with the other domains measured (data not shown for brevity).

There were no statistically significant differences between those with and without a TBI in the last year on the neuropsychological assessments; in fact, on some measures those who had a recent TBI performed slightly (albeit non-significantly) better than those who had not sustained a TBI in the last year (Table 2).

Table 2. Mean neuropsychological scores for the subsample and by those with a TBI in the last year and those without

Assessment	Total sample <i>n</i> = 64 <i>M</i> ( <i>SD</i> )	TBI in last year <i>n</i> = 26 <i>M</i> ( <i>SD</i> )	No TBI in last year <i>n</i> = 38 <sup>b</sup> <i>M</i> ( <i>SD</i> )	<i>t</i> (62)	<i>U</i>	<i>p</i>	<i>d</i>	95% <i>CI</i> for <i>d</i>	
								Lower	Upper
RBANS									
Total score	79.73(12.59)	82.35(14.04)	77.95(11.34)	-1.38		.17	0.45	-0.06	0.95
Immediate Memory	78.97(17.45)	82.46(17.20)	76.58(17.44)	-1.33		.19	0.34	-0.17	0.84
Visual-Spatial Construction	77.73(14.02)	77.12(14.56)	78.16(13.81)		512.50	.80	-0.07	-0.57	0.43
Language	92.36(12.37)	96.00(13.49)	89.87(11.05)	-1.99		.05	0.51	-0.01	1.01
Attention	88.44(15.54)	88.12(15.77)	88.66(15.59)	0.14		.89	-0.03	-0.53	0.47
Delayed Memory	84.22(16.17)	88.15(14.67)	81.53(16.78)		615.00	.10	0.41	-0.09	0.91
DKEFS									
Color Word Inference (CWIT)									
Inhibition	92.27(15.04)	92.50(13.29)	92.11(16.30)		478.50	.83	0.03	-0.47	0.52
Inhibition/Switching	84.53(16.90)	84.42(15.06)	84.61(18.25)	0.04		.97	-0.01	-0.51	0.49
Trail Making Test (CTMT)									
Number Letter Switching	93.33(17.92)	93.65(19.52)	93.11(16.97)		510.00	.68	0.03	-0.47	0.53

Note. CI = Confidence Interval, RBANS = Repeatable Battery for the Assessment of Neuropsychological Status, DKEFS = Delis Kaplan Executive Function System

Scores are qualitatively described based on their ranges:  $\leq 69$  = impaired, 70-79 = borderline, 80-89 = low average, 90-110 = average,  $\geq 111$  = high average [35].

<sup>b</sup> *n* = 37 for Trail Making Test (CTMT) Number Letter Switching trial

## Compliance

Next we compared the neuropsychological test scores of those who were non-compliant with sentence conditions or the law to those who were compliant. We found no statistically significant differences between the groups (data not shown for brevity). Additionally, there were no significant correlations between the total instances of non-compliance with sentence conditions and scores on the neuropsychological assessments. Therefore, as neuropsychological performance did not appear to be related to non-compliance, the whole sample ( $N = 106$ ) was used for the remaining analyses.

Over half of the sample had at least one instance of non-compliance with sentence conditions (range 0-14), and a quarter had non-compliance with the law (i.e., arrest; see Table 1). With regard to sentence compliance, the most common non-compliant activity was failure to report to the probation officer, with 89% of those who were non-compliant with their sentence conditions having at least one instance of failure to report.

Chi square tests showed no significant association between TBI in the last year and non-compliance with sentence conditions, nor was there a significant difference between those with and without TBI in the last year and the mean instances of non-compliance with sentence conditions. In contrast, there was a significant association between TBI in the last year and arrest; the proportion of those participants who experienced a TBI in the last year and were arrested (36%) was significantly higher than the proportion of those without a recent TBI who were arrested (16%). Given the association between TBI in the last year and arrest we decided to undertake a logistic regression to further examine the ability of TBI in the last year to predict arrest while controlling for variables shown in previous research to be associated with an increased risk of criminal behavior (Bonta & Andrews, 2016). The first step was to explore potential covariates using bivariate correlations and chi-square analysis,



to decide what to include in the logistic regression to predict arrest. We planned to include all variables significantly correlated with arrest at  $p \leq .05$  in the regression.

The univariate analyses revealed that age ( $U = 816, p = .10$ ), years of education ( $U = 1095, p = .68$ ), and length of time on sentence ( $U = 826, p = .12$ ), were not significantly associated with arrest; however, the actuarial risk score (RoC\*RoI;  $U = 1348, p = .02$ ) was significantly associated with arrest. Those with an arrest had a significantly higher RoC\*RoI score ( $M = .44, SD = .24$ ) than those without an arrest ( $M = .32, SD = .23$ ). Chi-square analysis showed that current substance use was also significantly associated with arrest ( $\chi^2 = 12.43, p = <.001$ ), current mental health diagnosis ( $\chi^2 = 1.41, p = .23$ ) was not. Based on these results, TBI in the last year, current substance use, and RoC\*RoI score were entered into the logistic regression to predict arrest.

Prior to conducting the logistic regression we checked that the data met all assumptions. The sample size was large enough to provide adequate power for the number of predictor variables used, to detect medium to large effects (Field, 2013). The final regression model incorporating TBI in the last year, current substance use, and risk of re-conviction/re-imprisonment score (RoC\*RoI) was significant in predicting arrest,  $\chi^2 = 25.79, p = <.001$  (Table 3). Each predictor made a significant unique contribution to the model. For those with a TBI in the last year the odds of being arrested increased by a factor of 3.72, for those who reported current substance use the odds increased by a factor of 8.56, and for every one-unit increase on the RoC\*RoI score there was 13.62 times increase in risk of arrest.

Table 3. Logistic regression coefficients for independent variables used to predict arrest

Predictor variables	<i>B</i>	<i>S.E</i>	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95% <i>CI for Odds Ratio</i>	
							Lower	Upper
TBI in the last year	1.31	0.53	6.20	1	.01	3.72	1.32	10.47
Current substance use	2.15	0.64	11.39	1	<.001	8.56	2.46	29.80
Risk score (RoC*RoI)	2.61	1.13	5.34	1	.02	13.62	1.49	124.77

Note. CI = Confidence Interval, RoC\*RoI = Actuarial risk of re-conviction leading to re-imprisonment

### **Discussion**

This is the first study to investigate the associations between a TBI in the last 12 months, neuropsychological functioning, and three indices of non-compliance in those serving community sentences. Contrary to our expectations, recent TBI was not associated with poorer neuropsychological functioning, and neuropsychological functioning was not significantly related to any of the non-compliance indices. As predicted, TBI in the last year was significantly associated with an increased likelihood of non-compliance with the law (i.e., arrest) even after controlling for the covariates static estimate of risk of re-conviction/re-imprisonment score (RoC\*RoI), and current substance use. However, there was no significant association between recent TBI and either of the indices for non-compliance with sentence conditions.

Consistent with the literature examining prevalence of TBI amongst incarcerated samples, the lifetime rate of TBI in this sample was high. Nearly all participants reported at least one incident of TBI in their lifetime, with 84% reporting at least one incident of TBI with LOC. In the year prior to entering the study nearly half of our sample experienced a TBI, and 10% experienced a TBI with LOC. Compared to the general population in New Zealand, where it is estimated—based on medical records—that 0.79% experience a TBI with LOC each year (Feigin et al., 2013), our sample's self-reported prevalence of TBI with LOC over a period of one year is notably higher. The most common cause of TBI in the last year for this sample was assault (fights, interpersonal partner violence victimization). Assault is the most common cause of TBI amongst individuals with substance use problems, no employment and lower educational achievement (Lezak et al., 2004), shared risk factors for offending.

Overall, our sample's performance on the neuropsychological measures was poor. Apart from language, inhibition, and mental flexibility the sample's average performance fell in the ranges qualitatively described as low average and borderline. These findings are consistent with research that shows that offender populations with TBI perform poorly on neuropsychological measures including the RBANS (Pitman et al., 2015), and specifically on immediate memory tasks (Nagele et al., 2018). However, language appeared to be a relative strength for our sample; in contrast with other studies which have found language performance—particularly on verbal fluency tasks—to be poor among criminally sentenced samples (LaDuke et al., 2017; LaVigne & Van Rybroek, 2011). Similarly, our sample performed relatively well on the cognitive inhibition task measured by the CWIT and mental flexibility task measured by the CTMT, both of which require the participant to ignore task irrelevant information (i.e., inhibit cognitive interference). Meta-analyses investigating the association between executive function measures, including the CWIT and the CTMT, and antisocial behavior have reported mixed results (Morgan & Lilienfeld, 2000; Ogilvie et al., 2011). The more recent meta-analysis showed small effect sizes for the CWIT inhibition task ( $d = .35$ ) and the CTMT number letter switching task ( $d = .38$ ; Ogilvie et al., 2011). Inhibiting cognitive interference is one 'type' of impulsivity, an umbrella term with a number of distinct constructs (Strickland & Johnson, 2021). How impulsivity is defined in the clinical and criminal literature (non-reflective or quick to action when reacting to situations or provocations; (Andrews et al., 2000; Wong & Gordon, 2000) is not necessarily well related to what is assessed by executive function measures of cognitive inhibition (e.g., ability to control reacting to irrelevant stimuli in a formal assessment setting).

Although the overall performance on neuropsychological tests was poor, there was no significant difference between the scores of those who had and had not received a TBI in the previous 12 months, suggesting that the current neuropsychological functioning of this

sample is not influenced by a recent TBI, but by other factors. We did find that more years of education were significantly associated with better performance in immediate memory, language, the RBANS total score, and number letter switching. Poorer scores on neuropsychological tasks that require language abilities, as each of the above mentioned tests did, have been associated with lower education attainment (Lam et al., 2013). However, the weak correlations found in our study indicates that education is only a part of a larger group of factors contributing to the poorer neuropsychological functioning found in this sample. This sample presented with a constellation of risk factors for poor neuropsychological functioning, including adverse childhood experiences (Malarbi et al., 2017), mental illness (Ellwart et al., 2003; Vasterling et al., 1998), and substance use (Ramey & Regier, 2019). Still, there were no statistically significant differences in neuropsychological scores between those with a or without a current substance use problem or mental health diagnosis. It would be difficult to attribute poor neuropsychological scores reported in this sample to a single variable. Nonetheless, regardless of the cause, cognitive deficits, particularly poor immediate memory, can have important consequences for a person engaged with the criminal justice system. For example, interactions with police, the courts, and corrections staff often involve verbal instructions, but without functional immediate memory the expectation that these individuals could follow such requests might be unrealistic. This can lead to non-compliant responses, which may then be misconstrued as “antisocial,” particularly if people are reluctant to reveal their difficulties to the relevant staff or sufficient language skills mask these less observable cognitive deficits (e.g., memory, attention).

The overall poor neuropsychological performance for many of our participants—with and without recent TBIs—brings into question the capability of some individuals serving community sentences to engage with and benefit from correctional services in their current forms. An interesting finding was that there was no significant difference in the

neuropsychological performance between those with non-compliance—with the law or sentence conditions—and those who were compliant, nor was a recent TBI associated with compliance with sentence conditions. In some jurisdictions, including those in the study, probation officers use various strategies to increase their supervisees' compliance, including text messages, making home visits, and being flexible with appointment times, particularly when they are aware that the supervisee has problems (e.g., substance use, cognitive problems; Norman et al., 2021; Ugwudike, 2010). These strategies employed by the probation officer is one aspect of probation services that may make compliance particularly difficult to attribute to the supervisee's neuropsychological functioning.

Even so, our results did show that those with a recent TBI were more than three times more likely to be arrested than those without a recent TBI, even when controlling for a static estimate of risk of re-conviction/re-imprisonment (RoC\*RoI) and current substance use, and despite arrest not being associated with neuropsychological functioning. It is possible that the severity of the injuries sustained by this sample in the year prior to entering the study—75% sustained a TBI without LOC and 20% sustained a mild TBI with LOC, 5% a moderate or severe TBI—mean that for the majority of the participants the effects of the injury might have been resolved by the time of the assessment (Silver et al., 2018). It is also likely that involvement in violence and crime is a risk factor for head injuries (Raine, 1997), and that a TBI in the last year is an indicator of more aggressive and riskier lifestyles vulnerable to police contact and arrest. The most common cause of TBI in the last year was assault, which is associated with other risk factors for offending (e.g., substance use, antisocial peers, antisocial attitudes). Additionally, a number of sequelae of TBI that are known risk factors for crime are not captured directly in typical neuropsychological assessments—for example, increases in irritability, emotional lability, and decreased self-regulation—but could exacerbate existing antisocial behavior and make ongoing offending more likely. Perhaps it is

these factors that account for the more than 3-fold increase in the odds of arrest that we found. This argument, although speculative, is strengthened by the finding that the presence of a recent TBI uniquely predicted increased odds of arrest, even when the RoC\*RoI and current substance use were included in the regression. A body of research has established a relationship between substance use problems and increased risk of re-arrest (Baillargeon et al., 2010; DeLisi et al., 2021; Wilson et al., 2011; Yukhnenko et al., 2020), however the RoC\*RoI's ability to predict arrest has not been investigated. The RoC\*RoI score is a probability estimate of an individual's risk of reconviction that will result in reimprisonment over the next five years in the community (Bakker et al., 1999) and is widely used in the New Zealand correctional system as a triage instrument for making sentencing decisions. Although it has shown in multiple studies to be highly predictive both of reimprisonment and even reconviction that does not lead to imprisonment, it was not designed to predict arrest. This study demonstrates that it is highly predictive of arrest, and despite that, the recent TBI indicator was still itself a strong predictor.

Studies of relationships between TBI and official criminal outcomes (arrest, conviction, sentencing) to date tend to overlook the importance of controlling for the conglomeration of other factors that covary with TBI and are themselves also predictive of criminal outcomes (Mitchell et al., 2017). People who are involved in crime for any length of time have many lifestyle factors that increase the risk of TBIs, as well as the risk of crime due to other causal factors. A static risk instrument based on criminal history and demographic variables arguably serves as a proxy for all of those factors, including any crime-resulting consequences of previous TBIs for the person, since these are high-frequency experiences for people with criminal histories. But the RoC\*RoI would be relatively insensitive to recent changes in risk such as those that may follow from a recent TBI. Adding in the recent TBI variable after controlling for previous history and current substance use creates a slightly

stronger argument that the TBI itself may be influencing criminal behavior, although of course substantial further investigation of changes in lifestyle and other sequelae are needed to test this idea thoroughly.

### **Implications**

Our findings indicate that individuals serving community sentences who sustained a TBI in the previous 12 months are at increased risk for being arrested. A TBI in the last year is an independent predictor of arrest beyond that associated with New Zealand's current static measure of risk (RoC\*RoI). Together these findings highlight that individuals with a recent TBI serving a community sentence may need additional monitoring and support, possibly including referral to TBI services in order to reduce the likelihood of rearrests. A practical option would be for probation services to implement a TBI screen and a referral procedure designed to access appropriate support services in the community for those who report recent head injuries or current TBI symptoms.

### **Future research**

Future research should include assessments that capture real world scenarios, or how a person is functioning on a daily basis, rather than the typically abstract tasks used in standard neuropsychological assessments. Self-reports from those serving community sentences describing why they are non-compliant could expand on understanding the mechanisms that influence compliance with community sentence outcomes. Future research could also explore the rate of those arrested who report sustaining a recent head injury and the current symptoms they are experiencing to gain a better understanding of how consequences of TBIs are associated with increased arrest.

### **Study limitations**

This study has a number of limitations, including the use of a convenience sample and the reliance on self-report of TBI. Whilst many studies rely on medical records to determine

the incidence of TBI, many people do not seek medical attention for mild injuries (Bazarian et al., 2005; Ribbers, 2007; Vink & Nimmo, 2002), and our sample rarely reported seeking medical attention for a TBI particularly when the cause of the injury was fighting or IPV.

In terms of generalizing our results to other community based correctional clients, limitations include (1) the small sample size and non-representative nature of the sample, (2) the limited nature of the neuropsychological assessment (e.g., does not include an ecological measure), and (3) the scope for discretion of probation officers in how they manage their supervisees, and report issue of non-compliance (Sorsby et al., 2017). In addition, we acknowledge that there may be differences in demographics and socio-economic status between our sample and the RBANS normative sample which may exaggerate the cognitive deficits observed (Ogden & McFarlane-Nathan, 1997). Recruitment of a healthy (TBI-free) comparison group from the same population would be ideal, but given the high rates of TBI, this was not feasible.

Lastly, the study's cross-sectional design does not allow us to do more than speculate about the potential underlying mechanisms in the relationship between a recent TBI and being arrested. As we noted, those who repeatedly break the law share a number of characteristics/risk factors with those who sustain TBIs, including a history of low educational attainment, unstable employment, and problematic substance use (Bonta & Andrews, 2007; Parry-Jones et al., 2006; Ponsford et al., 1995). Effort to disentangling the putative effects of TBI either cumulatively, over the person's lifetime, or even for recent injuries simply may not be possible, particularly when one understands that common TBI sequelae are already identified as risk factors for crime, regardless of whether they are caused by TBIs or other factors (e.g., impulsivity, emotional volatility; Bonta & Andrews, 2016).



## **Conclusions**

This study contributes to a large gap in the correctional sentence compliance literature by investigating associations between TBI, neuropsychological functioning, and three indices of non-compliance in those serving community sentences. The results suggest that supervisees who sustain a TBI while under community supervision may need additional supports, monitoring, and services to reduce the risk of re-offending. Our study confirms that people serving community sentences have deficits in some areas of neuropsychological functioning and high rates of TBI, but in contrast to our expectations and previous research, recent TBI and neuropsychological performance were not related, and although TBI in the last 12 months was predictive of arrests, overall neuropsychological performance was not. Future investigation is needed into whether the importance of TBI in the criminal justice system is due to its effects on neuropsychological performance, or to other potential sequelae that are more directly related to compliance outcomes (e.g., changes in emotional and self-regulation).

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## **Conflict of interest**

None.

## **Ethical standards**

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

## 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), 176-184.
- Andrews, D. A., Bonta, J., & Wormith, S. (2000). *Level of service/case management inventory: LS/CMI*. Multi-Health Systems Toronto, Canada.
- Arciniegas, D. B., Held, K., & Wagner, P. (2002). Cognitive impairment following traumatic brain injury. *Current Treatment Options in Neurology, 4*(1), 43-57.
- Baillargeon, J., Penn, J. V., Knight, K., Harzke, A. J., Baillargeon, G., & Becker, E. A. (2010). Risk of reincarceration among prisoners with co-occurring severe mental illness and substance use disorders. *Administration and Policy in Mental Health and Mental Health Services Research, 37*(4), 367-374.
- Bakker, L. W., Riley, D., & O'Malley, J. (1999). *ROC, risk of reconviction: Statistical models predicting four types of re-offending*.
- Barker-Collo, S., Jones, K., Theadom, A., Starkey, N., Dowell, A., McPherson, K., Ameratunga, S., Dudley, M., Te Ao, B., & Feigin, V. (2015). Neuropsychological outcome and its correlates in the first year after adult mild traumatic brain injury: A population-based New Zealand study. *Brain Injury, 29*(14), 1604-1616.
- Bazarian, J. J., Mcclung, J., Shah, M. N., Ting Cheng, Y., Flesher, W., & Kraus, J. (2005). Mild traumatic brain injury in the United States, 1998–2000. *Brain Injury, 19*(2), 85-91.
- Bechara, A., & Van Der Linden, M. (2005). Decision-making and impulse control after frontal lobe injuries. *Current Opinion in Neurology, 18*(6), 734-739.
- Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation, 6*(1), 1-22.
- Bonta, J., & Andrews, D. A. (2016). *The Psychology of Criminal Conduct*. Oxfordshire: Taylor & Francis.
- Bottoms, A. (2001). Compliance and community penalties. In: Bottoms A, Gelsthorpe L and Rex S (eds) *Community Penalties: Change and Challenges*, 87-116.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. *Hillsdale, NJ: Erlbaum*.
- Cornet, L. J., van der Laan, P. H., Nijman, H. L., Tollenaar, N., & de Kogel, C. H. (2015). Neurobiological factors as predictors of prisoners' response to a cognitive skills training. *Journal of Criminal Justice, 43*(2), 122-132.
- Corporation, A. C. (2017). *Traumatic Brain Injury Strategy and Action Plan 2017–2021*.
- Corrections, N. Z. D. (2016). *In the Community: Sentences and Orders*. Crown Copyright.
- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI identification method. *The Journal of Head Trauma Rehabilitation, 22*(6), 318-329.
- Cumming, G. (2013). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Oxfordshire: Routledge.
- Delis, D. C., Kaplan, E., & Kramer, J. H. (2001). Delis-Kaplan Executive Function System. Washington D.C: APA Psych Tests.
- DeLisi, M., Drury, A., & Elbert, M. (2021). Who are the compliant correctional clients? New evidence on protective factors among federal supervised releases. *International Journal of Offender Therapy and Comparative Criminology, 65*(14), 1536-1553.
- Demark, J., & Gemeinhardt, M. (2002). Anger and its management for survivors of acquired brain injury. *Brain Injury, 16*(2), 91-108.

- Dolan, M., & Fullam, R. (2004). Behavioural and psychometric measures of impulsivity in a personality disordered population. *Journal of Forensic Psychiatry & Psychology*, *15*(3), 426-450.
- Durand, E., Cheignard, M., Ruet, A., Dereix, A., Jourdan, C., & Pradat-Diehl, P. (2017). History of traumatic brain injury in prison populations: A systematic review. *Annals of Physical and Rehabilitation Medicine*, *60*(2), 95-101.
- Ellwart, T., Rinck, M., & Becker, E. S. (2003). Selective memory and memory deficits in depressed inpatients. *Depression and Anxiety*, *17*(4), 197-206.
- Feigin, V. L., Theadom, A., Barker-Collo, S., Starkey, N. J., McPherson, K., Kahan, M., Dowell, A., Brown, P., Parag, V., & Kydd, R. (2013). Incidence of traumatic brain injury in New Zealand: A population-based study. *The Lancet Neurology*, *12*(1), 53-64.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Newbury Park, CA: Sage.
- Fleminger, S., & Ponsford, J. (2005). Long term outcome after traumatic brain injury. In: British Medical Journal Publishing Group.
- Green, P., Allen, L., & Astner, K. (1996). Manual for Computerised Word Memory Test. *Durham, NC: CogniSyst*.
- Hardman, J.M., & Manoukianm A. (2002). Pathology of head trauma. *Neuroimaging Clinics*, *12*(2), 175-187.
- LaDuke, C., DeMatteo, D., Heilbrun, K., Gallo, J., & Swirsky-Sacchetti, T. (2017). The neuropsychological assessment of justice-involved men: Descriptive analysis, preliminary data, and a case for group-specific norms. *Archives of Clinical Neuropsychology*, *32*(8), 929-942.
- Lam, M., Eng, G. K., Rapisarda, A., Subramaniam, M., Kraus, M., Keefe, R. S., & Collinson, S. L. (2013). Formulation of the age–education index: Measuring age and education effects in neuropsychological performance. *Psychological Assessment*, *25*(1), 61-70.
- LaVigne, M., & Van Rybroek, G. J. (2011). Breakdown in the language zone: The prevalence of language impairments among juvenile and adult offenders and why it matters. *UC Davis Journal of International Law and Policy*, *15*, 37.
- Lezak, Howieson, D. B., Loring, D. W., & Fischer, J. S. (2004). *Neuropsychological assessment*. USA: Oxford University Press.
- Lezak, M. D. (1987). Relationships between personality disorders, social disturbances, and physical disability following traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, *2*(1), 57-69.
- Malarbi, S., Abu-Rayya, H. M., Muscara, F., & Stargatt, R. (2017). Neuropsychological functioning of childhood trauma and post-traumatic stress disorder: A meta-analysis. *Neuroscience & Biobehavioral Reviews*, *72*(7), 68-86.
- Matheson, F. I., McIsaac, K. E., Fung, K., Stewart, L. A., Wilton, G., Keown, L. A., Nathens, A. B., Colantonio, A., & Moineddin, R. (2020). Association between traumatic brain injury and prison charges: A population-based cohort study. *Brain Injury*, *34*(6), 757-763.
- McKay, C., Wertheimer, J. C., Fichtenberg, N. L., & Casey, J. E. (2008). The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS): Clinical utility in a traumatic brain injury sample. *The Clinical Neuropsychologist*, *22*(2), 228-241.
- McKinlay, A., Grace, C., Horwood, J., Feldman, M., Ridder, M., & MacFarlane, R. (2008). Prevalence of traumatic brain injury among children, adolescents and young adults: Prospective evidence from a birth cohort. *Brain Injury*, *22*(2), 175-181. <https://doi.org/10.1080/02699050801888824>
- McMurrin, M., & Theodosi, E. (2007). Is treatment non-completion associated with increased reconviction over no treatment? *Psychology, Crime & Law*, *13*(4), 333-343.

- Mitchell, Theadom, A., & du Preez, E. (2017). Prevalence of traumatic brain injury in a male adult prison population and its association with the offence type. *Neuroepidemiology*, 48, 164-170. <https://doi.org/10.1159/000479520>
- Morgan, A. B., & Lilienfeld, S. O. (2000). A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clinical Psychology Review*, 20(1), 113-136.
- Moser, R. S., & Schatz, P. (2002). Enduring effects of concussion in youth athletes. *Archives of Clinical Neuropsychology*, 17(1), 91-100.
- Nagele, D., Vaccaro, M., Schmidt, M., & Keating, D. (2018). Brain injury in an offender population: Implications for reentry and community transition. *Journal of Offender Rehabilitation*, 57(8), 562-585.
- Norman, E. M., Wilson, L., Starkey, N., & Polaschek, D. L. L. (2021). How probation officers understand and work with people on community supervision sentences to enhance compliance. *Probation Journal*.
- O'Rourke, C., Linden, M. A., Lohan, M., & Bates-Gaston, J. (2016). Traumatic brain injury and co-occurring problems in prison populations: A systematic review. *Brain Injury*, 30(7), 839-854.
- Ogden, J. A., & McFarlane-Nathan, G. (1997). Cultural bias in the neuropsychological assessment of young Maori men. *New Zealand Journal of Psychology*, 26, 2-12.
- Ogilvie, J. M., Stewart, A. L., Chan, R. C., & Shum, D. H. (2011). Neuropsychological measures of executive function and antisocial behavior: A meta-analysis. *Criminology*, 49(4), 1063-1107.
- Parry-Jones, B. L., Vaughan, F. L., & Miles Cox, W. (2006). Traumatic brain injury and substance misuse: A systematic review of prevalence and outcomes research (1994–2004). *Neuropsychological Rehabilitation*, 16(5), 537-560.
- Perkes, I., Schofield, P. W., Butler, T., & Hollis, S. J. (2011). Traumatic brain injury rates and sequelae: A comparison of prisoners with a matched community sample in Australia. *Brain Injury*, 25(2), 131-141. <https://doi.org/10.3109/02699052.2010.536193>
- 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. <https://doi.org/10.1080/09602011.2014.973887>
- Ponsford, J. L., Olver, J., & Curran, C. (1995). A profile of outcome: 2 years after traumatic brain injury. *Brain Injury*, 9(1), 1-10.
- Prigatano, G. P. (1986). *Neuropsychological rehabilitation after brain injury*. Baltimore, MD: Johns Hopkins University Press.
- Raine, A. (1997). *The psychopathology of crime: Criminal behavior as a clinical disorder*. Houston, TX: Gulf Professional Publishing.
- Ramey, T., & Regier, P. S. (2019). Cognitive impairment in substance use disorders. *CNS Spectrums*, 24(1), 102-113. <https://doi.org/https://doi.org/10.1017/S1092852918001426>
- Randolph, C. (1998). *Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)*. San Antonio, TX: Psychological Corporation
- Ray, B., & Richardson, N. J. (2017). Traumatic brain injury and recidivism among returning inmates. *Criminal Justice and Behavior*, 44(3), 472-486.
- Ray, B., Sapp, D., & Kincaid, A. (2014). Traumatic brain injury among Indiana state prisoners. *Journal of Forensic Sciences*, 59(5), 1248-1253.
- Ribbers, G. (2007). Traumatic brain injury rehabilitation in the Netherlands: Dilemmas and challenges. *The Journal of Head Trauma Rehabilitation*, 22(4), 234-238.

- Riggio, S., & Wong, M. (2009). Neurobehavioral sequelae of traumatic brain injury. *Mount Sinai Journal of Medicine: A Journal of Translational and Personalized Medicine*, 76(2), 163-172.
- Rosenbaum, A., & Hoge, S. K. (1989). Head injury and marital aggression. *The American Journal of Psychiatry*, 146(8), 1048-1051.  
<https://doi.org/https://doi.org/10.1176/ajp.146.8.1048>
- Seruca, T., & Silva, C. F. (2015). Recidivist criminal behaviour and executive functions: A comparative study. *The Journal of Forensic Psychiatry & Psychology*, 26(5), 699-717.
- Shiroma, E. J., Ferguson, P. L., & Pickelsimer, E. E. (2010). Prevalence of traumatic brain injury in an offender population: A meta-analysis. *Journal of Correctional Health Care*, 16(2), 147-159.
- Shiroma, E. J., Pickelsimer, E. E., Ferguson, P. L., Gebregziabher, M., Lattimore, P. K., Nicholas, J. S., Dukes, T., & Hunt, K. J. (2010). Association of medically attended traumatic brain injury and in-prison behavioral infractions: A statewide longitudinal study. *Journal of Correctional Health Care*, 16(4), 273-286.
- Silver, J. M., McAllister, T. W., & Arciniegas, D. B. (2018). *Textbook of traumatic brain injury*. Washington D.C: American Psychiatric Pub.
- Sorsby, A., Shapland, J., & Robinson, G. (2017). Using compliance with probation supervision as an interim outcome measure in evaluating a probation initiative. *Criminology & Criminal Justice*, 17(1), 40-61.
- Stewart, L. A., Wilton, G., & Sapers, J. (2016). Offenders with cognitive deficits in a Canadian prison population: Prevalence, profile, and outcomes. *International Journal of Law and Psychiatry*, 44, 7-14.
- Strickland, J. C., & Johnson, M. W. (2021). Rejecting impulsivity as a psychological construct: A theoretical, empirical, and sociocultural argument. *Psychological Review*, 128(2), 336-361.
- Theadom, A., Parag, V., Dowell, T., McPherson, K., Starkey, N., Barker-Collo, S., Jones, K., Ameratunga, S., Feigin, V. L., & Group, B. R. (2016). Persistent problems 1 year after mild traumatic brain injury: A longitudinal population study in New Zealand. *British Journal of General Practice*, 66(642), e16-e23.
- Theadom, A., Parmar, P., Jones, K., Barker-Collo, S., Starkey, N. J., McPherson, K. M., Ameratunga, S., Feigin, V. L., & Group, B. R. (2015). Frequency and impact of recurrent traumatic brain injury in a population-based sample. *Journal of Neurotrauma*, 32(10), 674-681.
- Tuominen, T., Korhonen, T., Hämäläinen, H., Katajisto, J., Vartiainen, H., Joukamaa, M., Lintonen, T., Wuolijoki, T., Jüriloo, A., & Lauerma, H. (2017). The factors associated with criminal recidivism in Finnish male offenders: Importance of neurocognitive deficits and substance dependence. *Journal of Scandinavian Studies in Criminology and Crime Prevention*, 18(1), 52-67.
- Ugwudike, P. (2010). Compliance with community penalties: The importance of interactional dynamics. In: McNeill F, Raynor P & Trotter C (eds), *Offender Supervision*, London, Willan: Cullompton, 351-369.
- Vasterling, J. J., Brailey, K., Constans, J. I., & Sutker, P. B. (1998). Attention and memory dysfunction in posttraumatic stress disorder. *Neuropsychology*, 12(1), 125-133.
- Vink, R., & Nimmo, A. J. (2002). Novel therapies in development for the treatment of traumatic brain injury. *Expert Opinion on Investigational Drugs*, 11(10), 1375-1386.
- William, H.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 of re-offending. *Brain Injury*, 24(10), 1184-1188

- Wilson, A. B., Draine, J., Hadley, T., Metraux, S., & Evans, A. (2011). Examining the impact of mental illness and substance use on recidivism in a county jail. *International Journal of Law and Psychiatry*, 34(4), 264-268.
- Wong, S. C. P., & Gordon, A. (2000). *The Violence Risk Scale*. Canada: University of Saskatchewan.
- Woolhouse, R., McKinlay, A., & Grace, R. C. (2018). Women in prison with traumatic brain injury: Prevalence, mechanism, and impact on mental health. *International Journal of Offender Therapy and Comparative Criminology*, 62(10), 3135-3150.
- Yukhnenko, D., Blackwood, N., & Fazel, S. (2020). Risk factors for recidivism in individuals receiving community sentences: A systematic review and meta-analysis. *CNS Spectrums*, 25(2), 252-263.

## Appendix 1

Appendix 1. A comparison of the demographic characteristics of participants completing the interview only and the subsample, those who completed both the interview and the neuropsychological assessment

Variable	Interview <i>n</i> = 42	Subsample <i>n</i> = 64	<i>U</i>	$\chi^2$	<i>p</i>	<i>d</i>	95% CI for <i>d</i>	
							Lower	Upper
Gender <i>n</i> (%)								
Men	35 (33.0)	47 (44.30)		1.42	.23			
Women	7 (6.60)	17 (16.00)						
Ethnicity <i>n</i> (%)								
Maori	29(27.40)	45(42.50)		2.30	.32			
European	13(12.30)	16(15.10)						
Other	0(0)	3(2.80)						
Age (years)	37.86(12.54)	37.42(10.75)	1312.00		.84	0.04	-0.35	0.43
<i>M</i> ( <i>SD</i> ) Range	19-64	20-65						
TBI in the last year	17(40.50)	27(42.50)		0.03	.86			
Months on sentence when recruited <i>M</i> ( <i>SD</i> )	9.88(16.19)	12.72(28.83)	1204.50		.37	-0.12	-0.50	0.28
Instances of non-compliance <i>M</i> ( <i>SD</i> )	2.00(2.85)	1.56(1.86)	1290.00		.72	0.19	-0.20	0.58
Non-compliance with sentence conditions <i>n</i> (%)	26(61.90)	37(57.80)		0.18	.68			
Arrest <i>n</i> (%)	11(26.20)	15(23.40)		0.10	.75			
RoC*RoI <i>M</i> ( <i>SD</i> )	.37(.23)	.34(.24)	1212.00		.39	0.13	-0.26	0.52

Note. CI = Confidence Interval, RoC\*RoI = Actuarial risk of re-conviction leading to re-imprisonment

## Chapter 6: General Discussion

This thesis aimed to explore the history of traumatic brain injury (TBI) and current neuropsychological functioning of individuals serving community-based sentences in New Zealand and assessed if there was an association or relationship between recent TBI, neuropsychological functioning and compliance with a community-based sentence. The overarching objectives of the research were to add to the understanding of community-based sentence compliance by drawing on the viewpoint of those who manage the sentences (i.e., probation officers) and investigate the relevance of neuropsychological functioning and TBI to compliance. Thus the research had three central aims:

1. To explore how probation officers in New Zealand define, view, and respond to non-compliance.
2. To screen individuals serving community-based sentences for TBI and assess their neuropsychological functioning.
3. To investigate the relationship between compliance with a community-based sentence and a recent TBI and current neuropsychological functioning.

This research also addressed secondary aims focused on understanding what other variables or characteristics (e.g., substance use) within this sample were associated with non-compliance with sentence conditions and non-compliance with the law.

The following general discussion focuses on the main research insights, integrates the findings from the studies, and considers the implications for policy and practice. This is followed by a statement on the strengths and weakness of the programme of research and suggestions for future research.

The findings from study one suggested that probation officers viewed cognitive problems as barriers to compliance and utilized individualized strategies to support those viewed as having cognitive problems to comply. The neuropsychological results from study



two indicated that this sample had significantly poorer neuropsychological functioning than normative samples. Nevertheless, no significant relationships were found between non-compliance with sentence conditions or non-compliance with the law (i.e., arrest) and poorer neuropsychological functioning. Surprisingly, poor executive function was not related to supervisee's non-compliance. However, findings from study two indicated that probation officers offered additional support to comply to supervisees with significantly poorer executive functioning. All but four of the supervisee participants had a history of TBI, and nearly half had a TBI within the year of joining the study. A recent TBI was not significantly associated with poorer neuropsychological functioning. However, a recent TBI predicted a significantly higher likelihood of arrest (i.e., lack of compliance with the law), even when controlling for risk of reconviction and current substance use.

As predicted, based on the literature describing higher rates of TBI in incarcerated samples compared to the general population, TBI was overrepresented in our sample (i.e., significantly higher than 12% the rate found in the general population; Frost et al., 2013), with 84% sustaining a TBI with LOC in their lifetime and 45% meeting criteria for a moderate or severe TBI in their lifetime. Only four participants reported no history of TBI. Our results were consistent with a recent study of TBI involving community-based offenders in the United States. The authors of that study reported that between 44% and 97%, depending on the probation office site, of the sample reported a significant TBI<sup>7</sup> (Gorgens et al., 2021). Unlike other studies that examined *lifetime* TBI, when examining the association between TBI and compliance, our study investigated how a *recent* TBI would impact compliance with a supervised sentence. In the year prior to entering the study, we found that nearly half of our sample experienced a TBI, and 10% experienced a TBI with LOC.

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<sup>7</sup> The authors defined a significant TBI as one moderate or severe TBI, an injury with a loss of consciousness before the age of 15, or multiple, repeated injuries

Consistent with epidemiological research (Feigin et al., 2013), mild TBI was the most common type of TBI experienced by this sample in the year prior to entering the study. After comparing those supervisees with a recent TBI and those without on neuropsychological performance, and a number of demographic, psycho-social, and criminal justice variables, the only significant difference between the groups was age and being arrested, with those with a TBI in last year being significantly younger and more likely to be arrested.

While younger age is commonly associated with being at higher risk for TBI (Feigin et al., 2013) and offending (Bonta & Andrews, 2016), this was the first study to show a significant association between being arrested and sustaining a recent TBI in individuals serving a community-based sentence. However, contrary to our predictions, we did not find a significant association between recent TBI and poorer neuropsychological functioning, despite studies reporting neuropsychological consequences from a mild TBI can persist for a year or more (Barker-Collo et al., 2015), particularly when other factors like less time in school, a history of mental illness and substance abuse, prior TBIs and psycho-social stress are present (Hardman & Manoukian, 2002; Schofield et al., 2006b). Although a history of a recent TBI was common in this sample, we could not conclude that poorer neuropsychological function was a possible factor in the relationship between TBI and crime. Instead, our findings led us to speculate that perhaps TBI was an indicator, or consequence, of a lifestyle defined by criminogenic risk factors like poor educational achievement, substance use, and antisocial peers that increased the individuals' risk of arrest. For instance, in our study, fights were the most common cause of TBI in the last year for men and for women, the most common cause was interpersonal partner violence (IPV); however, in the general population, the most common causes of TBI are falls and motor vehicle crashes (Feigin et al., 2013).

A number of factors are associated with the increased likelihood of sustaining a TBI from an assault, including low socioeconomic status, lower educational achievement, unemployment, and being incarcerated (Lezak et al., 2004; Morrell et al., 1998). Previous literature has demonstrated that offenders with a history of TBI compared to those with no history of TBI are more likely to be involved in disciplinary charges and violent infractions while in prison (Matheson et al., 2020; Shiroma, Pickelsimer, et al., 2010). It is possible that TBI is both a cause of offending, as several authors have concluded (Damasio et al., 1994) and a consequence of activities that are defined as criminal offending (e.g., fighting, a car accident due to drug or alcohol use). Either way, sustaining a TBI can be a signal to corrections staff that the supervisee is at increased risk of re-offending. In addition to risk management, identifying supervisees with recent TBIs provides an opportunity for staff to check in on the well-being of a supervisee following an injury and offer education around the consequences of TBI. Many supervisees do not realize that TBI results in invisible injuries that sometimes masquerade as other disorders or issues (e.g., somatic, emotional, behavioural and cognitive functioning); however, probation officers assume that they do (Linden et al., 2021; O'Rourke et al., 2018b).

In addition to TBI, we did not find any differences in the neuropsychological functioning for those currently using substances, another predictor of arrest in this study, and those who were not. However, the finding that current substance use increased the odds of arrest by a factor of 8.56 confirmed reports from probation officers in the focus groups and individual interviews that current substance use was an important factor in the non-completion of a supervision sentence. Our findings support the extensive literature that indicates the continued use of alcohol and drugs inhibit compliance with community-based sentences and increase re-offending (Baillargeon et al., 2010; DeLisi et al., 2021; Marlowe, 2003; Wilson et al., 2011; Yukhnenko et al., 2020). In fact, studies have shown that

abstinence from drugs is related to a 40-75% reduction in crime rates for known offenders (Marlowe, 2003).

Regardless of TBI history or current substance use, this sample performed poorly on the neuropsychological measures, but as noted earlier, poor neuropsychological performance was not related to non-compliance with the law or sentence conditions. In fact, it was difficult to make any conclusions on how poorer neuropsychological performance was related to compliance because of probation officers' behaviours. In study one the probation officers reported that they offered additional support to supervisees they thought had poorer cognitive skills. The results from study two demonstrated that supervisees who were getting additional support had poorer neuropsychological functioning. Mason and Murphy (2002), conjectured that the probation officer influence was a factor that led to non-significant findings when comparing compliance with community sentence conditions outcomes between supervisees whose scores indicated the presence of an intellectual disability and those whose scores did not indicate an intellectual disability. While we concluded that poorer neuropsychological functioning in areas of inhibitory control, initiate, working memory, planning/organizing, organization of materials seemed to elicit more support from the probation officer, we could only speculate that probation officer support mediated the impact of the poorer neuropsychological functioning on compliance. A supportive relationship does increase the likelihood a supervisee will successfully complete their sentence (Van Deirse et al., 2018), and the probation officers in this study were not only supportive but used their discretion to minimize the negative impact of cognitive problems on compliance, including having the sentence modified in order to reduce the number of conditions required. This use of discretion by probation officers made it difficult to assess how the outcome of compliance is impacted by an individual's neuropsychological performance (Sorsby et al., 2017).

New Zealand probation officers appeared to follow the Risk Need Responsivity (RNR; Bonta & Andrews, 2007) model of corrections practices. Probation officers who participated in this study worked towards building quality relationships with their supervisees. Presumably, through this close engagement, probation officers identified the supervisee's needs and barriers to compliance. The responsivity principle draws attention to the role of specific individual strengths and weaknesses that may enhance or impede rehabilitation and encourages practitioners to optimize their interventions or strategies by accommodating these characteristics. Both studies one and two suggested that probation officers were able to identify specific cognitive weaknesses' such as poor memory, planning, inhibition, and initiation and employed strategies based on these individual characteristics to support compliance. However, it is unlikely that probation officers are identifying all supervisees with cognitive barriers to compliance. For example, overall, language was a strength for our sample relative to other areas of functioning. Since good verbal skills may hide neuropsychological deficits that could impede compliance (Raines, 1993), it is likely that some supervisees with cognitive deficits may not have received additional support. In contrast, if a supervisee's language skills are poor they may have problems with communication (Tomblin et al., 1991), which may result in less probation officer support and punitive responses to non-compliance.

There was consensus amongst the probation officers that good communication skills were an important factor in successful sentence completion and avoiding formal sanctions. Probation officers suggested that some supervisees could not communicate to solve social conflicts or verbalize reasons why they did not attend a sentence requirement, which led to probation officers taking punitive actions (e.g., written warnings, formal sanctions) in response to non-compliance. This is consistent with research that has found breach proceedings are most often undertaken when a supervisee fails to report to their probation

officer without communicating a reason for the absence (Robinson & McNeill, 2008).

However, it has been suggested that poor communication skills in offenders could be a sign of poor neuropsychological functioning related to frontal lobe damage (Turkstra et al., 2003). Interestingly, while probation officers related deficits in memory or problem-solving skills to cognitive problems, communications skills were not considered a cognitive issue. Instead, probation officers viewed poor communication skills more of a manifestation of antisocial attitudes toward the sentence requirements, probation officer, and corrections. Two groups in this study did significantly worse on language tasks: those with a TBI prior to 15 years and those with fewer years of education. If poorer neuropsychological functioning in the area of language is underlying poor communication skills those with less education and a TBI prior to age 15 could be at a disadvantage regarding the amount of support they elicit from their probation officers. However, this idea is only speculative, and future research is needed to understand how poor communication skills are perceived by a probation officer and how they are related to neuropsychological function.

Incidents of non-compliance with community sentence conditions can include actions not ordinarily viewed as criminal. For example, as reported earlier the most common non-compliant behaviours in this study were not attending appointments with a probation officer, which is consistent with previous literature that has shown missed report-ins to the probation officer are the most common acts of non-compliance and, in some cases, results in imprisonment (Grattet et al., 2009; Robinson & McNeill, 2008). To avoid entrapping individuals in the system by convicting them of community sentence breaches for otherwise non-criminal acts, it is important to investigate and understand how individual level characteristics relate to non-compliance with sentence conditions. This includes, most especially, behaviours that are viewed by criminal justice staff as antisocial and purposeful but are, in fact, behavioural consequences of poor neuropsychological function.

## **Implications**

While further research needs to be undertaken to inform any changes in policy or practice, the results from this thesis suggest that community corrections would benefit from the implementation of TBI and neuropsychological screens. This would help corrections staff identify supervisees with recent TBIs and those with neuropsychological issues to ensure that they are supported rather than being passed through the system or lost (not identified) in it. While flexibility and responsiveness are necessary for community corrections, when the priority becomes getting a supervisee through to the end of their sentence, rather than engaging them in rehabilitation, efforts may be misplaced. It is important that supervisees are not only receiving support from their probation officer but also receiving services that address these individual level characteristics that are barriers to sentence compliance and long-term desistance from crime. In other jurisdictions, programs have been implemented to support community-based and incarcerated offenders with head injuries and neuropsychological deficits. For example, the Achieving Healing through Education, Accountability, and Determination program (A.H.E.A.D) is a seven-module group program designed to help offenders understand the effects of TBI and introduce strategies for coping with related deficits (Colorado Department of Human Services, 2019).

Additionally, education about TBI and its effects would benefit corrections staff, given the high rates within offender populations. Staff can learn effective communication strategies to employ, and build on the compensatory strategies (e.g., supplying a planner/diary or notebook that includes the important information) already practised by many of the probation officers who participated in this study. These skills can also be implemented for those with neuropsychological deficits, regardless of the cause. Screens such as the BRIEF-A could be easily adopted by corrections staff to assess the strengths and weakness of

a supervisee to help guide practices and supports needed to respond to the individual neuropsychological functioning.

### **Strengths and limitations**

A major strength of this thesis was the inclusion of probation officers and consideration of their roles in compliance. Another strength was the use of both qualitative and quantitative analysis to explore compliance with community-based sentences. The qualitative analysis of probation officers' reports provided a more detailed account of their perspectives on compliance overall and the compliance of individual supervisees on their caseloads, while quantitative analysis explored the relevance of individual characteristics of the supervisee on compliance.

Limitations include using a TBI self-report screen with no medical record verification, the cross-sectional design, and the use of a convenience sample. In terms of generalizing our results to other community-based correctional clients, limitations include (1) the small sample size and non-representative nature of the sample, (2) the limited nature of the neuropsychological assessment (e.g., is not a comprehensive neuropsychological assessment) and (3) the use of discretion and strategies employed by probation officers who participated in this study may be different to those who chose not to participate in this study, and to those who work in other countries for other jurisdictions.

### **Future research**

An important finding from this thesis was that a recent TBI was a predictor of arrest, although we can only speculate about what feeds the relationship between TBI and arrest. Future research could continue to explore the links between TBI and crime. For example, the research could use qualitative interviews to identify circumstances or individual characteristics present in offenders who sustain a TBI and offend within the same year.



Neuropsychological functioning was poor in this sample. Future research should investigate how poorer neuropsychological function might impact other areas of correction services, such as treatment readiness or responsivity. Also, future research could investigate if deficits in specific domains of functioning are related to probation officers' perspective on the supervisee's barriers to compliance. For example, as discussed earlier, communication skills are tied to language skills; it is possible that what probation officers observe as poor communication skills may be related to language impairments.

### **Conclusions**

This thesis explored the relevance of TBI and current neuropsychological dysfunction to compliance outcomes among community-based offenders in New Zealand. All but 4 supervisees had a history of TBI, with half having a TBI within the last year and significantly poorer neuropsychological functioning compared to normative samples. However, poor neuropsychological functioning appeared to be a characteristic of the sample that was not related to a specific cause (e.g., TBI, substance use). Notably, this thesis suggests that individual characteristics like TBI and neuropsychological functioning impact compliance with a community-based sentence in different ways: a recent TBI was predictive of re-arrest while serving a community sentence, and poorer neuropsychological functioning was significantly associated with increased support from the probation officer to comply. Supervisees who were arrested also were more likely to report current problematic substance use and sustaining their TBIs during an assault. Finally, this thesis indicates that probation officers in New Zealand align their supervision strategies with the needs and individual characteristic of the supervisee, increasing the likelihood of successful sentence compliance.

## References

- Aarten, P. G. (2019). Exploring probation supervision compliance in the Netherlands. *Law & Contemporary Problems*, 82(1), 227-256.
- Achenbach, T. M., Dumenci, L., & Rescorla, L. (2003). Ratings of relations between DSM-IV diagnostic categories and items of the Adult Self-Report (ASR) and Adult Behavior Checklist (ABCL). University of Vermont *Research Center for Children, Youth and Families*.
- ACRM. (1993). Definition of mild traumatic brain injury. *Head Trauma Rehabilitation*, 8(3), 86-87.
- Alexander, M. P., & Stuss, D. T. (2000). Disorders of frontal lobe functioning. *Seminars in Neurology*, 20(4), 427-438.
- Anderson, S. W., Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1999). Impairment of social and moral behavior related to early damage in human prefrontal cortex. *Nature Neuroscience*, 2(11), 1032-1037.
- 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), 176-184.
- Anderson, V., Northam, E., & Wrennall, J. (2018). *Developmental neuropsychology: A clinical approach*. Oxfordshire: Routledge.
- Anderson, V. A., Jacobs, R., & Anderson, P. J. (2010). *Executive functions and the frontal lobes: A lifespan perspective*. Oxfordshire: Psychology Press.
- Andrews, D. A., Bonta, J., & Wormith, S. (2000). *Level of service/case management inventory: LS/CMI*. Multi-Health Systems Toronto, Canada.
- Andrews, D. A., Zinger, I., Hoge, R. D., Bonta, J., Gendreau, P., & Cullen, F. T. (1990). Does correctional treatment work? A clinically relevant and psychologically informed meta-analysis. *Criminology*, 28(3), 369-404.
- Annisson, J., Eadie, T., & Knight, C. (2008). People first: Probation officer perspectives on probation work. *Probation Journal*, 55(3), 259-271.
- Arciniegas, D. B., Held, K., & Wagner, P. (2002). Cognitive impairment following traumatic brain injury. *Current Treatment Options in Neurology*, 4(1), 43-57.
- Atkinson, D. F., & Mann, R. E. (2012). Prison officers as observers of offence paralleling behaviours: An untapped resource? *The Journal of Forensic Psychiatry & Psychology*, 23(2), 139-155.
- Baillargeon, J., Penn, J. V., Knight, K., Harzke, A. J., Baillargeon, G., & Becker, E. A. (2010). Risk of reincarceration among prisoners with co-occurring severe mental illness and substance use disorders. *Administration and Policy in Mental Health and Mental Health Services Research*, 37(4), 367-374.
- Bakker, L. W., Riley, D., & O'Malley, J. (1999). *ROC, risk of reconviction: Statistical models predicting four types of re-offending*. .
- Barbosa, F., & Monteiro, L. C. (2008). Recurrent criminal behavior and executive dysfunction. *The Spanish Journal of Psychology*, 11(1), 259-265.
- Barker-Collo, S., Jones, K., Theadom, A., Starkey, N., Dowell, A., McPherson, K., Ameratunga, S., Dudley, M., Te Ao, B., & Feigin, V. (2015). Neuropsychological outcome and its correlates in the first year after adult mild traumatic brain injury: A population-based New Zealand study. *Brain Injury*, 29(13-14), 1604-1616.
- Barklage, H., Miller, D., & Bonham Jr, G. (2006). Probation conditions vs. probation officer directives: Where the twain shall meet. *Federal Probation*, 70(3), 37-41.

- Barnfield, T. V., & Leathem, J. M. (1998). Neuropsychological outcomes of traumatic brain injury and substance abuse in a New Zealand prison population. *Brain Injury, 12*(11), 951-962.
- Bazarian, J. J., Mcclung, J., Shah, M. N., Ting Cheng, Y., Flesher, W., & Kraus, J. (2005). Mild traumatic brain injury in the United States, 1998–2000. *Brain Injury, 19*(2), 85-91.
- Beaver, K. M., Boutwell, B. B., Barnes, J., Vaughn, M. G., & DeLisi, M. (2017). The association between psychopathic personality traits and criminal justice outcomes: Results from a nationally representative sample of males and females. *Crime & Delinquency, 63*(6), 708-730.
- Bechara, A., & Van Der Linden, M. (2005). Decision-making and impulse control after frontal lobe injuries. *Current Opinion in Neurology, 18*(6), 734-739.
- Bergeron, T. K., & Valliant, P. M. (2001). Executive function and personality in adolescent and adult offenders vs. non-offenders. *Journal of Offender Rehabilitation, 33*(3), 27-45.
- Bernstein, D. M. (1999). Subject Review: Recovery from mild head injury. *Brain Injury, 13*(3), 151-172.
- Blair, R. (2004). The roles of orbital frontal cortex in the modulation of antisocial behavior. *Brain and Cognition, 55*(1), 198-208.
- Blasko, B. L., Friedmann, P. D., Rhodes, A. G., & Taxman, F. S. (2015). The parolee–parole officer relationship as a mediator of criminal justice outcomes. *Criminal Justice and Behavior, 42*(7), 722-740.
- Blonigen, D. M., Rodriguez, A. L., Manfredi, L., Britt, J., Nevedal, A., Finlay, A. K., Rosenthal, J., Smelson, D., & Timko, C. (2017). The availability and utility of services to address risk factors for recidivism among justice-involved veterans. *Criminal Justice Policy Review, 28*(8), 790-813.
- 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.
- Bonta, J. (1995). The responsivity principle and offender rehabilitation. Forum on Corrections Research.
- Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation, 6*(1), 1-22.
- Bonta, J., & Andrews, D. A. (2016). *The psychology of criminal conduct*. Oxfordshire: Taylor & Francis.
- Boone, M., & Herzog-Evans, M. (2013). Decision-making and offender supervision. In *Offender supervision in Europe*. London: Palgrave Macmillan, 51-96.
- Boone, M., & Maguire, N. (2017). *The enforcement of offender supervision in Europe: understanding breach processes*. Oxfordshire: Routledge.
- Bottoms, A. (2001). Compliance and community penalties. In: Bottoms A, Gelsthorpe L, & Rex S (eds) *Community penalties: Change and challenges*. London, Willan: Cullompton, 87-116.
- Bourgon, G., & Bonta, J. (2014). Reconsidering the responsibility principle: A way to move forward. *Federal Probation, 78*(2), 3-10.
- Bracken, D. (2003). Skills and knowledge for contemporary probation practice. *Probation Journal, 50*(2), 101-114.
- Bracken, D. C. (2007). Risk management and/or punishment in the community: Supervising conditional sentences. *British Journal of Community Justice, 5*(2), 71-82.
- Braithwaite, V. (2003). Dancing with tax authorities: Motivational postures and non-compliant actions. *Taxing Democracy, 3*, 15-39.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101.
- Brewer-Smyth, K., Burgess, A. W., & Shults, J. (2004). Physical and sexual abuse, salivary cortisol, and neurologic correlates of violent criminal behavior in female prison inmates. *Biological Psychiatry, 55*(1), 21-31.
- Brower, M. C., & Price, B. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal of Neurology, Neurosurgery & Psychiatry, 71*(6), 720-726.
- Brown, J. D. (2004). Managing the Transition from institution to community: A Canadian parole officer perspective on the needs of newly released federal offenders. *Western Criminology Review, 5*(2), 97-107.
- Brunton, I., & Hartley, T. (2013). Enhanced thinking skills and the association between executive function and antisocial behaviour in children and adult offenders: Scope for intervention? *The Journal of Forensic Practice, 15*(1), 68-77.
- Bufkin, J. L., & Luttrell, V. R. (2005). Neuroimaging studies of aggressive and violent behavior: Current findings and implications for criminology and criminal justice. *Trauma, Violence, & Abuse, 6*(2), 176-191.
- Canton, R., & Dominey, J. (2017). *Probation*. Oxfordshire: Routledge.
- Cassidy, J. D., Carroll, L., Peloso, P., Borg, J., Von Holst, H., Holm, L., Kraus, J., & Coronado, V. (2004). Incidence, risk factors and prevention of mild traumatic brain injury: Results of the WHO Collaborating Centre Task Force on Mild Traumatic Brain Injury. *Journal of Rehabilitation Medicine, 36*(0), 28-60.
- Catroppa, C., & Anderson, V. (1999). Recovery of educational skills following paediatric traumatic brain injury. *Pediatric Rehabilitation, 3*(4), 167-175.
- Catroppa, C., Anderson, V. A., Muscara, F., Morse, S. A., Haritou, F., Rosenfeld, J. V., & Heinrich, L. M. (2009). Educational skills: Long-term outcome and predictors following paediatric traumatic brain injury. *Neuropsychological Rehabilitation, 19*(5), 716-732.
- Cattalani, R., Lombardi, F., Brianti, R., & Mazzucchi, A. (1998). Traumatic brain injury in childhood: Intellectual, behavioural and social outcome into adulthood. *Brain Injury, 12*(4), 283-296.
- Chan, R. C., Shum, D., Touloupoulou, T., & Chen, E. Y. (2008). Assessment of executive functions: Review of instruments and identification of critical issues. *Archives of Clinical Neuropsychology, 23*(2), 201-216.
- Cheng, J., O'Connell, M. E., & Wormith, J. S. (2019). Bridging neuropsychology and forensic psychology: Executive function overlaps with the central eight risk and need factors. *International Journal of Offender Therapy and Comparative Criminology, 63*(4), 558-573.
- Clasby, B., Bennett, M., Hughes, N., Hodges, E., Meadham, H., Hinder, D., Williams, H., & Mewse, A. (2019). The consequences of traumatic brain injury from the classroom to the courtroom: Understanding pathways through structural equation modelling. *Disability and Rehabilitation, 1*-10.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Cohen, R. A., Rosenbaum, A., Kane, R. L., Warnken, W. J., & Benjamin, S. (1999). Neuropsychological correlates of domestic violence. *Violence and Victims, 14*(4), 397-411.
- Colantonio, A., Kim, H., Allen, S., Asbridge, M., Petgrave, J., & Brochu, S. (2014). Traumatic brain injury and early life experiences among men and women in a prison

- population. *Journal of Correctional Health Care*, 20(4), 271-279.  
<https://doi.org/10.1177/1078345814541529>
- Colorado Department of Human Services, M. B. I. N. (2019). *A.H.E.A.D.* .  
<https://mindsourcencolorado.org/ahead/>.
- Cornet, L. J., van der Laan, P. H., Nijman, H. L., Tollenaar, N., & de Kogel, C. H. (2015). Neurobiological factors as predictors of prisoners' response to a cognitive skills training. *Journal of Criminal Justice*, 43(2), 122-132.
- Corporation, A. C. (2017). *Traumatic Brain Injury Strategy and Action Plan 2017–2021*.
- Corrections, N. Z. D. (2016). *In the Community: Sentences and Orders*. Crown Copyright.
- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI identification method. *The Journal of Head Trauma Rehabilitation*, 22(6), 318-329.
- Cullen, F. T., & Gendreau, P. (2000). Assessing correctional rehabilitation: Policy, practice, and prospects. *Criminal Justice*, 3, 109-175.
- Cumming, G. (2013). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Oxfordshire: Routledge.
- Damasio, H., Grabowski, T., Frank, R., Galaburda, A. M., & Damasio, A. R. (1994). The return of Phineas Gage: clues about the brain from the skull of a famous patient. *Science*, 264(5162), 1102-1105.
- Deering, J. (2010). Attitudes and beliefs of trainee probation officers: A 'new breed'? *Probation Journal*, 57(1), 9-26.
- Delis, D. C., Kaplan, E., & Kramer, J. H. (2001). Delis-Kaplan Executive Function System.
- DeLisi, M., Drury, A., & Elbert, M. (2021). Who are the compliant correctional clients? New evidence on protective factors among federal supervised releases. *International Journal of Offender Therapy and Comparative Criminology*, 65(14), 91-108. 0306624X21992681.
- DeLude, B., Mitchell, D., & Barber, C. (2012). The probationer's perspective on the probation officer-probationer relationship and satisfaction with probation. *Federal Probation*, 76(1), 35-39.
- Demark, J., & Gemeinhardt, M. (2002). Anger and its management for survivors of acquired brain injury. *Brain Injury*, 16(2), 91-108.
- DeMichele, M., & Payne, B. (2018). Exploring probation officer styles and goals with individual, organizational, and social characteristics. *European Journal of Probation*, 10(3), 232-248.
- Denney, A. S., Tewksbury, R., & Jones, R. S. (2014). Beyond basic needs: Social support and structure for successful offender reentry. *Journal of Quantitative Criminal Justice & Criminology*, 2(1), 39-67.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135-168.
- Dowden, C., & Andrews, D. A. (2004). The importance of staff practice in delivering effective correctional treatment: A meta-analytic review of core correctional practice. *International Journal of Offender Therapy and Comparative Criminology*, 48(2), 203-214.
- Durand, E., Chevignard, M., Ruet, A., Dereix, A., Jourdan, C., & Pradat-Diehl, P. (2017). History of traumatic brain injury in prison populations: A systematic review. *Annals of Physical and Rehabilitation Medicine*, 60(2), 95-101.
- Durand, E., Watier, L., Fix, M., Weiss, J., Chevignard, M., & Pradat-Diehl, P. (2016). Prevalence of traumatic brain injury and epilepsy among prisoners in France: Results of the Fleury TBI study. *Brain Injury*, 30(4), 363-372. <https://doi.org/10.3109/02699052.2015.1131848>

- Ellwart, T., Rinck, M., & Becker, E. S. (2003). Selective memory and memory deficits in depressed inpatients. *Depression and Anxiety, 17*(4), 197-206.
- Epperson, M. W., Canada, K., Thompson, J., & Lurigio, A. (2014). Walking the line: Specialized and standard probation officer perspectives on supervising probationers with serious mental illnesses. *International Journal of Law and Psychiatry, 37*(5), 473-483.
- Farrall, S. (2002). Long-term absences from probation: Officers' and probationers' accounts. *The Howard Journal of Criminal Justice, 41*(3), 263-278.
- Farrer, T. J., Frost, R. B., & Hedges, D. W. (2013). Prevalence of traumatic brain injury in juvenile offenders: A meta-analysis. *Child Neuropsychology, 19*(3), 225-234.
- Fazel, S., Lichtenstein, P., Grann, M., & Långström, N. (2011). Risk of violent crime in individuals with epilepsy and traumatic brain injury: A 35-year Swedish population study. *PLoS medicine, 8*(12).
- Feigin, V. L., Theadom, A., Barker-Collo, S., Starkey, N. J., McPherson, K., Kahan, M., Dowell, A., Brown, P., Parag, V., & Kydd, R. (2013). Incidence of traumatic brain injury in New Zealand: A population-based study. *The Lancet Neurology, 12*(1), 53-64.
- Ferguson, P. L., Pickelsimer, E. E., Corrigan, J. D., Bogner, J. A., & Wald, M. (2012). Prevalence of traumatic brain injury among prisoners in South Carolina. *Journal of Head Trauma Rehabilitation, 27*(3), E11-E20.  
<https://doi.org/10.1097/HTR.0b013e31824e5f47>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Newbury Park, CA: Sage.
- Fishbein, D. (2000). Neuropsychological function, drug abuse, and violence: A conceptual framework. *Criminal Justice and Behavior, 27*(2), 139-159.
- Fishbein, D., Sheppard, M., Hyde, C., Hubal, R., Newlin, D., Serin, R., Chrousos, G., & Alesci, S. (2009). Deficits in behavioral inhibition predict treatment engagement in prison inmates. *Law and Human Behavior, 33*(5), 419-435.
- Flannery, D. J., Vazsonyi, A. T., & Waldman, I. D. (2007). *The Cambridge handbook of violent behavior and aggression*. Cambridge University Press.
- Flaskas, C., & Perlesz, A. (2018). *The therapeutic relationship in systemic therapy*. Oxfordshire: Routledge.
- Fleminger, S., & Ponsford, J. (2005). Long term outcome after traumatic brain injury. In: British Medical Journal Publishing Group.
- Frost, R. B., Farrer, T. J., Primosch, M., & Hedges, D. W. (2013). Prevalence of traumatic brain injury in the general adult population: A meta-analysis. *Neuroepidemiology, 40*(3), 154-159.
- Fuster, J. (2015). *The prefrontal cortex*. Academic Press.
- Gannon, T. A., & Ward, T. (2014). Where has all the psychology gone?: A critical review of evidence-based psychological practice in correctional settings. *Aggression and Violent Behavior, 19*(4), 435-446.
- Garcia-Barrera, M. A., Kamphaus, R. W., & Bandalos, D. (2011). Theoretical and statistical derivation of a screener for the behavioral assessment of executive functions in children. *Psychological Assessment, 23*(1), 64-79.
- Garland, B., Wodahl, E. J., & Mayfield, J. (2011). Prisoner reentry in a small metropolitan community: Obstacles and policy recommendations. *Criminal Justice Policy Review, 22*(1), 90-110.
- Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C., & Rapoport, J. L. (1999). Brain development during childhood and adolescence: A longitudinal MRI study. *Nature Neuroscience, 2*(10), 861-863.

- Gioia, G. A., & Isquith, P. K. (2004). Ecological assessment of executive function in traumatic brain injury. *Developmental Neuropsychology*, *25*(1-2), 135-158.
- Gioia, G. A., Isquith, P. K., & Guy, S. C. (2001). Assessment of executive functions in children with neurological impairment. In: R. Simeonsson & S. Rosenthal (Eds), *Psychological and developmental assessment: Children with disabilities and chronic conditions*. Houston, TX: Guilford Press, 317-356.
- Glaser, D. (1964). *The effectiveness of a prison and parole system*. Indianapolis: Bobbs-Merrill.
- Gogtay, N., Giedd, J. N., Lusk, L., Hayashi, K. M., Greenstein, D., Vaituzis, A. C., Nugent, T. F., Herman, D. H., Clasen, L. S., & Toga, A. W. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences*, *101*(21), 8174-8179.
- Goldstein, H. (1963). Police discretion: The ideal versus the real. *Public Administration Review*, 140-148.
- Gorgens, K. A., Meyer, L., Dettmer, J., Standeven, M., Goodwin, E., Marchi, C., & Lyman, H. (2021). Traumatic brain injury in community corrections: Prevalence and differences in compliance and long-term outcomes among men and women on probation. *Criminal Justice and Behavior*, 00938548211010316.
- Grant, S., & McNeill, F. (2014). The quality of probation supervision: Comparing practitioner accounts in England and Scotland. *European Journal of Probation*, *6*(2), 147-168.
- Grattet, R., Nguyen, V., Bird, M., & Gross, J. (2018). Probation's changing role in California: Challenges and opportunities for hybrid supervision. *Federal Probation*, *82*(1), 20-25.
- Grattet, R., Petersilia, J., Lin, J., & Beckman, M. (2009). Parole violations and revocations in California: Analysis and suggestions for action. *Federal Probation*, *73*(1), 2-11.
- Green, P., Allen, L., & Astner, K. (1996). *Manual for Computerised Word Memory Test*. Durham, NC: CogniSyst.
- Guberman, G. I., Robitaille, M.-P., Larm, P., Ptito, A., Vitaro, F., Tremblay, R. E., & Hodgins, S. (2019). Are traumatic brain injuries associated with criminality after taking account of childhood family social status and disruptive behaviors? *The Journal of Neuropsychiatry and Clinical Neurosciences*, *31*(2), 123-131.
- Gunnison, E., & Helfgott, J. B. (2011). Factors that hinder offender reentry success: A view from community corrections officers. *International Journal of Offender Therapy and Comparative Criminology*, *55*(2), 287-304.
- Gyateng, T., McSweeney, T., & Hough, M. (2010). Key predictors of compliance with community supervision in London. London: Project report, Criminal Justice Partnership
- Haggerty, K. D., & Bucerius, S. M. (2020). Picking battles: Correctional officers, rules, and discretion in prison. *Criminology: An Interdisciplinary Journal*, *59*(1), 137-157.
- Hancock, M., Tapscott, J. L., & Hoaken, P. N. (2010). Role of executive dysfunction in predicting frequency and severity of violence. *Aggressive Behavior*, *36*(5), 338-349.
- Hanson, K. L., Medina, K. L., Padula, C. B., Tapert, S. F., & Brown, S. A. (2011). Impact of adolescent alcohol and drug use on neuropsychological functioning in young adulthood: 10-year outcomes. *Journal of Child & Adolescent Substance Abuse*, *20*(2), 135-154.
- Hardman, J. M., & Manoukian, A. (2002). Pathology of head trauma. *Neuroimaging Clinics*, *12*(2), 175-187.

- Hawley, C. A., & Maden, A. (2003). Mentally disordered offenders with a history of previous head injury: Are they more difficult to discharge? *Brain Injury, 17*(9), 743-758. <https://doi.org/10.1080/0269905031000089341>
- Herbert, C. W., Morenoff, J. D., & Harding, D. J. (2015). Homelessness and housing insecurity among former prisoners. *RSF: The Russell Sage Foundation Journal of the Social Sciences, 1*(2), 44-79.
- Hodgins, S. (2007). Persistent violent offending: what do we know? *The British Journal of Psychiatry, 190*(49), 12-14.
- Holroyd, C. B., & Coles, M. G. (2002). The neural basis of human error processing: Reinforcement learning, dopamine, and the error-related negativity. *Psychological Review, 109*(4), 679-709.
- Hucklesby, A. (2009). Understanding offenders' compliance: A case study of electronically monitored curfew orders. *Journal of Law and Society, 36*(2), 248-271.
- Hudspeth, W. J., & Pribram, K. H. (1990). Stages of brain and cognitive maturation. *Journal of Educational Psychology, 82*(4), 881-884.
- Hudspeth, W. J., & Pribram, K. H. (1992). Psychophysiological indices of cerebral maturation. *International Journal of Psychophysiology, 12*(1), 19-29.
- Hughes, W. (2012). Promoting offender engagement and compliance in sentence planning: Practitioner and service user perspectives in Hertfordshire. *Probation Journal, 59*(1), 49-65.
- Jakola, A., Müller, K., Larsen, M., Waterloo, K., Romner, B., & Ingebrigtsen, T. (2007). Five-year outcome after mild head injury: A prospective controlled study. *Acta Neurologica Scandinavica, 115*(6), 398-402.
- James, D. J. (2004). Profile of jail inmates, 2002. Washington, D.C: US Department of Justice, Office of Justice Programs, Bureau of Justice.
- Jansen, J. (2020). Traumatic brain injury and its relationship to previous convictions, aggression, and psychological functioning in Dutch detainees. *Journal of Forensic Psychology Research and Practice, 20*(5), 395-412.
- Jones, M. (2004). *Community Corrections*. Long-Grove, IL: Waveland Press.
- Jones, M., & Kerbs, J. J. (2007). Probation and parole officers and discretionary decision-making: Responses to technical and criminal violations. *Federal Probation, 71*, 9-15.
- Jorge, R., & Robinson, R. G. (2002). Mood disorders following traumatic brain injury. *NeuroRehabilitation, 17*(4), 311-324.
- Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: A review of our current understanding. *Neuropsychology Review, 17*(3), 213-233.
- Kennealy, P. J., Skeem, J. L., Manchak, S. M., & Eno Louden, J. (2012). Firm, fair, and caring officer-offender relationships protect against supervision failure. *Law and Human Behavior, 36*(6), 496-505.
- Kennedy, E., Heron, J., & Munafò, M. (2017). Substance use, criminal behaviour and psychiatric symptoms following childhood traumatic brain injury: Findings from the ALSPAC cohort. *European Child & Adolescent Psychiatry, 26*(10), 1197-1206.
- Klockars, C. B. (1972). A theory of probation supervision. *The Journal of Criminal Law, Criminology, and Police Science, 63*(4), 550-557.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine, 15*(2), 155-163.
- Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry, 3*(8), 760-773.
- Kopak, A. M., Hoffmann, N. G., & Proctor, S. L. (2016). Key risk factors for relapse and rearrest among substance use treatment patients involved in the criminal justice system. *American Journal of Criminal Justice, 41*(1), 14-30.



- Kosson, D., Budhani, S., Nakic, M., Chen, G., Saad, Z. S., Vythilingam, M., Pine, D. S., & Blair, R. J. R. (2006). The role of the amygdala and rostral anterior cingulate in encoding expected outcomes during learning. *Neuroimage*, *29*(4), 1161-1172.
- LaDuke, C., DeMatteo, D., Heilbrun, K., Gallo, J., & Swirsky-Sacchetti, T. (2017). The neuropsychological assessment of justice-involved men: Descriptive analysis, preliminary data, and a case for group-specific norms. *Archives of Clinical Neuropsychology*, *32*(8), 929-942.
- Lam, M., Eng, G. K., Rapisarda, A., Subramaniam, M., Kraus, M., Keefe, R. S., & Collinson, S. L. (2013). Formulation of the age–education index: Measuring age and education effects in neuropsychological performance. *Psychological Assessment*, *25*(1), 61-70.
- Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *The Journal of Head Trauma Rehabilitation*, *21*(5), 375-378.
- LaVigne, M., & Van Rybroek, G. J. (2011). Breakdown in the language zone: The prevalence of language impairments among juvenile and adult offenders and why it matters. *UC Davis Journal of International Law & Policy*, *15*, 37.
- Lenroot, R. K., & Giedd, J. N. (2006). Brain development in children and adolescents: Insights from anatomical magnetic resonance imaging. *Neuroscience & Biobehavioral Reviews*, *30*(6), 718-729.
- Leon-Carrion, J., & Ramos, F. J. C. (2003). Blows to the head during development can predispose to violent criminal behaviour: rehabilitation of consequences of head injury is a measure for crime prevention. *Brain Injury*, *17*(3), 207-216.
- Levin, H. S., Benton, A. L., & Grossman, R. G. (1982). *Neurobehavioral consequences of closed head injury*. USA: Oxford University Press.
- Lewis, D. O., Pincus, J. H., Feldman, M., Jackson, L., & Bard, B. (1986). Psychiatric, neurological, and psychoeducational characteristics of 15 death row inmates in the United States. *American Journal of Psychiatry* *143*(7), 838-845.
- Lezak, M. D., Howieson, D. B., Loring, D. W., & Fischer, J. S. (2004). *Neuropsychological Assessment*. USA: Oxford University Press.
- Lezak, M. D. (1982). The problem of assessing executive functions. *International Journal of Psychology*, *17*(1-4), 281-297.
- Lezak, M. D. (1987a). Relationships between personality disorders, social disturbances, and physical disability following traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, *2*(1), 57-69.
- Lezak, M. D. (1987b). Relationships between personality disorders, social disturbances, and physical disability following traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, *2*(1), 57-69.
- Liebling, A., & Maruna, S. (2013). *The effects of imprisonment*. Routledge.
- Linden, M. A., O'Rourke, C., Monaghan, C., & Rainey, D. (2021). Experiences of offenders with traumatic brain injury. *Brain Impairment*, *22*(1), 108-123.
- Listwan, S. J. (2009). Reentry for serious and violent offenders: An analysis of program attrition. *Criminal Justice Policy Review*, *20*(2), 154-169.
- Lowe, C., & Rabbitt, P. (1998). Test-re-test reliability of the CANTAB and ISPOCD neuropsychological batteries: Theoretical and practical issues. *Neuropsychologia*, *36*(9), 915-923.
- Lowenkamp, C. T., Latessa, E. J., & Holsinger, A. M. (2006). The risk principle in action: What have we learned from 13,676 offenders and 97 correctional programs? *Crime & Delinquency*, *52*(1), 77-93.

- Luther, J. B., Reichert, E. S., Holloway, E. D., Roth, A. M., & Aalsma, M. C. (2011). An exploration of community reentry needs and services for prisoners: A focus on care to limit return to high-risk behavior. *AIDS Patient Care and STDs*, 25(8), 475-481.
- Ma, Z., Bayley, M. T., Perrier, L., Dhir, P., Dépatie, L., Comper, P., Ruttan, L., Lay, C., & Munce, S. E. (2019). The association between adverse childhood experiences and adult traumatic brain injury/concussion: A scoping review. *Disability and Rehabilitation*, 41(11), 1360-1366.
- Machin, S., Marie, O., & Vujić, S. (2011). The crime reducing effect of education. *The Economic Journal*, 121(552), 463-484.
- Malarbi, S., Abu-Rayya, H. M., Muscara, F., & Stargatt, R. (2017). Neuropsychological functioning of childhood trauma and post-traumatic stress disorder: A meta-analysis. *Neuroscience & Biobehavioral Reviews*, 72, 68-86.
- Marlowe, D. B. (2003). Integrating substance abuse treatment and criminal justice supervision. *Science & Practice Perspectives*, 2(1), 4-14.
- Marsh, I. (2007). *Theories of Crime*. Oxfordshire: Routledge.
- Marsh, N., & Martinovich, W. (2006). Executive dysfunction and domestic violence. *Brain Injury*, 20(1), 61-66.
- Mason, J., & Murphy, G. (2002). Intellectual disability amongst people on probation: Prevalence and outcome. *Journal of Intellectual Disability Research*, 46(3), 230-238.
- Matheson, F. I., McIsaac, K. E., Fung, K., Stewart, L. A., Wilton, G., Keown, L. A., Nathens, A. B., Colantonio, A., & Moineddin, R. (2020). Association between traumatic brain injury and prison charges: A population-based cohort study. *Brain Injury*, 34(6), 757-763.
- McIsaac, K. E., Moser, A., Moineddin, R., Keown, L. A., Wilton, G., Stewart, L. A., Colantonio, A., Nathens, A. B., & Matheson, F. I. (2016). Association between traumatic brain injury and incarceration: A population-based cohort study. *CMAJ Open*, 4(4), E746-E753.
- McKay, C., Wertheimer, J. C., Fichtenberg, N. L., & Casey, J. E. (2008). The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS): Clinical utility in a traumatic brain injury sample. *The Clinical Neuropsychologist*, 22(2), 228-241.
- McKinlay, A., Corrigan, J., Horwood, L. J., & Fergusson, D. M. (2014). Substance abuse and criminal activities following traumatic brain injury in childhood, adolescence, and early adulthood. *The Journal of Head Trauma Rehabilitation*, 29(6), 498-506.
- McKinlay, A., Grace, C., Horwood, J., Feldman, M., Ridder, M., & MacFarlane, R. (2008). Prevalence of traumatic brain injury among children, adolescents and young adults: Prospective evidence from a birth cohort. *Brain Injury*, 22(2), 175-181. <https://doi.org/10.1080/02699050801888824>
- McMurrin, M., & Theodosi, E. (2007). Is treatment non-completion associated with increased reconviction over no treatment? *Psychology, Crime & Law*, 13(4), 333-343.
- McNeill, F. (2006). A desistance paradigm for offender management. *Criminology & Criminal Justice*, 6(1), 39-62.
- Meijers, J., Harte, J. M., Meynen, G., & Cuijpers, P. (2017). Differences in executive functioning between violent and non-violent offenders. *Psychological Medicine*, 47(10), 1784-1793.
- Menon, D. K., Schwab, K., Wright, D. W., & Maas, A. I. (2010). Position statement: definition of traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 91(11), 1637-1640.
- Merbitz, C., Jain, S., Good, G. L., & Jain, A. (1995). Reported head injury and disciplinary rule infractions in prison. *Journal of Offender Rehabilitation*, 22(3-4), 11-19.

- Miller, B. L., & Cummings, J. L. (2017). *The Human Frontal Lobes: Functions and Disorders*. Houston, TX: Guilford Publications.
- Miller, E. (2002). Brain injury as a contributory factor in offending. In: J. Glicksohn (Eds) *The Neurobiology of Criminal Behavior*. Boston, MA: Springer, 5, 137-153.
- Miller, L. (1992). Neuropsychology, personality, and substance abuse in the head injury case: Clinical and forensic issues. *International Journal of Law and Psychiatry*, 15(3), 303-316.
- Mitchell, Theadom, A., & du Preez, E. (2017). Prevalence of traumatic brain injury in a male adult prison population and its association with the offence type. *Neuroepidemiology*, 48, 164-170. <https://doi.org/10.1159/000479520>
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100(4), 674-701.
- Moffitt, T. E. (2007). A review of research on the taxonomy of life-course persistent versus adolescence-limited antisocial behavior. In: D. Flannery, A. Vazsonyi, & I. Waldman (Eds.), *The Cambridge Handbook of Violent Behavior and Aggression*. Cambridge University Press.
- Moffitt, T. E., Caspi, A., Harrington, H., & Milne, B. J. (2002). Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology*, 14(1), 179-207.
- Mollayeva, T., Mollayeva, S., & Colantonio, A. (2018). Traumatic brain injury: sex, gender and intersecting vulnerabilities. *Nature Reviews Neurology*, 14(12), 711-722.
- Morgan, A. B., & Lilienfeld, S. O. (2000). A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clinical Psychology Review*, 20(1), 113-136.
- Morrell, R. F., Merbitz, C. T., Jain, S., & Jain, S. (1998). Traumatic brain injury in prisoners. *Journal of Offender Rehabilitation*, 27(3-4), 1-8. [https://doi.org/10.1300/J076v27n03\\_01](https://doi.org/10.1300/J076v27n03_01)
- Moser, R. S., & Schatz, P. (2002). Enduring effects of concussion in youth athletes. *Archives of Clinical Neuropsychology*, 17(1), 91-100.
- Mowen, T. J., Wodahl, E., Brent, J. J., & Garland, B. (2018). The role of sanctions and incentives in promoting successful reentry: Evidence from the SVORI data. *Criminal Justice and Behavior*, 45(8), 1288-1307.
- MTBI, C. (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.
- Nagele, D., Vaccaro, M., Schmidt, M., & Keating, D. (2018). Brain injury in an offender population: Implications for reentry and community transition. *Journal of Offender Rehabilitation*, 57(8), 562-585.
- Nellis, M. (2006). Surveillance, rehabilitation, and electronic monitoring: Getting the issues clear. *Criminology & Public Policy*, 5(1), 103-108.
- Norman, E. M., Wilson, L., Starkey, N., & Polaschek, D. L. L. (2021). How probation officers understand and work with people on community supervision sentences to enhance compliance. *Probation Journal*
- O'Rourke, C., Linden, M. A., & Lohan, M. (2018a). Misconceptions about traumatic brain injury among probation services. *Disability and Rehabilitation*, 40(10), 1119-1126.
- O'Rourke, C., Linden, M. A., & Lohan, M. (2018b). Traumatic brain injury and abuse among female offenders compared to non-incarcerated controls. *Brain Injury*, 32(13-14), 1787-1794.

- O'Rourke, C., Linden, M. A., Lohan, M., & Bates-Gaston, J. (2016). Traumatic brain injury and co-occurring problems in prison populations: A systematic review. *Brain Injury, 30*(7), 839-854.
- O'Sullivan, M., Fitzsimons, S., Ramos, S. d. S., Oddy, M., & Sterr, A. (2020). Characteristics and neuropsychological impact of traumatic brain injury in female prisoners. *Brain Injury, 35*(1), 72-81.
- Ogden, J. A., & McFarlane-Nathan, G. (1997). Cultural bias in the neuropsychological assessment of young Maori men. *New Zealand Journal of Psychology, 26*, 2-12.
- Ogilvie, J. M., Stewart, A. L., Chan, R. C., & Shum, D. H. (2011). Neuropsychological measures of executive function and antisocial behavior: A meta-analysis. *Criminology, 49*(4), 1063-1107.
- Olson, D. (2014). Risk factors for prison recidivism. *Encyclopedia of criminology and criminal justice*. New York, NY: Springer.
- Ostermann, M., & Hyatt, J. (2020). *Do text message reminders impact appointment behaviors for individuals under community supervision?* (Doctoral dissertation, Drexel University).
- Ouimet, M. C., Brown, T. G., Nadeau, L., Lepage, M., Pelletier, M., Couture, S., Tremblay, J., Legault, L., Dongier, M., & Gianoulakis, C. (2007). Neurocognitive characteristics of DUI recidivists. *Accident Analysis & Prevention, 39*(4), 743-750.
- Overend, C. O. (2011). *Investigation of the relationship between cognitive impairment and treatment responsivity in mentally disordered offenders*. (Doctoral dissertation, Edinburgh University)
- Paparozi, M. A., & Gendreau, P. (2005). An intensive supervision program that worked: Service delivery, professional orientation, and organizational supportiveness. *The Prison Journal, 85*(4), 445-466.
- Parry-Jones, B. L., Vaughan, F. L., & Miles Cox, W. (2006). Traumatic brain injury and substance misuse: A systematic review of prevalence and outcomes research (1994–2004). *Neuropsychological Rehabilitation, 16*(5), 537-560.
- Perkes, I., Schofield, P. W., Butler, T., & Hollis, S. J. (2011). Traumatic brain injury rates and sequelae: A comparison of prisoners with a matched community sample in Australia. *Brain Injury, 25*(2), 131-141.  
<https://doi.org/10.3109/02699052.2010.536193>
- Petersilia, J. (2004). What works in prisoner reentry-reviewing and questioning the evidence. *Federal Probation, 68*(2), 4-8.
- Piccolino, A. L., & Solberg, K. B. (2014). The impact of traumatic brain injury on prison health services and offender management. *Journal of Correctional Health Care, 20*(3), 203-212. <https://doi.org/10.1177/1078345814530871>
- Pickett, W., Ardern, C., & Brison, R. J. (2001). A population-based study of potential brain injuries requiring emergency care. *Cmaj, 165*(3), 288-292.
- Piquero, A. (2001). Testing Moffitt's neuropsychological variation hypothesis for the prediction of life-course persistent offending. *Psychology, Crime & Law, 7*(3), 193-215.
- 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. <https://doi.org/10.1080/09602011.2014.973887>
- Ponsford, J. L., Olver, J., & Curran, C. (1995). A profile of outcome: 2 years after traumatic brain injury. *Brain Injury, 9*(1), 1-10.
- Prigatano, G. P. (1986). *Neuropsychological rehabilitation after brain injury*. Baltimore, MD: Johns Hopkins University Press.

- Prins, S. J. (2014). Prevalence of mental illnesses in US state prisons: A systematic review. *Psychiatric Services, 65*(7), 862-872.
- Purkiss, M., Kifer, M., Hemmens, C., & Burto, V. S. (2003). Probation officer functions-A statutory analysis. *Fed. Probation, 67*(1), 12-23.
- Raine, A. (1997). *The Psychopathology of Crime: Criminal Behavior as a Clinical Disorder*. Houston, TX: Gulf Professional Publishing.
- Raine, A., Moffitt, T. E., Caspi, A., Loeber, R., Stouthamer-Loeber, M., & Lynam, D. (2005). Neurocognitive impairments in boys on the life-course persistent antisocial path. *Journal of Abnormal Psychology, 114*(1), 38-49.
- Raines, A. (1993). *The psychology of crime: Criminal behavior as a clinical disorder*. San Diego, CA: Academic Press.
- Ramey, T., & Regier, P. S. (2019). Cognitive impairment in substance use disorders. *CNS Spectrums, 24*(1), 102-113.  
<https://doi.org/https://doi.org/10.1017/S1092852918001426>
- Randolph, C. (1998). *Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)*. San Antonio, TX: Psychological Corporation
- Ray, B., & Richardson, N. J. (2017). Traumatic brain injury and recidivism among returning inmates. *Criminal Justice and Behavior, 44*(3), 472-486.
- Ray, B., Sapp, D., & Kincaid, A. (2014). Traumatic brain injury among Indiana State prisoners. *Journal of Forensic Sciences, 59*(5), 1248-1253. <https://doi.org/10.1111/1556-4029.12466>
- Raynor, P. (2004). The probation service 'pathfinders' finding the path and losing the way? *Criminal Justice, 4*(3), 309-325.
- Raynor, P., Ugwudike, P., & Vanstone, M. (2014). The impact of skills in probation work: A reconviction study. *Criminology & Criminal Justice, 14*(2), 235-249.
- Raynor, P., Ugwudike, P., Vanstone, M., & Heath, B. (2012). The Jersey Supervision Skills Study. *EuroVista, 2*(1), 20-22.
- Reitan, R. M., & Wolfson, D. (2000). The neuropsychological similarities of mild and more severe head injury. *Archives of Clinical Neuropsychology, 15*(5), 433-442.
- Rex, S. (1999). Desistance from offending: Experiences of probation. *The Howard Journal of Criminal Justice, 38*(4), 366-383.
- Ribbers, G. (2007). Traumatic brain injury rehabilitation in the Netherlands: Dilemmas and challenges. *The Journal of Head Trauma Rehabilitation, 22*(4), 234-238.
- Riggio, S., & Wong, M. (2009). Neurobehavioral sequelae of traumatic brain injury. *Mount Sinai Journal of Medicine: A Journal of Translational and Personalized Medicine, 76*(2), 163-172.
- Robinson, G., & McNeill, F. (2008). Exploring the dynamics of compliance with community penalties. *Theoretical Criminology, 12*(4), 431-449.
- Romero-Martínez, Á., Lila, M., Gracia, E., Martín-Fernández, M., & Moya-Albiol, L. (2021). Generally antisocial batterers with high neuropsychological deficits present lower treatment compliance and higher recidivism. *Psychology of Violence, 11*(3), 318-328.
- Rosenbaum, A., & Hoge, S. K. (1989). Head injury and marital aggression. *The American Journal of Psychiatry, 146*(8), 1048-1051.  
<https://doi.org/https://doi.org/10.1176/ajp.146.8.1048>
- Ross, E. H., & Hoaken, P. N. (2011). Executive cognitive functioning abilities of male first time and return Canadian federal inmates. *Canadian Journal of Criminology and Criminal Justice, 53*(4), 377-403.
- Roszyk, A., Izdebska, A., & Peichert, K. (2013). Planning and inhibitory abilities in criminals with antisocial personality disorder. *Acta Neuropsychologica, 11*(2), 193-205.

- Roth, R. M., Gioia, G. A., & Isquith, P. K. (2005). *BRIEF-A: Behavior Rating Inventory of Executive Function--adult Version*. Lutz, FL: Psychological Assessment Resources.
- Ruff, R. (2005). Two decades of advances in understanding of mild traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 20*(1), 5-18.
- Sánchez de Ribera, O., Trajtenberg, N., & Cook, S. (2020). Executive functioning among first time and recidivist inmates in Uruguay. *Applied Neuropsychology: Adult, 1-9*.
- Schaefer, L., & Williams, G. C. (2018). The impact of probation and parole officers' attitudes about offenders on professional practices. *Corrections, 5*(4), 1-18.
- Schiffer, B., Pawliczek, C., Mu, B., Forsting, M., Gizewski, E., Leygraf, N., & Hodgins, S. (2014). Neural mechanisms underlying cognitive control of men with lifelong antisocial behavior. *Psychiatry Research: Neuroimaging, 222*(1-2), 43-51.
- Schofield, P. W., Butler, T., Hollis, S. J., Smith, N. E., Lee, S. J., & Kelso, W. M. (2006a). Traumatic brain injury among Australian prisoners: Rates, recurrence and sequelae. *Brain Injury, 20*(5), 499-506. <https://doi.org/10.1080/02699050600664749>
- Schofield, P. W., Butler, T. G., Hollis, S. J., Smith, N. E., Lee, S. J., & Kelso, W. M. (2006b). Neuropsychiatric correlates of traumatic brain injury (TBI) among Australian prison entrants. *Brain Injury, 20*(13-14), 1409-1418.
- Scott, C. K., Grella, C. E., Dennis, M. L., & Funk, R. R. (2014). Predictors of recidivism over 3 years among substance-using women released from jail. *Criminal Justice and Behavior, 41*(11), 1257-1289.
- Seruca, T., & Silva, C. F. (2015). Recidivist criminal behaviour and executive functions: A comparative study. *The Journal of Forensic Psychiatry & Psychology, 26*(5), 699-717.
- Shiroma, E. J., Ferguson, P. L., & Pickelsimer, E. E. (2010). Prevalence of traumatic brain injury in an offender population: A meta-analysis. *Journal of Correctional Health Care, 16*(2), 147-159.
- Shiroma, E. J., Pickelsimer, E. E., Ferguson, P. L., Gebregziabher, M., Lattimore, P. K., Nicholas, J. S., Dukes, T., & Hunt, K. J. (2010). Association of medically attended traumatic brain injury and in-prison behavioral infractions: A statewide longitudinal study. *Journal of Correctional Health Care, 16*(4), 273-286.
- Silver, J. M., McAllister, T. W., & Arciniegas, D. B. (2018). *Textbook of traumatic brain injury*. Washington D.C: American Psychiatric Pub.
- Skeem, J. L., Loudon, J. E., Polaschek, D., & Camp, J. (2007). Assessing relationship quality in mandated community treatment: Blending care with control. *Psychological Assessment, 19*(4), 397-410.
- Skeem, J. L., & Manchak, S. (2008). Back to the future: From Klockars' model of effective supervision to evidence-based practice in probation. *Journal of Offender Rehabilitation, 47*(3), 220-247.
- Slabonik, M. L., & Sims, B. (2002). Controlling discretion in bureaucratic agencies: A survey of adult probation officers. *Corrections Compendium, 27*(9), 1-5.
- Sloas, L., Murphy, A., Wooditch, A., & Taxman, F. S. (2019). Assessing the use and impact of points and rewards across four federal probation districts: A Contingency management approach. *Victims & Offenders, 14*(7), 811-831.
- Smit, D. V. Z. (2007). *Handbook of basic principles and promising practices on alternatives to imprisonment*. New York, NY: United Nations Publications.
- Smith, A., Heyes, K., Fox, C., Harrison, J., Kiss, Z., & Bradbury, A. (2018). The effectiveness of probation supervision towards reducing reoffending: A Rapid Evidence Assessment. *Probation Journal, 65*(4), 407-428.

- Sorsby, A., Shapland, J., & Robinson, G. (2017). Using compliance with probation supervision as an interim outcome measure in evaluating a probation initiative. *Criminology & Criminal Justice*, *17*(1), 40-61.
- Staton-Tindall, M., Havens, J. R., Oser, C. B., & Burnett, M. C. (2011). Substance use prevalence in criminal justice settings. In: C. Leukefeld, T. Gullotta, and J. Gregrich (Eds) *Handbook of evidence-based substance abuse treatment in criminal justice settings*. New York: Springer, 81-101.
- Steiner, B., Travis III, L. F., Makarios, M. D., & Brickley, T. (2011). The influence of parole officers' attitudes on supervision practices. *Justice Quarterly*, *28*(6), 903-927.
- Stewart, L. A., Wilton, G., & Sapers, J. (2016). Offenders with cognitive deficits in a Canadian prison population: Prevalence, profile, and outcomes. *International Journal of Law and Psychiatry*, *44*, 7-14.
- Strickland, J. C., & Johnson, M. W. (2021). Rejecting impulsivity as a psychological construct: A theoretical, empirical, and sociocultural argument. *Psychological Review*, *128*(2), 336-361.
- Stuss, D. T. (1992). Biological and psychological development of executive functions. *Brain and Cognition*, *20*(1), 8-23.
- Teasdale, G., & Jennett, B. (1974). Assessment of coma and impaired consciousness: A practical scale. *The Lancet*, *304*(7872), 81-84.
- Theadom, A., Parag, V., Dowell, T., McPherson, K., Starkey, N., Barker-Collo, S., Jones, K., Ameratunga, S., Feigin, V. L., & Group, B. R. (2016). Persistent problems 1 year after mild traumatic brain injury: A longitudinal population study in New Zealand. *British Journal of General Practice*, *66*(642), e16-e23.
- Theadom, A., Parmar, P., Jones, K., Barker-Collo, S., Starkey, N. J., McPherson, K. M., Ameratunga, S., Feigin, V. L., & Group, B. R. (2015). Frequency and impact of recurrent traumatic brain injury in a population-based sample. *Journal of Neurotrauma*, *32*(10), 674-681.
- Theadom, A., Starkey, N., Barker-Collo, S., Jones, K., Ameratunga, S., Feigin, V., & Group, B. y. R. (2018). Population-based cohort study of the impacts of mild traumatic brain injury in adults four years post-injury. *PloS One*, *13*(1).
- Timonen, M., Miettunen, J., Hakko, H., Zitting, P., Veijola, J., von Wendt, L., & Rasanen, P. (2002). The association of preceding traumatic brain injury with mental disorders, alcoholism and criminality: The Northern Finland 1966 Birth Cohort Study. *Psychiatry Research*, *113*, 217-226.
- Tomblin, J. B., Hardy, J. C., & Hein, H. A. (1991). Predicting poor-communication status in preschool children using risk factors present at birth. *Journal of Speech, Language, and Hearing Research*, *34*(5), 1096-1105.
- Travis, J., Solomon, A. L., & Waul, M. (2001). From prison to home: The dimensions and consequences of prisoner reentry. Washington D.C: Urban Institute
- Trotter, C., & Evans, P. (2012). An analysis of supervision skills in youth probation. *Australian & New Zealand Journal of Criminology*, *45*(2), 255-273.
- Tuominen, T., Korhonen, T., Hämäläinen, H., Katajisto, J., Vartiainen, H., Joukamaa, M., Lintonen, T., Wuolijoki, T., Jüriloo, A., & Lauerma, H. (2017). The factors associated with criminal recidivism in Finnish male offenders: Importance of neurocognitive deficits and substance dependence. *Journal of Scandinavian Studies in Criminology and Crime Prevention*, *18*(1), 52-67.
- Turkstra, L., Jones, D., & Toler, H. L. (2003). Brain injury and violent crime. *Brain Injury*, *17*(1), 39-47.

- Ugwudike, P. (2010). *Compliance with community penalties: The importance of interactional dynamics*. In: F. McNiell, P. Raynor & C. Trotter (Eds) *Offender supervision*. London, Willan: Cullompton, 351-369.
- Ugwudike, P. (2013a). Compliance with community orders: Front-line perspectives and evidence-based practices. In: P. Ugwudike & P. Raynor (Eds) *What works in offender compliance*. New York: Springer, 165-182.
- Ugwudike, P. (2013b). Probation enforcement practice with sex offenders. In *Sex offenders: punish, help, change or control?* Oxfordshire: Routledge, 305-322.
- Valliant, P. M., Freeston, A., Pottier, D., & Kosmyna, R. (2003). Personality and executive functioning as risk factors in recidivists. *Psychological Reports*, 92(1), 299-306.
- Van Deirse, T. B., Cuddeback, G. S., Wilson, A. B., & Burgin, S. E. (2018). Probation officers' perceptions of supervising probationers with mental illness in rural and urban settings. *American Journal of Criminal Justice*, 43(2), 267-277.
- Van Zomeren, A., & Van den Burg, W. (1985). Residual complaints of patients two years after severe head injury. *Journal of Neurology, Neurosurgery & Psychiatry*, 48(1), 21-28.
- Vassallo, J. L., Proctor-Weber, Z., Lebowitz, B. K., Curtiss, G., & Vanderploeg, R. D. (2007). Psychiatric risk factors for traumatic brain injury. *Brain Injury*, 21(6), 567-573.
- Vasterling, J. J., Brailey, K., Constans, J. I., & Sutker, P. B. (1998). Attention and memory dysfunction in posttraumatic stress disorder. *Neuropsychology*, 12(1), 125-133.
- Vink, R., & Nimmo, A. J. (2002). Novel therapies in development for the treatment of traumatic brain injury. *Expert Opinion on Investigational Drugs*, 11(10), 1375-1386.
- Walker, R., Hiller, M., Staton, M., & Leukefeld, C. G. (2003). Head injury among drug abusers: An indicator of co-occurring problems. *Journal of Psychoactive Drugs*, 35(3), 343-353.
- Wall, S., Williams, W. H., Cartwright-Hatton, S., Kelly, T., Murray, J., Murray, M., Owen, A., & Turner, M. (2006). Neuropsychological dysfunction following repeat concussions in jockeys. *Journal of Neurology, Neurosurgery & Psychiatry*, 77(4), 518-520.
- Wan, W. Y., Poynton, S., & Weatherburn, D. (2016). Does parole supervision reduce the risk of re-offending? *Australian & New Zealand Journal of Criminology*, 49(4), 497-511.
- Weaver, B., Piacentini, L., Moodie, K., & Barry, M. (2020). Exploring and explaining non-compliance with community supervision. *The British Journal of Criminology*, 61(2), 434-455.
- West, A. D., & Seiter, R. P. (2004). Social worker or cop? Measuring the supervision styles of probation & parole officers in Kentucky and Missouri. *Journal of Crime and Justice*, 27(2), 27-57.
- Whitehead, J. T., & Lindquist, C. A. (1992). Determinants of probation and parole officer professional orientation. *Journal of Criminal Justice*, 20(1), 13-24.
- 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. <https://doi.org/10.3109/02699052.2010.495697>
- Wilson, A. B., Draine, J., Hadley, T., Metraux, S., & Evans, A. (2011). Examining the impact of mental illness and substance use on recidivism in a county jail. *International Journal of Law and Psychiatry*, 34(4), 264-268.
- Wong, S. C. P., & Gordon, A. (2000). *The Violence Risk Scale*. Canada: University of Saskatchewan.



- Woolhouse, R., McKinlay, A., & Grace, R. C. (2018). Women in prison with traumatic brain injury: Prevalence, mechanism, and impact on mental health. *International Journal of Offender Therapy and Comparative Criminology*, 62(10), 3135-3150.
- Wortley, R. K. (2003). Measuring police attitudes toward discretion. *Criminal Justice and Behavior*, 30(5), 538-558.
- Yang, Y., & Raine, A. (2009). Prefrontal structural and functional brain imaging findings in antisocial, violent, and psychopathic individuals: A meta-analysis. *Psychiatry Research: Neuroimaging*, 174(2), 81-88.
- Yukhnenko, D., Blackwood, N., & Fazel, S. (2020). Risk factors for recidivism in individuals receiving community sentences: A systematic review and meta-analysis. *CNS Spectrums*, 25(2), 252-263.
- Zettler, H. R., & Medina, J. C. (2020). Missed officer–probationer contacts and its influence on rearrest. *Criminal Justice Policy Review*, 31(3), 374-394.
- Zillmer, E. A., & Spiers, M. V. (2001). *Principles of Neuropsychology*. Belmont, CA: Wadsworth/Thomson Learning.

## Appendix A: Co-Authorship Form Manuscript 1



### Co-Authorship Form

**Postgraduate Studies Office**  
Student and Academic Services Division  
*Wahanga Ratonga Matauranga Akonga*  
The University of Waikato  
Private Bag 3105  
Hamilton 3240, New Zealand  
Phone +64 7 838 4439  
Website: <http://www.waikato.ac.nz/sasd/postgraduate/>

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 3: Manuscript 1

Norman, E., Wilson, L., Polaschek, D.L.L., Starkey, N. (2021). How Probation Officers Understand and Work With People on Community Supervision Sentences to Enhance Compliance. Probation Journal.

Manuscript accepted pending revision.

Nature of contribution  
by PhD candidate

Emily wrote the manuscript with feedback and support from Devon and Nicola.

Emily did the analysis and each co-author reviewed the analysis, checking the themes and codes for consistency.

Extent of contribution  
by PhD candidate (%)

70%

### CO-AUTHORS

Name	Nature of Contribution
Lara Wilson	Lara provided support for data collection and analysis.
Devon Polaschek	Devon provided feedback and support for data collection, analysis, and writing the manuscript.
Nicola Starkey	Nicola provided feedback and support for data collection, analysis, and writing the manuscript.

### Certification by Co-Authors

The undersigned hereby certify that:

- ❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
Lara Wilson		18/06/2021
Devon Polaschek		June 17, 2021
Nicola Starkey		17/6/21

## Appendix B: Co-Authorship Form Manuscript 2



### Co-Authorship Form

Postgraduate Studies Office  
 Student and Academic Services Division  
 Wahanga Rakonga Mātauranga Akeonga  
 The University of Waikato  
 Private Bag 3105  
 Hamilton 3240, New Zealand  
 Phone +64 7 838 4439  
 Website: <http://www.waikato.ac.nz/sasd/postgraduate/>

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

**Chapter 4: Manuscript 2**  
 Norman, E., Polaschek, D.L.L., Starkey, N. (2021). Executive function in individuals who are compliant and non-compliant with the conditions of a community-based sentence. Submitted to Psychiatry, Psychology, and Law Journal. Under review

Nature of contribution by PhD candidate:   
 Extent of contribution by PhD candidate (%):

#### CO-AUTHORS

Name	Nature of Contribution
Devon Polaschek	Devon provided feedback and support for data collection, analysis, and writing the manuscript.
Nicola Starkey	Nicola provided feedback and support for data collection, analysis, and writing the manuscript.

#### Certification by Co-Authors

The undersigned hereby certify that:

- ❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
Devon Polaschek		June 17, 2021
Nicola Starkey		17 June 2021

### Appendix C: Co-Authorship Form Manuscript 3



## Co-Authorship Form

**Postgraduate Studies Office**  
 Student and Academic Services Division  
 Wahanga Ratonga Matauranga Akonga  
 The University of Waikato  
 Private Bag 3105  
 Hamilton 3240, New Zealand  
 Phone +64 7 838 4439  
 Website: <http://www.waikato.ac.nz/sasd/postgraduate/>

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 5: Manuscript 3  
 Norman, E., Starkey, N., Polaschek, D.L.L. (2021). The association between self-reported traumatic brain injury, neuropsychological function, and compliance among people serving community sentences. Submitted to Brain Impairment Journal. Awaiting decision

Nature of contribution by PhD candidate: Emily wrote the manuscript with feedback and support from Devon and Nicola.  
 Extent of contribution by PhD candidate (%): 70%

#### CO-AUTHORS

Name	Nature of Contribution
Nicola Starkey	Nicola provided feedback and support for data collection, analysis, and writing the manuscript.
Devon Polaschek	Devon provided feedback and support for data collection, analysis, and writing the manuscript.

#### Certification by Co-Authors

The undersigned hereby certify that:

- ❖ the above statement correctly reflects the nature and extent of the PhD candidate’s contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
Devon Polaschek		June 17, 2021
Nicola Starkey		17/6/2021

**Appendix D: Probation Officer Focus Group Participation Sheet****Participant Information Sheet**

THE UNIVERSITY OF  
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**Project Title**

Probation officers' perspectives on issues of community sentence compliance.

**Who am I?**

My name is Emily Norman and I am doing a PhD thesis at the University of Waikato. I earned a Master's degree in Forensic Psychology in the United States, and have spent the last ten years working with criminal justice system-involved individuals as a mental health and addictions counsellor. I have worked both in community corrections and state prisons.

**Other members of the research team**

My research is being supervised by Professors Devon Polaschek, and Nicola Starkey. Professor Devon Polaschek has 25 years of experience with correctional research and Professor Nicola Starkey is a recognized expert on TBI and neurocognitive functioning.

Working alongside me is Lara Wilson, a 4<sup>th</sup> year student at the University. She is new to research and will be assisting me with running the group.

Dr Rob Ngamanu from the Hamilton South psychologists team will also be providing clinical and cultural advice on the design of the overall project. He may look at portions of anonymised transcripts if we want his advice on something specific but the identity of research participants will not be known to him.

**What is this research project about?**

The overall objective of this PhD research study is to investigate the relationship between traumatic brain injury (TBI), neuro-cognitive function and compliance with community sentence (parole or probation). To begin, we aim to discuss with probation officers your views on offender non-compliance on community based sentences you oversee. Your views on, for example, types and causes of non-compliance, along with information on any current strategies employed to enhance compliance are the interest in this project. We plan to use your ideas to inform the next step in this research, which will be to analyse types and causes of non-compliance with community-based sentences, and also to gain a better understanding of offenders with TBI or problems with neuro-cognitive functioning, and how these issues may influence their sentence compliance.

**How can you help?**

If you agree to take part, we will ask you to participate in a focus group with other probation officers employed by the Department of Corrections. I will be facilitating the group and will ask the group questions designed to elicit a discussion about compliance issues, for example the types of non-compliance, and strategies utilized when trying to enhance a client's compliance. The focus group will take up to an hour. The focus group will take place at a probation office and the time that will be coordinated with your office manager. In order to capture everything you say, we plan to audio-record the discussion for later transcription.

Please contact (office manager or me) if you are interested in volunteering to participate in the focus group. If you agree to take part, we will ask you to provide written consent to participate in this study on the day of the focus group. If during the focus group you do not wish to answer any of the questions that is fine, you may stay and not contribute to the discussion. You can also change your mind about participating during the focus group, and leave at any time during the focus group. Because this is a discussion and because we intend not to record your identity in the audio-recording, if you do leave the session and withdraw from the study at any point after it has started, we will not be able to remove anything you have said from the recording already made.

**What will happen to the information collected?**

Your identity will be kept strictly confidential to Professor Polaschek and me. To protect your identity, there will be nothing to link you to the contributions you make in the focus group when I transcribe the audio recording .

Only Dr Polaschek and I will see you sign the consent form and these will be kept in a cupboard in a locked room at the University of Waikato. Professor Polaschek will be the only other person who will have access to the audio recording.

I will analyse the results of the focus group and write it up as a portion of my PhD thesis. We may also talk about the overall findings at conferences and meetings and may write it up for scientific journal publications or in book chapters. You will not be named or identified in any reports, publications, presentations, or public documents arising from this research. You will be offered a summary of findings from the study when it has concluded. If you would like this summary, you will be invited to indicate on the consent form where you would like it sent. We expect the research will be finished in 2022.

### **Declaration to participants**

If you choose to take part in this study, you have the right to:

- Ask any further questions about the study at any time while you are with us;
- Refuse to answer any question, and leave the study any point during the focus group;
- Be sent a summary of findings from the study when it has finished;
- Not be identified by name in any reports, presentations, or publications arising from this research;
- Strict confidentiality with regard to all information gathered from you during this study unless there is a risk of serious imminent harm that requires the facilitator to take action to make things safe;
- Have all audio recordings and written transcription and/or notes relating to you destroyed within 5 years after the end of this study.

### **Who's responsible?**

If you have any questions or concerns about the project, either now or in the future, please contact either:

Chief supervisor: Professor Devon Polaschek – School of Psychology, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

Email: [Devon.polaschek@waikato.ac.nz](mailto:Devon.polaschek@waikato.ac.nz)

Phone 07-8379224

Or

Primary researcher: Emily M. Norman, PhD candidate, The University of Waikato

Email: [em93@students.waikato.ac.nz](mailto:em93@students.waikato.ac.nz)

*"This research project has been approved by The University of Waikato Human Research Ethics Committee (Health). Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email [humanethics@waikato.ac.nz](mailto:humanethics@waikato.ac.nz), postal address, The University of Waikato Private Bag 3105 Gate 1, Knighton Road Hamilton, New Zealand*

**Appendix E: Probation Officer Focus Group Consent Form****Consent Form for Participants**

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**PARTICIPANT CONSENT FORM**

**Name of person to be interviewed:** \_\_\_\_\_

I have received a copy of the Information Sheet describing the research project. Any questions that I have, relating to the research, have been answered to my satisfaction. I understand that I can ask further questions about the research at any time during my participation, and that I can leave at any time during the focus group.

During the focus group, I understand that I do not have to answer any of the questions unless I am happy to talk about the topic.

When I sign this consent form, I give consent for the researcher to use the findings from the focus group for the purposes of the research outlined in the Information Sheet. I understand that my identity will remain confidential in the transcript that is subsequently made, and presentation of the research findings.

<b>Please complete the following checklist. Tick [✓] the appropriate box for each point.</b>	<b>YES</b>	<b>NO</b>
<i>[I wish to view the transcript of the focus group.]</i>		
<i>[I wish to receive a copy of the findings.]</i>		
<i>I understand that if I withdraw from the study by leaving the focus group, the contributions I have made up to this point will remain in the transcript, though they will not be able to be linked to me.</i>		

Participant : \_\_\_\_\_ Researcher : \_\_\_\_\_  
 Signature : \_\_\_\_\_ Signature : \_\_\_\_\_  
 Date : \_\_\_\_\_ Date : \_\_\_\_\_  
 Contact Details : \_\_\_\_\_ Contact Details : [em93@students.waikato.ac.nz](mailto:em93@students.waikato.ac.nz)

We will send a copy of the findings to your community probation office. If you would like a copy sent to you personally, please indicate the email address we should send it to:

*"This research project has been approved by The University of Waikato Human Research Ethics Committee (Health). Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email [humanethics@waikato.ac.nz](mailto:humanethics@waikato.ac.nz), postal address, The University of Waikato Private Bag 3105 Gate 1, Knighton Road Hamilton, New Zealand*

**Appendix F: Probation Officer Demographic Questionnaire**

*Probation Officer - Demographic Questions*



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Brief Demographic questionnaire:

Ethnicity: \_\_\_\_\_

Gender: \_\_\_\_\_

Number of years as a Probation Officer: \_\_\_\_\_

*Office use only:*

ID #: \_\_\_\_\_



**Appendix G: Probation Officer Focus Group Questions**

*Focus Group Interview Questions*



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What are the types of activity do your supervisees do (or not do) that constitute non-compliance?

What are some of the problems, triggers, reasons for non-compliance?

How do you deal with different types of non-compliance?

What skills do you think a supervisee needs to succeed in complying with a community sentence?

What are some of the things you may observe in a person you are supervising that would make you suspect a history of TBI or problems with neuro-cognitive functioning?

**Appendix H: Plan for Managing Risk/Crisis for Study Two*****Plans for Managing Participant***

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## Plans for Managing Participant Risk

### **Risk of Self-harm**

- 1 Identify from what the participant has said during data collection that there *may* be an issue with an imminent and serious risk of self-harm
- 2 Use active listening and make empathic statements (if practical to do so) and gather more information about the issue to help identify whether the risk of self-harm is imminent and serious.
- 3 If I believe unequivocally that a serious and imminent risk of self-harm exists, I will advise the participant that I will need to take some action to ensure his immediate safety and discuss with him how we can best manage that risk. At this stage, I might see whether a staff member can sit with him, or, alternatively, whether there are family or friends who can. If the risk of self-harm continues to be imminent and serious, I will contact the Mental Health Crisis Assessment and Management Team (CAMT). If he refuses to stay on-site while I contact the CAMT, then, at the very least, I will discuss the situation with a family member or close friend of the participant and ascertain their ability to ensure the participant's safety. I will then contact Devon as soon as is practical and appropriate for advice as to how to proceed.
- 4 If I am very concerned but not completely certain that the risk is imminent and serious, I will advise the participant that I am concerned about what he is saying and need to discuss the concerns I have further with Devon. I will ask participant to stay at the office while I do this. If he agrees, I can also discuss it with his agency worker, but either way I must contact Devon and advise her of the event and discuss as needed.
- 5 I will do this while in the room with the participant (if necessary), or ideally nearby to encourage him to remain at the NGO office while I

- seek advice. If Devon is not available I will contact the back-up person (another registered clinical psychologist on staff in the University Of Waikato School Of Psychology, to be appointed).
- 6 Devon (or her back-up person) will help me to work out the next steps I will take to manage the risk. I will proceed to work through these steps, contacting Devon again and as many times as necessary.
- 7 After the incident is resolved, I will record the event and actions, and fully debrief with Devon or her back up person (to ensure that I feel I am sufficiently supported and that a senior clinician has shared adequately in the responsibility for the decision-making etc.).

If the situation does not reach the level of imminent and serious risk requiring immediate safety action, then I will still endeavour to contact Devon to discuss the situation, and use a selection of the strategies below (depending on the history, nature, and severity of the risk):

- With his permission, inform an agency worker or another third party who can help (e.g., a family member)
- Encourage the participant to access the support he needs from the people he trusts (e.g., agency worker, friends, family, kaumatua, religious, community or cultural leaders or professionals)
- Provide the participant with the contact details of a free, local counselling agency
  - E.g., Mana Social Services Trust in Rotorua (<http://www.manasocialservcestirus t.org.nz/contacts.php>)
  - E.g., Evolve Peer Support Trust in Hamilton (<https://www.neighbourly.co.nz/or ganisation/evolve-peer-support>)
- With his permission, consider a referral to local mental health service, or recommend the participant go to his GP
- Provide him with the contact details of Lifeline.
- With his permission, contact any other relevant agencies he is already involved with who may be able to help (e.g., counselling agency, alcohol and drug programme)

## **Risk of Harm to Another/Others or to Participant from Another/Others**

The immediate responses are very similar to those for harm to self.

The key principles are:

1. Wherever possible, I will first discuss with the participant my view of what he is saying and gather as much additional information as possible to ensure that I have a clear picture of the basis for my concern.
2. I will contact Devon or another clinician for advice regardless of whether I ultimately think the situation reaches the threshold of imminent and serious. If possible, I will contact Devon while I still have the participant with me.
3. I will not discuss the risk with others in the agency without the participant's permission unless I judge that the risk is imminent and serious *and* I believe that the agency is in a position to help.
4. The main difference in our response to the risk of harm to another/others will be with which emergency services are contacted. If there is an imminent and serious risk of harm to another, I will need to attempt to contact the person/people who are at risk. That may involve a wider breach of confidentiality. For example, I may need to ask the agency if they have a contact number for the other person. If, however, there are clear, serious, and imminent threats to a person whose identity is also clear, I may need to ring the police. If the participant himself is at imminent and serious risk from another person I may also need to call the police, after first ascertaining (if possible) whether a protection order is already in place. I may also need to call the CAMT if the situation appears to be related to current acute mental disorder.

Strategies I will use if not immediately contacting police/crisis service:

- Use active listening and give the participant an opportunity to settle (if practical and appropriate)
- Possibly develop a safety plan with the participant outlining how he will minimize the risk of harm to the person/people (if practical and appropriate)
- Encourage the participant to pass on the information to an agency worker or another third party who can help minimize the risk (if practical and appropriate). Facilitate that discussion with the participant if requested.
- Provide the participant with the contact details of a free, local counselling agency (if practical and appropriate)
- Encourage him to contact the police or a lawyer himself if his own safety is threatened.

**Appendix I: Probation Officer Participation Sheet for Study Two*****Participant Information Sheet- Probation Officer***

THE UNIVERSITY OF  
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**Project Title**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Who am I?**

My name is Emily Norman and I am doing a PhD thesis at the University of Waikato. My research is being supervised by Professors Devon Polaschek, a Clinical Psychologist and Nicola Starkey. Professor Devon Polaschek has 25 years of experience with correctional research and Professor Nicola Starkey is a recognized expert on TBI and neuropsychological functioning.

I earned a Master's degree in Forensic Psychology in the United States, and have spent the last ten years working with criminal justice system involved individuals as a mental health and addictions counsellor. I have worked both in community corrections and state prison's.

**What is this research project about?**

The overall objective of this PhD research study is to investigate the association among traumatic brain injury (TBI), neuro-psychological function and compliance with community sentence. To accomplish this objective, I would like to interview individuals serving a community sentence (clients) about their perspectives on sentence compliance

issues, and gather any history of head injuries. I would also like to interview their probation officers regarding their compliance at the beginning and end of the sentence.

To understand if head injuries have any impact on sentence compliance I will need to look at each client participants corrections files, that includes probation officers' case notes related to compliance. I will also ask clients to participate in a battery of neuropsychological assessments. I will use the results from the neuropsychological assessments, the initial interview, the probation officers' interviews and file data to establish if there is an association between current neuropsychological function, a history of TBI, and compliance with a community sentence using statistical analysis.

### **How can you help?**

If you agree to take part we will ask you to distribute information about participation in the study to your clients. We will ask that you participate in two interviews (for each of your clients who participate) that will take no longer than 30 minutes each. In the interview, questions regarding a specific client's compliance will be discussed. We will also be looking at your case notes on compliance related to each of your clients who participates.

All interviews will take place at your probation office.

Please contact me via the email below if you are interested in volunteering to participate in the study. If you agree to take part, we will ask you to provide written consent to participate in this study. If you join the study and then decide you do not wish to participate in the study any longer, you can leave and ask that we not include your information in the findings. You can change your mind about participating during the interview, and leave, or withdraw from the study any time simply by telling me.

### **What will happen to the information collected?**

Your identity will be kept strictly confidential to Professor Polaschek and myself. To protect your identity an ID number will assigned to your consent form, and all the information

you provide will be stored under that ID number not your name. Only the researcher will see you sign the consent form and these will be kept in a locked drawer or cupboard in a locked room at the University of Waikato. Professor Polaschek will be the only other person who will have access to that locked drawer or cupboard.

We will analyse the results of the interviews and compliance case notes and write it up as a portion of my PhD thesis. We may also talk about the overall findings at conferences and meetings and may write it up for scientific journal publications or in book chapters. You will not be named or identified in any reports, publications, presentations, or public documents arising from this research. You will be offered a summary of findings from the study when it has concluded. If you would like this summary, you will be invited to indicate on the consent form where you would like it sent. We expect the research will be finished in 2022.

### **Declaration to participants**

If you choose to take part in this study, you have the right to:

- Ask any further questions about the study at any time while you are with us;
- Refuse to answer any question, and leave the study any point during the interviews;
- Withdraw the information provided in an interview from the study within 7 days of that interview
- Be sent a summary of findings from the study when it has finished;
- Not be identified by name in any reports, presentations, or publications arising from this research;
- Strict confidentiality with regard to all information gathered from you during this study unless there is a risk of serious imminent harm that requires the primary researcher to take action to make things safe;
- Have all data and/or notes relating to you destroyed within 5 years after the end of this study.

### **Interested in participating?**

Please contact Emily Norman at [em93@students.waikato.ac.nz](mailto:em93@students.waikato.ac.nz)

### **Who's responsible?**

If you have any questions or concerns about the project, either now or in the future, please contact either:

Primary supervisor: Professor Devon Polaschek – School of Psychology, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

Email: [Devon.polaschek@waikato.ac.nz](mailto:Devon.polaschek@waikato.ac.nz)

Phone 07-8379224

Or

Primary researcher: Emily M. Norman, PhD candidate, The University of Waikato

Email: [em93@students.waikato.ac.nz](mailto:em93@students.waikato.ac.nz)

*"This research project has been approved by The University of Waikato Human Research Ethics Committee (Health). Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email [humanethics@waikato.ac.nz](mailto:humanethics@waikato.ac.nz), postal address, The University of Waikato Private Bag 3105 Gate 1, Knighton Road Hamilton, New Zealand*



**Appendix J: Probation Officer Consent Form for Study Two*****Consent Form for Probation Officers***

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

**PARTICIPANT CONSENT FORM:** \_\_\_\_\_

**RESEARCH PROJECT:**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Name of person interviewed:** \_\_\_\_\_

I have received a copy of the Information Sheet describing the research project. Any questions that I have, relating to the research, have been answered to my satisfaction. I understand that I can ask further questions about the research at any time during my participation. I understand that I can leave at any time during the interviews. I understand that I have up to 7 days to contact the primary researcher and ask that the information from my interview not be included in the study results.

When I sign this consent form, I will retain ownership of my interview and information, but I give consent for the researcher to use the findings from the interview and my case notes for the purposes of the research outlined in the Information Sheet. I understand that my identity will remain confidential in the presentation of the research findings.

<p><b>Please complete the following checklist. Tick [✓] the appropriate box for each point.</b></p>	<p><b>YES</b></p>	<p><b>NO</b></p>
---	-------------------	------------------

<i>[I wish to receive a copy of the findings.]</i>		
--	--	--

Participant : \_\_\_\_\_

Signature : \_\_\_\_\_

Date : \_\_\_\_\_

Contact \_\_\_\_\_

Details : \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Researcher : \_\_\_\_\_

Signature : \_\_\_\_\_

Date : \_\_\_\_\_

Contact \_\_\_\_\_

Details : \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix K: Probation Officer Interview Schedule Study Two

### Interview Schedule- Probation officer interviews



THE UNIVERSITY OF  
**WAIKATO**  
Te Whare Wānanga o Waikato

Offender ID#:  
Offender DOB:  
PRN:  
PO ID#:  
End Sentence:

#### **First interview: Interview with probation officer following supervisee interview**

The discussion will revolve around the compliance of a particular client. Researcher will ask about anticipated issues for this client (risk factors, skills, rehabilitation needs), ANY NON-COMPLIANCE ISSUES- EVEN THE SOFT STUFF, (E.G. not showing up on time, etc.). Researcher will also ask about interventions the probation officer might utilize to increase the client's compliance.

#### **Conditions:**

#### **Non-compliance:**

#### **Anticipated issues:**

#### **PO Strategies:**

#### *Probation Officer Interview*

*Say to PO:* The next 8 questions are from a scale developed overseas for rating how Probation Officers and their clients relate to each other. Each item is rated on a 7 point scale, from 1 = never to 7 = always.

1. I treat \_\_\_\_\_ fairly.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

2. I care about \_\_\_\_\_ as a person.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

Note: if PO says they find it hard answering this one because of concerns about professional boundaries, ask them whether they care whether the person lives or dies, or would they help them if they were in a car accident etc. It's tapping basic compassion for other human beings.

3. I take the time required to really understand \_\_\_\_\_.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

4. I take all of \_\_\_\_\_'s needs into account.

1	2	3	4	5	6	7
Never	Rarely	Occasionally	Sometimes	Often	Very often	Always

5. \_\_\_\_\_ seems to feel safe enough to be open and honest with me.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always
6. \_\_\_\_\_ seems to feel I am someone he can trust.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always
7. \_\_\_\_\_ seems worried that I am looking to punish him.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always
8. I expect \_\_\_\_\_ to do things independently, and don't help him out.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always

Second interview (completion of client's sentence)

This discussion will revolve around how this particular client did on their community supervision related to complying with their conditions. Any non-compliance, any soft non-compliance that was not documented (e.g., not showing up on time, ) It will also explore what the probation officer did to prevent non-compliance.

Any non-compliance:

What caused the non-compliance

What strategies used to increase compliance

*Probation Officer Interview*

Say to PO: The next 8 questions are from a scale developed overseas for rating how Probation Officers and their clients relate to each other. Each item is rated on a 7 point scale, from 1 = never to 7 = always.

1. I treat \_\_\_\_\_ fairly.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always
2. I care about \_\_\_\_\_ as a person.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always

*Note: if PO says they find it hard answering this one because of concerns about professional boundaries, ask them whether they care whether the person lives or dies, or would they help them if they were in a car accident etc. It's tapping basic compassion for other human beings.*

3. I take the time required to really understand \_\_\_\_\_.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always
4. I take all of \_\_\_\_\_'s needs into account.  
 1                      2                      3                      4                      5                      6                      7  
 Never              Rarely              Occasionally              Sometimes              Often              Very often              Always

5. \_\_\_\_\_ seems to feel safe enough to be open and honest with me.
- |       |        |              |           |       |            |        |
|-------|--------|--------------|-----------|-------|------------|--------|
| 1     | 2      | 3            | 4         | 5     | 6          | 7      |
| Never | Rarely | Occasionally | Sometimes | Often | Very often | Always |
6. \_\_\_\_\_ seems to feel I am someone he can trust.
- |       |        |              |           |       |            |        |
|-------|--------|--------------|-----------|-------|------------|--------|
| 1     | 2      | 3            | 4         | 5     | 6          | 7      |
| Never | Rarely | Occasionally | Sometimes | Often | Very often | Always |
7. \_\_\_\_\_ seems worried that I am looking to punish him.
- |       |        |              |           |       |            |        |
|-------|--------|--------------|-----------|-------|------------|--------|
| 1     | 2      | 3            | 4         | 5     | 6          | 7      |
| Never | Rarely | Occasionally | Sometimes | Often | Very often | Always |
8. I expect \_\_\_\_\_ to do things independently, and don't help him out.
- |       |        |              |           |       |            |        |
|-------|--------|--------------|-----------|-------|------------|--------|
| 1     | 2      | 3            | 4         | 5     | 6          | 7      |
| Never | Rarely | Occasionally | Sometimes | Often | Very often | Always |

**Appendix L: Supervisee Initial Interview Information Sheet*****Client Information Sheet – Preliminary Interview***

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

**Project Title**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Who am I?**

My name is Emily Norman and I am doing a PhD thesis at the University of Waikato. My research is being supervised by Professors Devon Polaschek, a Clinical Psychologist and Nicola Starkey. Professor Devon Polaschek has 25 years of experience with correctional research and Professor Nicola Starkey is a recognized expert on TBI and neurocognitive functioning.

I earned a Master's degree in Forensic Psychology in the United States, and have spent the last ten years working with criminal justice system involved individuals as a mental health and addictions counselor. I have worked both in community corrections and state prison's.

**What is this research project about?**

The overall objective of this PhD research study is to understand if head injuries and their symptoms are related difficulties people serving a community sentence have when trying to do what is required of them. To do this, we would like to interview individuals serving a community sentence about their thoughts on their sentence conditions and their history of head injuries. We will also look at each participants corrections files for case notes

on conditions and history with corrections. We would also like to know if the head injuries caused any symptoms that are being experienced today. To do this we will ask individuals to do some tests that tell us how the brain works.

### **How can you help?**

To participate you must be serving a sentence with at least 6 more months left to complete. If you agree to take part in this portion of the study, we will ask you to participate in a one hour interview. During the interview we will ask you questions about your conditions, ask you questions about your history of head injuries. None of the questions being asked are intended to embarrass you or make you feel uncomfortable, if at anytime you feel you do not want to answer a question you do not have to. We will also ask you for your permission to read your corrections file. All interviews and assessments will take place at your probation office. After completing the first interview, there will be an opportunity to volunteer for the next part of the study where you will complete the tests that look at how the brain works.

Please contact your probation officer if you are interested in volunteering to participate in the study. If you agree to take part, we will ask you to provide written consent (a form provided to you by the researcher) to participate in this study on the day of the interview. If during the interview you do not wish to participate in the study you can leave and ask that we not include your information in the findings. You can change your mind about participating during the interview, and leave, or withdraw from the study any time up to 7 days after the interview simply by telling the researcher.

### **What will happen to the information collected?**

Your identity will be kept strictly confidential to Professor Polaschek and myself. To protect your identity an ID number will be assigned to your consent form, and all the information you provide will be stored under that ID number not your name. Only I will see you sign the

consent form and these will be kept in a locked drawer or cupboard in a locked room at the University of Waikato. Professor Polaschek will be the only other person who will have access to that locked drawer or cupboard.

I will analyze the results of the interview, assessments and file data and write it up as a portion of my PhD thesis. We may also talk about the overall findings at conferences and meetings and may write it up for scientific journal publications or in book chapters. You will not be named or identified in any reports, publications, presentations, or public documents arising from this research. You will be offered a summary of findings from the study when it has concluded. If you would like this summary, you will be invited to indicate on the consent form where you would like it sent. Similarly, if you would like your results from the neuropsychological assessments you can indicate that on the consent form as well. Note that if the results from the neuropsychological assessments fall in the clinical range (indicating some deficit) we will contact you and provide referral information. We expect the research will be finished in 2022.

### **Declaration to participants**

If you choose to take part in this study, you have the right to:

- Ask any further questions about the study at any time while you are with us;
- Refuse to answer any question, and leave the study any point during the interview;
- Withdraw your information from the study within 7 days of the interview or by contacting me or Devon (see below)
- Be sent a summary of findings from the study when it has finished;
- Be sent results from your neuropsychological assessments
- Not be identified by name in any reports, presentations, or publications arising from this research;
- Strict confidentiality with regard to all information gathered from you during this study unless there is a risk of serious imminent harm that requires the primary researcher to take action to make things safe;
- Have all data and/or notes relating to you destroyed within 5 years after the end of this study.

### **Who's responsible?**



If you have any questions or concerns about the project, either now or in the future, please contact either:

Primary supervisor: Professor Devon Polaschek – School of Psychology, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

Email: [Devon.polaschek@waikato.ac.nz](mailto:Devon.polaschek@waikato.ac.nz)

Phone 07-8379224

Or

Primary researcher: Emily M. Norman, PhD candidate, The University of Waikato

Email: [emadonna2000@yahoo.com](mailto:emadonna2000@yahoo.com)

*"This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email [fass-ethics@waikato.ac.nz](mailto:fass-ethics@waikato.ac.nz), postal address, Faculty of Arts and Social Sciences, Te Kura Kete Aronui, University of Waikato, Te Whare Wananga o Waikato, Private Bag 3105, Hamilton 3240."*

**Appendix M: Supervisee Consent Form for Initial Interview*****Consent Form for Client- Interview***

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

**PARTICIPANT CONSENT FORM:**\_\_\_\_\_

**RESEARCH PROJECT:**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Name of person interviewed:**\_\_\_\_\_

I have received a copy of the Information Sheet describing the research project. Any questions that I have, relating to the research, have been answered to my satisfaction. I understand that I can ask further questions about the research at any time during my participation. I understand that I can leave at any time during the interview, and ask that my file data not be included in the study. I understand that I have up to 7 days to contact the primary researcher and ask that the information from my interview not be included in the study results..

When I sign this consent form, I will retain ownership of my interview and information, but I give consent for the researcher to use the findings from the interview and my file data for the purposes of the research outlined in the

Information Sheet. I understand that my identity will remain confidential in the presentation of the research findings.

Please complete the following checklist. Tick [✓] the appropriate box for each point.	YES	NO
<i>[I wish to receive a copy of the findings.]</i>		
<i>[Other?]</i>		

Participant : \_\_\_\_\_  
 Signature : \_\_\_\_\_  
 Date : \_\_\_\_\_  
 Contact \_\_\_\_\_

Researcher : \_\_\_\_\_  
 Signature : \_\_\_\_\_  
 Date : \_\_\_\_\_  
 Contact \_\_\_\_\_

Details : \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Details : \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Appendix N: Supervisee Initial Interview Schedule**

*Interview Schedule*



THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

1. ID Number: \_\_\_\_\_

2. Age: \_\_\_\_\_

3. Ethnicity: \_\_\_\_\_

4. Highest education level achieved (Check the one that applies)

NCEA 1, 2, 3, or equivalent (e.g., school certificate)

Polytech diploma/degree

University diploma

Bachelor's degree

Graduate diploma/honours degree

Master's degree

PHD

Age left school? \_\_\_\_\_

Any periods of time you were out of school and then returned?

\_\_\_\_\_

5. History of Mental health diagnosis and/or symptoms

In your life have you ever been diagnosed or experienced symptoms related to:	N O	Y E S	Age diagnosed or first symptoms	Symptomology : frequency, types, onset	Currently experiencing	Last time had symptoms
Depression (major, dysthymic)						

Generalized Anxiety						
ADHD						
Conduct disorder						
PTSD						
Bi-Polar						
Schizophrenia						
OCD						
Anti-social personality						
Borderline personality						
Neuro-developmental disorder (Intellectual disability, Autism spectrum)						
Other-Specify						

6. History of Substance use, abuse, dependence

In your life have you ever used the following substances?	NO	YES	Age of first use:	Pattern of use: how long, or how many times.	Currently using?	Date of last use:
Alcohol						
Cannabis						
Methamphetamine (Ice, Pee, Speed)						
Cocaine (crack, coke)						
Opioids (heroin, morphine, pain pills-codeine, Percocet)						
Sedatives or sleeping pills (Valium, rohypnol)						
Inhalants (nitrous, glues, paint thinner, petrol)						
Hallucinogens (LSD, acid, mushrooms, PCP, Special K ketamine)						
Other- Specify						

7. What, to the best of your memory, are your current sentence conditions?

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8. We are really interested in what you think about how hard or easy it is to comply with your various sentence conditions. From your perspective what are some of the issues you face when complying with your sentence conditions? (probe for particular conditions that are easy or hard, and how Probation Officer has responded to any difficulties raised).



**Appendix O: Information Sheet for Neuropsychological Assessment*****Client Information Sheet – Neuropsychological Assessment***

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

**Project Title**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Who am I?**

My name is Emily Norman and I am doing a PhD thesis at the University of Waikato. My research is being supervised by Professors Devon Polaschek, a Clinical Psychologist and Nicola Starkey. Professor Devon Polaschek has 25 years of experience with correctional research and Professor Nicola Starkey is a recognized expert on TBI and neurocognitive functioning.

I earned a Master's degree in Forensic Psychology in the United States, and have spent the last ten years working with criminal justice system involved individuals as a mental health and addictions counselor. I have worked both in community corrections and state prison's.

**What is this research project about?**

The overall objective of this PhD research study is to understand if head injuries and their symptoms are related difficulties people serving a community sentence have when trying to do what is required of them. To accomplish this, we would like to interview individuals serving a community sentence about their thoughts on their conditions and their history of head injuries. We will also look at each participants corrections files for case notes

on conditions and history with corrections. We would also like to know if the head injuries caused any symptoms that are being experienced today. To do this we will ask individuals to do some tests that tell us how the brain works.

### **How can you help?**

If you agree to take part in this portion of the study, we will ask you to participate in a 2 hour interview. For this interview you will be asked to answer questions and do game like activities on both paper and on a computer. None of the tests or questions are intended to make you feel uncomfortable or upset, if you feel that way during the tests you can choose to not answer a question, take a break, leave the study, or discuss how you feel with the researcher. Because the tests are used to tell us how the brain works, some of the questions will seem easy, but others may be more difficult. There are questions on the tests that are difficult for people to answer.

Please contact your probation officer if you are interested in volunteering to participate in this portion of the study. If you agree to take part, we will ask you to provide written consent (a form provided to you by the researcher) to participate in this study on the day of the tests. If during the tests you do not wish to participate in the study you can leave and ask that we not include your information in the findings. You can change your mind about participating during the tests, and leave, or withdraw from this portion of the study at any time up to 7 days after the tests simply by telling the researcher (contact information is below).

### **What will happen to the information collected?**

Your identity will be kept strictly confidential to Professor Polaschek and myself. To protect your identity an ID number will assigned to your consent form, and all the information you provide will be stored under that ID number not your name. Only I will see you sign the consent form and these will be kept in a locked drawer or cupboard in a locked room at the



University of Waikato. Professor Polaschek will be the only other person who will have access to that locked drawer or cupboard.

I will analyze the results of the interview, assessments and file data and write it up as a portion of my PhD thesis. We may also talk about the overall findings at conferences and meetings and may write it up for scientific journal publications or in book chapters. You will not be named or identified in any reports, publications, presentations, or public documents arising from this research. You will be offered a summary of findings from the study when it has concluded. If you would like this summary, you will be invited to indicate on the consent form where you would like it sent. Similarly, if you would like your results from the neuropsychological assessments you can indicate that on the consent form as well. Note that if the results from the neuropsychological assessments fall in the clinical range (indicating some deficit) we will contact you and provide referral information. We expect the research will be finished in 2022.

### **Declaration to participants**

If you choose to take part in this study, you have the right to:

- Ask any further questions about the study at any time while you are with us;
- Refuse to answer any question, and leave the study any point during the interview;
- Withdraw your information from this portion of the study within 7 days of the tests or by contacting me or Devon (see below)
- Be sent a summary of findings from the study when it has finished;
- Be sent results from your tests;
- Not be identified by name in any reports, presentations, or publications arising from this research;
- Strict confidentiality with regard to all information gathered from you during this study unless there is a risk of serious imminent harm that requires the primary researcher to take action to make things safe;
- Have all data and/or notes relating to you destroyed within 5 years after the end of this study.

### **Who's responsible?**

If you have any questions or concerns about the project, either now or in the future, please contact either:

Primary supervisor: Professor Devon Polaschek – School of Psychology, The University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

Email: [Devon.polaschek@waikato.ac.nz](mailto:Devon.polaschek@waikato.ac.nz)

Phone 07-8379224

Or

Primary researcher: Emily M. Norman, PhD candidate, The University of Waikato

Email: [emadonna2000@yahoo.com](mailto:emadonna2000@yahoo.com)

*"This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email [fass-ethics@waikato.ac.nz](mailto:fass-ethics@waikato.ac.nz), postal address, Faculty of Arts and Social Sciences, Te Kura Kete Aronui, University of Waikato, Te Whare Wananga o Waikato, Private Bag 3105, Hamilton 3240."*

**Appendix P: Supervisee Consent Form for Neuropsychological Assessment*****Consent Form for Clients- Neuropsychological***

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

**PARTICIPANT CONSENT FORM:**\_\_\_\_\_

**RESEARCH PROJECT:**

Examining compliance issues related to community sentences: is there an association among traumatic brain injury (TBI), neuro-psychological functioning, and non-compliance with conditions of a community sentence?

**Name of person interviewed:**\_\_\_\_\_

I have received a copy of the Information Sheet describing the research project. Any questions that I have, relating to the research, have been answered to my satisfaction. I understand that I can ask further questions about the research at any time during my participation, and that I can choose to leave the testing at any time. I understand that I have up to 7 days to contact the primary researcher and ask that the results from my neuropsychological assessments not be included in the study results. I also understand that the primary researcher will contact me if the results on any of the assessments fall into the clinical range, indicating a deficit, and offer referrals to appropriate services.

When I sign this consent form, I understand that I give consent for the researcher to use the findings from the tests for the purposes of the research outlined in the Information Sheet. I understand that my identity will remain confidential in the presentation of the research findings.

<p><b>Please complete the following checklist. Tick [✓] the appropriate box for each point.</b></p>	<p><b>YES</b></p>	<p><b>NO</b></p>
<p><i>[I wish to receive a copy of the findings.]</i></p>		
<p><i>[Other?]</i></p>		

Participant : \_\_\_\_\_  
 Signature : \_\_\_\_\_  
 Date : \_\_\_\_\_  
 Contact \_\_\_\_\_

Researcher : \_\_\_\_\_  
 Signature : \_\_\_\_\_  
 Date : \_\_\_\_\_  
 Contact \_\_\_\_\_

Details : \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Details : \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Appendix Q: Neuropsychological Assessment Interview Schedule***Neuropsychological assessment Schedule*

THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānanga o Waikato*

Kia Ora,

I am Emily and I am going to ask you some questions, and ask you to do some assessments or tasks. These questions and tests are designed to measure how the health of your brain influences your thinking and behaviours. Answer each question to the best of your ability, and don't be discouraged if you are unable to answer a question or solve a problem, these tests are designed to be difficult at some points in order to fully test your abilities. There will be portions of the tests that would be difficult for most people to complete or answer. Please let me know at any point if you feel uncomfortable or need a break.

Before we begin would you like to lead a Karakia to open the session? If not, we can continue with the interview.

Neuropsychological assessment interview schedule: Tests will be given in this order

BRIEF

SCOLP

RBANS

DKEFS

C-WMT

VAES

