Neurocognitive Functioning and Treatment Implications in Offenders with Fetal Alcohol Spectrum Disorder

by

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Abstract

This dissertation consists of three separate papers exploring how an understanding of neurocognitive functioning can guide treatment for offenders with FASD. The first paper is a review of the literature on the relationship between neurocognitive impairment and high risk, delinquent, and criminal behaviour, followed by an overview of the needs of offenders with FASD in the context of the current Canadian justice system. This review concludes with the recommendation that a systemic shift, which incorporates a consideration of the biological, psychological, and social factors that impact criminality, will best support pro-social behaviours and reduce recidivism among individuals with FASD.

The goal of the second paper was to explore whether young offenders with FASD present with a unique profile of neurocognitive functioning compared to young offenders without FASD. A retrospective file review was conducted on clinical data obtained from neurocognitive assessments with 81 youth with and without FASD (aged 12 to 20 years) in an Alberta young offender treatment program. Relative to a Comparison group, young offenders with FASD displayed a unique neurocognitive profile, with deficits in cognitive flexibility, verbal and working memory, academics, complex processing speed, verbal ability, and inhibition (in males only), and relative strengths in simple processing speed, motor skills, visual memory, and visual-perceptual reasoning ability. These findings are discussed in the context of how we may use information about neurocognitive functioning to guide screening, sentencing, and programming practices for young offenders with FASD.

In the third paper, I explored perspectives of service providers working with an innovative justice program in rural Alberta for adults with suspected FASD. The goal was to identify the perceived impacts and challenges of using information from neurocognitive assessments to inform court decisions. Through two focus groups with 18 participants, four themes were identified: building capacity, humanizing the offender, creating bridges, and moving forward. Themes are discussed in reference to existing recommended practices for working with offenders with FASD, and future avenues for research are identified.

Preface

This thesis is an original work by Katherine Wyper. Chapter 2 of this thesis has been published as K. Wyper, J. Pei "Neurocognitive difficulties underlying high risk and criminal behaviour in FASD: Clinical implications." In M. Nelson & M. Trussler (Eds.), *Fetal Alcohol Spectrum Disorders: Ethical and Legal Perspectives*. Amsterdam: Springer. I was responsible for the literature review and manuscript composition. J. Pei was the supervisory author and was involved with concept formation and manuscript composition. Chapter 3 was part of a larger research project, which received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Neurocognitive Profile of Young Offenders," Pro00043496, December 17, 2013, and Chapter 4 was part of a larger research project which received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Alexis Project," Pro00028693, April 26, 2013.

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Chapter 1. Introduction

Research on Fetal Alcohol Spectrum Disorder (FASD) is a relatively new field, with the disorder having only been formally identified in North America 42 years ago (Jones & Smith, 1973). Early work characterized infants born to chronic alcoholic mothers as having physical birth defects, pre- and post-natal growth deficiencies, and impairments in social, motor, and mental functioning (Jones & Smith). Since this seminal work, an abundance of research has contributed to the literature regarding the negative effects of prenatal alcohol exposure (PAE) on a developing fetus. This research has evolved from looking at the direct impacts of PAE on physical and neurological development, to the functional difficulties associated with PAE, and more recently to interventions designed for supporting individuals with FASD. FASD is the leading cause of developmental and cognitive disability in the Western world, with recent prevalence estimates between 1.4% and 4.4% of live births in Alberta (Stade et al., 2009; Thanh, Johnson, Salmon, & Sebastianski, 2014). The economic impact of FASD in Canada is huge, with an annual cost of $5.3 billion to support individuals 0 to 53 years old affected by the disorder (Stade et al., 2009). In Alberta alone, the annual cost to support people living with FASD is an estimated $143 million (Thanh & Jonsson, 2009).

Individuals with FASD experience *primary disabilities*, which are those directly related to the central nervous system damage resulting from PAE. One of the hallmark features of FASD is disrupted neurocognitive development, and the resulting difficulties are evident in both standardized testing results (Mattson, Crocker, & Nguyen, 2011) as well as through ecologically meaningful caregiver and teacher reports (e.g., Rasmussen, McAuley, Andrew, 2007). These impairments can be life-long, however the ways in which they manifest functionally may change across the lifespan. Given the increased independence and responsibility typically associated with adolescence and adulthood, older individuals with FASD face challenges different than in childhood. That is, as some individuals with FASD age, their developmental ability may lag increasingly behind their chronological age, and with progressing environmental demands and societal expectations, neurocognitive impairment and associated behavioural challenges may become more dysfunctional. Compounding this growing ability-expectancy discrepancy, there are fewer services and evidence-based interventions for older individuals with FASD (Chudley, Kilgour, Cranston, & Edwards, 2007), which may lead to difficulties when young adults age out of pediatric services at age 18. Adults with FASD may achieve independence with appropriate assistance and services (Chudley et al., 2007), however, despite our knowledge of the persisting challenges associated with FASD and the benefits of support, there is a serious lack of

interventions designed for affected adolescents and adults (Petrenko, Tahir, Mahoney, & Chin, 2014).

For this reason, many individuals with FASD also experience *adverse outcomes,* a range of challenges stemming from the functional difficulties related to primary disabilities as well as inappropriate or inadequate support for the individual's needs (Streissguth, Barr, Kogan, & Bookstein, 1996). There is a well-established body of literature to document these adverse outcomes. Streissguth and colleagues' (1996) landmark longitudinal research identified mental health problems, inappropriate sexual behaviours, disrupted school experiences, confinement (in hospitals or correctional settings), and substance abuse as significant concerns for adolescents and adults with FASD. These findings have been replicated in numerous studies across the world, including some research in Canada (Clark, Lutke, Minnes, & Ouellette-Kuntz, 2004). Trouble with the law is also frequently noted in this group (Streissguth et al., 2004), and in the last two decades there has been a rapid growth in media and research interest around the issue of FASD in the justice system.

FASD in the Justice System

Both youth (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011) and adults (MacPherson, Chudley, & Grant, 2011) with FASD are over-represented in correctional settings, and researchers believe that many additional offenders may be affected by PAE but are undiagnosed (Fast & Conry, 2009). Given the social and adaptive difficulties related to FASD, incarcerated individuals may experience victimization and struggle to adjust to correctional environments (Byrne, 2002; Conry & Fast, 2000; Pei, Leung, Jambolsky, Alsbury, in press). Unfortunately, traditional justice models and practices fall short when managing the needs of offenders with FASD. These systems are structured for individuals with intact cognitive functioning who can understand the link between inappropriate behaviour and negative consequences, which often is not the case for offenders with FASD (Malbin, 2004). Indeed, in a recent study, offenders with FASD reported that behavioural and cognitive deficits, mental illness, and adverse social experiences contribute to the risk of entering and becoming "trapped" in the justice system (Pei et al., in press). Compounding this problem, there is a lack of FASD awareness and training about FASD among legal professionals (Byrne, 2002; Cox, Clairmont, & Cox, 2008), and an even more critical paucity of research around FASD-informed justice interventions.

One potential source of insight regarding how to best understand and meet the needs of offenders with FASD is the literature on neurocognition. An abundance of studies have established the key influence of neurocognitive functioning on high risk behaviours in the general population (Steinberg, 2008), including delinquency and crime (e.g., Raine et al.,

2005). Notably, many of the areas of neurocognitive impairment associated with criminality (e.g., inhibition, working memory, cognitive flexibility) are also often areas impacted by PAE. However, although it has been hypothesized that neurocognitive impairment may be a "fundamental" factor related to criminal behaviour in FASD (Institute of Health Economics, 2013), to date, there is very little research published that explicitly and comprehensively examine neurocognitive functioning in this group. Importantly, an increased understanding of neurocognitive strengths and difficulties of offenders with FASD has the potential to guide interventions and support successful outcomes.

Current Dissertation and Research Questions

This dissertation consists of three papers related to the topic of neurocognitive functioning among offenders with FASD. In order to understand the vulnerabilities and needs of offenders with FASD, it is important to consider the broader literature on delinquent and criminal behaviours, and how certain patterns of brain impairment can lead to the propensity to engage in such behaviours. Therefore, the first paper is a review of the current literature related to neurocognitive functioning among offenders and individuals with FASD in the context of the justice system. The goal of Paper 1 was to determine:

1. What can be learned from the literature on neurocognitive functioning and criminal behaviour to help understand offenders with FASD?

Equally important is knowledge of whether or how offenders with FASD are unique from other groups of offenders, as this can inform whether these individuals warrant differential treatment in the justice system. Thus, building on the literature-informed conceptualization of offending behaviour in FASD from Paper 1, in Paper 2 I compared the profile of neurocognitive functioning between young offenders with FASD and without FASD. The goal of Paper 2 was to collect new data to answer the question:

2. Do young offenders with FASD show a unique neurocognitive profile compared to young offenders without FASD?

Lastly, based on the idea that offenders with FASD are a unique population and may benefit from differential treatment in the justice system, Paper 3 was designed to bridge the theoretical background from Paper 1 and the clinical understanding gleaned from Paper 2. In Paper 3, I explored how an innovative program in an Alberta First Nations community is attempting to address the needs of offenders with FASD by combining neurocognitive assessment and justice services. The goal was to explore the perspectives of service providers who work with the program, and answer the question:

3. In what ways do Alexis FASD Justice Program service providers believe that combining neurocognitive assessment and justice services is enhancing the justice process for offenders with FASD?

Across all three papers, the ultimate goal was to gather information from multiple sources about one of the potential underlying factors related to criminal behaviour in FASD (i.e., neurocognitive functioning), and how this information can be translated into practices that foster positive outcomes for these individuals. The underlying premise is that there is not yet a comprehensive understanding of the needs of offenders with FASD within our justice system, and as a result this system is not adequately equipped to support these individuals. This gap in understanding undermines our ability to accurately assess an individual's level of risk and responsibility in making sentencing decisions and providing treatment for offenders with FASD. My overarching hypothesis for this dissertation is that PAE leads to a pattern of brain dysfunction that increases an individual's propensity for criminal behaviours, while at the same time rendering them more vulnerable once involved in the system. If so, traditional treatment responses would need to be adjusted to adequately address these needs, and information shared with justice and clinical stakeholders who have the potential to make meaningful impacts on the lives of those affected by FASD.

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Chapter 2. Neurocognitive Difficulties Underlying High Risk and Criminal Behaviour in Fetal Alcohol Spectrum Disorder: Clinical Implications

Introduction to Fetal Alcohol Spectrum Disorder

Fetal Alcohol Spectrum Disorder (FASD) refers to a range of physical, neurological, cognitive, socio-emotional, and behavioural impairments that can result when a developing embryo or fetus is exposed to alcohol during pregnancy (Chudley et al., 2005). A leading cause of developmental and cognitive disability in the Western world, FASD has an estimated prevalence rate of 1-4% of live births in Alberta, Canada (Stade et al., 2009; Thanh, Johnson, Salmon, & Sebastianski, 2014) and estimates as high as 2-5% have been reported in the United States and some western European countries (May et al., 2009). Consequently, the economic impact of FASD is huge, with an annual cost of $5.3 billion in Canada (Stade, Ungar, Stevens, Beyen, & Koren, 2007; Stade et al., 2009). One of the contributors to these costs is the high number of individuals who come into contact with the justice system. An examination of the links between risk factors for criminal behaviour, FASD-related vulnerabilities, offender characteristics, and the current state of the justice system reveals that more consideration must be given to how we can respond to these individuals in the most effective way.

Identifying FASD. As an umbrella term, FASD includes several specific diagnoses with varying degrees of impact on an individual's neurodevelopment. In Canada, most diagnosticians currently rely on the Canadian Guidelines (Chudley et al., 2005) to navigate the complex, inter-disciplinary diagnostic process, and these guidelines are currently being updated with the most recent research and informed by multi-disciplinary clinical expertise. Traditionally, the diagnostic process has involved assessment of four domains: physical growth, facial development, central nervous system functioning, and prenatal exposure to alcohol. Each of these four domains is evaluated by a team of clinicians and ranked from 1 to 4 on severity or probability of impairment, with 1 representing no impairment or risk and 4 representing severe impairment or high risk. Assessment also involves evaluation of other pre-natal risk factors such as lack of prenatal care, prenatal complications, genetic risk factors, and in utero exposure to other teratogens; and post-natal risk factors such as abuse, disrupted living arrangements, head injuries, and exposure to violence or substance abusing caregivers (Astley, 2004). Combined, this information is considered to be relevant for the process of determining differential diagnosis, as well as informing intervention approaches.

Primary disabilities. The direct neurological insult due to prenatal alcohol exposure (PAE) can lead to a range of neurocognitive and behavioural challenges, the most common

of which are impairments in intelligence, executive functioning (EF), learning and memory, academic skills, language and communication, visuo-spatial and motor ability, attention problems, and hyperactivity (see Mattson, Crocker, & Nguyen, 2011 for a review). These difficulties are evident in both standardized test results (Mattson et al., 2011) and ecologically meaningful caregiver and teacher reports (e.g., Rasmussen, McAuley, Andrew, 2007). Compared with healthy controls, IQ-matched controls, and individuals with other neurodevelopmental disabilities such as Attention-Deficit Hyperactivity Disorder, individuals with FASD show relatively intact functioning on basic neurocognitive tasks, but struggle with higher-level tasks relying on complex EF skills (Mattson et al., 2011). Specifically, some studies report that individuals with FASD show relatively stronger abilities in basic language (McGee, Bjorkquist, Riley, & Mattson, 2009), simple visual-perceptive tasks (Kodituwakku, 2009), simple processing tasks (Burden, Jacobson, & Jacobson, 2005), fine motor skills, and some aspects of attention and areas of academics (Vaurio, Riley, & Mattson, 2011). Conversely, higher-level neurocognitive functions such as inhibition (Burden et al., 2009), decision-making (Kully-Martens, Treit, Pei, & Rasmussen, 2013), working memory (Burden, Jacobson, Sokol, & Jacobson, 2005), and cognitive flexibility (Coles, Platzman, Raskind-Hood, Brown, Falek, & Smith, 1997) tend to be more impaired in individuals with FASD.

Adverse outcomes. In addition to these direct impacts of PAE, there is also a range of adverse outcomes identified for this population. The etiologies of these outcomes are more complex, and appear to result from an interaction between direct impacts of PAE and environmental factors. Streissguth, Barr, Kogan, and Bookstein (1996) and other researchers (Clark, Lutke, Minnes, & Ouellette-Kuntz, 2004) have identified mental health problems, inappropriate sexual behaviours, disrupted school experiences, confinement (in hospitals or correctional settings), and substance abuse as significant concerns for adolescents and adults with FASD. Trouble with the law is also frequently noted in this group (Streissguth et al., 2004), and in the last two decades there has been a rapid growth in media and research interest around the issue of FASD in the justice system.

Post-Natal Risk Factors and FASD

Several factors have been identified that may protect an individual against these adverse outcomes, including early diagnosis (before the age of 6 years), living in a stable and nurturing home environment, and not being a victim of violence (Streissguth et al., 2004). Unfortunately, many of these protective factors are absent for individuals with FASD. In one study, it was found that over 80% of children born with FASD were not living with their biological mothers (Streissguth et al., 2004), and other researchers have reported that family environments of older individuals with FASD are "remarkably unstable" (Streissguth

et al., 1991). Importantly, placement history has been shown to significantly impact both cognitive and behavioural functioning in children with FASD (Victor, Wozniak, & Chang, 2008), indicating that caregiving environment is a crucial variable affecting outcomes. Other commonly experienced post-natal risk factors among individuals with FASD include neglect, violence toward the child, post-natal exposure to parental substance abuse, parental divorce or separation, poverty, and other major trauma (Carmichael Olson, Oti, Gelo, & Beck, 2009). Given the evidence regarding the deleterious effects of both PAE *and* adverse early life experiences on neurodevelopment, individuals with FASD experience what is sometimes referred to as "double jeopardy" with these two layers of risk (Carmichael et al., 2009).

Adolescents and Adults with FASD

Most early studies of FASD focused on the effects of PAE in children, and only later did researchers turn their attention towards the lasting impact of the disorder into adolescence and adulthood. Researchers examining the manifestations of FASD in older ages tend to report that some physical anomalies persist, as do many of the cognitive, academic, adaptive, and developmental difficulties documented in childhood (Streissguth et al., 1991). Key functional difficulties described in these later years include challenges with behavioural and emotional functioning, school and employment, and independent living (Spohr, Willms, & Steinhausen, 2007). Additionally, substance abuse problems and trouble with the law may increase with age among adolescents and adults with FASD (Streissguth et al., 2004).

Canadian researchers have highlighted that living with a caregiver, requiring low levels of support, and being less vulnerable to manipulation may all be related to better outcomes (Clark et al., 2004). Another important finding from this research is that IQ did not significantly affect the likelihood of adverse outcomes, but adaptive functioning did, which highlights the importance of assessing daily living skills in order to meaningfully understand the needs of an individual with FASD. Researchers have recently found that, even when compared with an IQ-matched control group, individuals with FASD experience significantly more adaptive deficits (Temple, Shewfelt, Tao, Casati, & Klevnick, 2011). Because many individuals with FASD are intellectually impaired but not disabled (Mattson et al., 2011; Streissguth et al., 2004), those who have relatively intact intelligence but limited adaptive skills may fall through the cracks of agencies relying on IQ scores alone to allocate services.

The difficulties associated with FASD can be life-long, however the ways in which they manifest functionally may change across the lifespan. Given the increased independence and responsibility expected of adolescents and adults, older individuals with FASD face challenges different than in childhood. With greater environmental demands and societal expectations, the cognitive, socio-emotional, and behavioural impairments associated with

FASD may become more problematic. Complicating this growing ability-expectancy discrepancy, fewer services and interventions exist for adolescents and adults with FASD (Petrenko, Tahir, Mahoney, & Chin, 2014) even though they may be able to achieve independence with appropriate assistance and support (Chudley, Kilgour, Cranston, & Edwards, 2007).

FASD and high risk behaviours. High risk behaviours are generally defined as those that have a negative impact on the well-being of an individual, and that may cause immediate injury or contribute to cumulative negative outcomes (De Guzman & Bosch, 2007). There is an important distinction between socially *acceptable* risk behaviour – such as adventure seeking (e.g., bungee jumping) – and *reckless* behaviour that threatens one's safety (Arnett, 1992). Common reckless high risk behaviours include unsafe sexual behaviour, reckless driving, drug and alcohol abuse, violence and deviance, criminal activity, and other actions leading to unintentional or intentional injury (Centers for Disease Control and Prevention, CDCP, 2013). Adolescents and young adults (under the age of 25) are particularly vulnerable to engaging in high risk behaviours because this life stage is characterized by major changes in physical, socio-emotional, and neurological development accompanied by increased independence and autonomy (Steinberg, 2008). Although some degree of experimentation and risk-taking is a normal part of development, high risk behaviours pose one of the greatest threats to the health and well-being of young people and are a significant contributor to injury and death (Butler-Jones, 2011; CDCP, 2013; Steinberg, 2008). High risk behaviours are concerning not only due to the dangers inherent in these behaviours, but also because high risk behaviours initiated at a young age are associated with problematic behaviours later in life (e.g., substance abuse), and certain high risk behaviours can put others at risk as well (e.g., unsafe driving) (Steinberg, 2008).

Many of the adverse outcomes noted in FASD can be considered high risk behaviours. High rates of school drop-out, substance abuse, inappropriate sexual behaviour, and suicidality certainly threaten the well-being of these individuals and can lead to injury or other negative outcomes. More specifically, some researchers have shown that individuals with FASD demonstrate maladaptive and problem behaviours such as impulsivity, teasing and bullying, dishonesty (e.g., lying, stealing, cheating), cruelty, destruction of property, physical aggression, and self-injury (LaDue, Streissguth, & Randels, 1993; Nash et al., 2006; Rasmussen, Talwar, Loomes, & Andrew, 2008). High rates of risky behaviours among adolescents with PAE may be associated with deficits in EF and decision-making, as well as brain abnormalities (Rasmussen & Wyper, 2007).

Neurocognitive Functioning in Offender Populations

Many of the high risk behaviours described above are delinquent or illegal, and as such, interactions with the justice system are frequent for individuals engaging in these behaviours. Consideration of the neurocognitive characteristics of offender populations as a whole can provide some insight into the underlying mechanisms implicated in their behaviour, and shed light on potential intervention strategies to address these factors.

EF and self-regulation impairments. EF refers to a set of higher-order processes that oversee thought and action under conscious control (Zelazo & Müller, 2002) and guide adaptive responses to novel situations (Hughes, 2011). EF undergoes rapid changes during childhood and continues to develop into adolescence and beyond (Zelazo & Carlson, 2012). The neurological underpinnings of EF were first established through neuropsychological studies of individuals with brain damage, and identified the frontal lobe as a key brain area associated with these functions (e.g., Shallice & Burgess, 1991). The life-long relevance of EF is demonstrated in research showing that some early-developing EF processes are predictive of later outcomes such as physical health, substance abuse, personal finances, and criminal behaviour (Moffitt et al., 2011).

One way to conceptualize EF is in terms of "hot" and "cold" processes. "Hot" executive functions are those involved in situations with high levels of emotion and motivation, whereas "cold" executive functions are used in emotionally-neutral situations (Zelazo & Carlson, 2012). In terms of high risk behaviours, hot EF processes may be particularly relevant, evinced by the finding that most adolescent risk-taking occurs during situations of emotional arousal (Steinberg, 2004).

Self-regulation is another broad concept encompassing a number of sub-functions related to high risk behaviours. In describing the practical implications of self-regulation, Baumeister, Schmeichel, and Vohs (2007) assert that, "most of the social and personal problems that afflict people in modern western society have some element of self-regulatory failure at their root" (p. 2). Research on self-regulation originates from multiple schools of thought, but for the purpose of this review it is defined as the "self altering its own responses or inner states," (Baumeister et al., 2007, p. 5) involving "active responding and decision-making" (Murtagh & Todd, 2004, p. 22), which overlaps considerably with EF. Self-regulation includes emotional, behavioural, and cognitive regulation, and is used interchangeably with self-control in this review.

Delinquent and criminal behaviour is related to numerous impairments falling under the umbrellas of EF and self-regulation. Multiple studies have shown that impairments in both hot and cold EF are associated with violent, aggressive (Hancock, Tapscott, & Hoaken,

2010; Hoaken, Shaughnessy, & Pihl, 2003), and antisocial (De Brito, Viding, Kumari, Blackwood, & Hodgins, 2013; Ogilvie, Stewart, Chan, & Shum, 2011) behaviour. These studies parallel brain imaging research that reveals reduced structure and function of the brain areas related to EF and self-regulation (i.e., prefrontal cortex) in antisocial and violent individuals (Yang & Raine, 2009).

Inhibition/impulse control. Inhibition can be broadly defined as voluntary control over cognition or behaviour, and in particular as the ability to resist a prepotent or impulsive response, with neurological roots in the frontal lobe. Impaired inhibition is considered by some researchers to result in impulsivity (Aron, 2007), thus these two concepts will be used synonymously for the purpose of this review. Poor inhibition and impulsivity are some of the most widely cited deficits among individuals who engage in delinquent or criminal behaviours. Longitudinal work has implicated teacher-rated impulsivity measured in kindergarten to self-reported delinquent and antisocial behaviours in adolescents (Tremblay, Pihl, Vitaro, & Dobkin, 1994). The same group of researchers later found that strong inhibition may serve as a protective factor against self-reported delinquency in adolescents (Kerr, Tremblay, Pagani, & Vitaro, 1997). Researchers more recently suggest that impulsivity may moderate the relationship between protective factors (i.e., family warmth and parental knowledge) and delinquency (Chen & Jacobsen, 2013). In adult populations, impaired behavioural inhibition has been found in offenders with antisocial personality disorder compared with healthy controls (Dolan, 2012). Recent neurophysiology research using transcranial magnetic stimulation and electroencephalography has implicated the prefrontal cortex in the inhibition deficits among some groups of offenders (Hoppenbrouwers et al., 2013). Importantly, the relationship between low inhibition/high impulsivity, and criminal behaviour may be specific to the type of offense, as Hancock and colleagues (2010) found that poorer performance on these measures was related to a higher number and greater severity of violent, but not non-violent offences.

Decision-making. The term "decision-making" is broad, but in general this process requires choosing one option over another or several other alternatives (Seguin, Arseneault, & Tremblay, 2007), involving both "cold" cognitive functions and "hot" emotional processes. Cold processes include weighing risks and benefits (incorporating aspects of reward, punishment, and future consequences), and holding alternatives in mind while comparing them, whereas hot processes involve the affective response to various alternatives (based on emotional or visceral reactions to situations, often under time pressures) (Seguin et al., 2007), all of which may have neurological roots in the prefrontal lobe (Bechara, 2005;

Bechara, Tranel, & Damasio, 2000; Syngelaki, Moore, Savage, Fairchild, & Van Goozen, 2009).

Decision-making impairments have been documented in young offender populations as well as youth with conduct disorder, both of whom have been shown to make more risky choices than controls (Fairchild et al., 2009; Syngelaki et al., 2009). The cause of this impairment may be explained as an imbalance in reward-punishment sensitivities (Fairchild et al.). Similar impairments have been noted in adult populations, with antisocial offenders both with and without comorbid psychopathy showing deficits in adaptive decision-making (De Brito et al., 2013). Though some researchers suggest that experimental measures of decision-making may not accurately reflect real-world situations (Steinberg, 2004), recent work found that laboratory-measured decision-making (i.e., performance on the Iowa Gambling Task) predicted recidivism in offenders at 3- and 6-month follow-up, supporting the ecological validity of this construct (Beszterczey, Nestor, Shirai, & Harding, 2013).

Working memory. In Baddeley's (1992) seminal research on working memory, he defines the construct as "temporary storage and manipulation of the information necessary for complex cognitive tasks" (p. 556), and this function is also associated with the prefrontal region of the brain (Owen, Downes, Sahakian, Polkey, & Robbins, 1990). Baddeley underscores the influence of working memory on many important tasks including language processing and reasoning, and forensic research also commonly cites working memory as an area of deficit among offenders. For instance, several studies have demonstrated that juvenile offenders display weaker spatial working memory than controls (Cauffman, Steinberg, & Piquero, 2005; Syngelaki et al., 2009), and impairments in verbal working memory have also been noted in adult offenders both with and without antisocial personality disorder and psychopathy (De Brito et al., 2013; Hoppenbrouwers et al., 2013).

Cognitive flexibility and set-shifting. Cognitive flexibility is generally known as the ability to shift attention, adapt one's thoughts and responses, and generate novel ideas, and it is often used interchangeably with set-shifting. Deficits in these neurocognitive functions have been noted in both violent and non-violent adult offenders (Bergvall, Wessely, Forsmann, & Hansen, 2001; Tuominen et al., 2014), adult offenders with antisocial personality disorder (Dolan, 2012), and in young offenders (Syngelaki et al., 2009). Weaker performance on measures of cognitive flexibility and concept formation has also been related to a higher number and greater severity of violent but not nonviolent crimes in adult offenders (Hancock et al., 2010).

Verbal ability. Broadly defined, verbal ability is an individual's capacity to understand language, and is neurologically localized in the left hemisphere of the brain. Verbal ability is

heavily influenced by one's learning environment (Romi & Marom, 2007), and impairment in this domain is a strong risk factor for antisocial and delinquent behaviour (Munoz, Frick, Kimonis, & Aucoin, 2008). For example, Romi and Manom (2007) compared intellectual ability between delinquent youth and controls and found that delinquent youth performed significantly worse than controls in verbal indices, but not performance indices of the Wechsler Intelligence Scale for Children – Revised. Similarly, Manninen and colleagues (2013) reported that low verbal intellectual ability was highly predictive of later offending (and violent crimes in particular) among youth with conduct disorder. Lower verbal skills are also related to physical aggression in adolescents (Barker et al., 2011), and longitudinal research suggests that language impairments in childhood lead to higher parent-reported delinquency and self-reported rates of criminal arrests and convictions at 19 years old; however this relationship was only found in males (Brownlie et al., 2004).

Although these findings provide a compelling case for the link between verbal impairment and delinquency/crime, Hancock and colleagues (2010) found that offenders with greater expressive verbal skills were more likely than offenders with weaker skills to commit severe violent offenses. The authors hypothesized that, because violent offences are often predicated by verbal exchanges, individuals with greater expressive language may be more likely to verbally insult and provoke, in turn escalating the conflict.

Attention. The concept of attention has been defined from a number of perspectives, but one that is particularly relevant clinically is that proposed by Sohlberg and Mateer (1987): "the capacity to focus on particular stimuli over time and to manipulate flexibly the information" (p. 117). Impairments in attention and concentration have been commonly noted in delinquent youth (Manninen et al., 2013), and these problems may be worse for youth living in residential institutions compared with non-institutionalized delinquent youth and non-delinquent controls (Romi & Marom, 2007). Indeed, clinically significant attention difficulties are frequently noted in delinquent and offender groups, in the form of high rates of attention-deficit hyperactivity disorder (Belcher, 2014; Young & Thome, 2011). Moreover, offenders with attention deficits have been shown to have a higher number of convictions than those without (Tuominen et al., 2014).

Bringing it Together: The FASD-Affected Offender

Prenatal exposure to substances has been shown to increase vulnerability to criminal behaviour later in life (Heffron et al., 2011) and one mechanism through which PAE may lead to these problem behaviours is neurocognitive impairment. As described above, individuals with PAE and FASD have repeatedly been shown to display broad deficits in EF (Connor, Sampson, Bookstein, Barr, & Streissguth, 2000; Mattson et al., 1999; Rasmussen

et al., 2007) and self-regulation (Kodituwakku, Handmaker, Cutler, Weathersby, & Handmaker, 1995). In fact, EF is one of the most frequently documented impairments among individuals with FASD (Mattson, Goodman, Caine, Delis, & Riley, 1999), and especially higher-level EF tasks (Mattson et al., 2011). In particular, individuals with heavy PAE (with or without an FASD diagnosis) display difficulties in planning, cognitive flexibility, inhibition, concept formation, and reasoning (Mattson et al., 1999). EF deficits as reported by parents and teachers of children with FASD may account for a significant proportion of the social difficulties they experience, and behavioural regulation and metacognition ("thinking about thinking") are noted as key concerns (Schonfeld, Paley, Frankel, & O'Connor, 2006). Affective or "hot" EF impairments may be especially relevant in terms of high risk behaviours in this population, as children with FASD have been shown to be impaired on decision-making and risk-taking tasks, and may not learn from negative consequences to make more positive choices (Kully-Martens et al., 2013).

Given the relationship between neurocognitive ability and high risk behaviours, it is little wonder that individuals with FASD are vulnerable to engaging in such behaviours. Deficits that characterize FASD may predispose an individual for engaging in criminal behaviours and becoming involved with the justice system (Byrne, 2002). These deficits include poor adaptive skills, slow information-processing, inflexibility and perseveration, limited understanding of consequences and ability to learn from past mistakes, receptive language impairments, distractibility and inattention, immaturity, social ineptness, vulnerability to manipulation/suggestibility, dishonesty, and weaker moral judgment (Byrne; Malbin, 2004; Mela & Luther, 2013; Page, 2001; Schonfeld, Mattson, & Riley, 2005), many of which have roots in neurocognitive functioning.

FASD and the Justice System

In some longitudinal research, 60% of FASD-affected individuals have reported experiencing trouble with the law and 35% have reported being criminally incarcerated (Streissguth et al., 1996). Both youth (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011) and adults (MacPherson, Chudley, & Grant, 2011) with FASD are over-represented in the justice system with prevalence estimates of 10-23% (Fast, Conry, & Loock, 1999; MacPherson et al., 2011) vastly exceeding the rate of 1-4% for FASD in the general population. It is also believed that many offenders have been prenatally exposed to alcohol but remain undiagnosed (Fast & Conry, 2009) due to the "invisibility" of FASD, where affected individuals may show no physical symptoms and appear to have strong expressive vocabularies, and service professionals may lack awareness of FASD (Malbin, 2004; Page 2001).

Individuals with FASD who enter the justice system may also become targets for victimization, may end up learning more criminal acts without understanding why they were incarcerated in the first place, and may be unable to conform to the custodial environment (Byrne, 2002; Conry & Fast, 2000). Indeed, Canadian researchers have recently reported that offenders with FASD experience difficulty adjusting to correctional settings, with higher numbers of institutional incidents (as victims and perpetrators), more institutional charges, and less likelihood of completing correctional programming or being granted parole (Mullins, MacPherson, Moser, & Matheson, 2014).

The Canadian criminal justice system is not fully equipped to support individuals with diverse cognitive abilities. Traditional justice practices assume that offenders can make links between inappropriate behaviour and negative consequences (Malbin, 2004), and even in the case of offenders with mental disorders, it is assumed that with treatment, the disorder may be rectified (Roach & Bailey, 2009). The system fails to accommodate for FASD, and for offenders with the disorder, this system falls short:

> The inability of the present system to effectively provide meaningful rehabilitation or deterrence to individuals suffering from FAS/ARND combines with the increased vulnerability to further victimization within penal facilities clearly sends a message that it is not appropriate for the Canadian Judicial system to continue to minimize the very real impact FAS/ARND has on individuals. (Chartrand & Forbes-Chilibeck, 2003, p. 61)

Because of these issues, there is a dire need for increased FASD education and training for justice personnel (Byrne, 2002; Cox, Clairmont, & Cox, 2008), access to timely assessment and diagnosis of FASD, screening methods, treatment for offenders suspected of having FASD (Burd, Selfridge, Klug, & Bakko, 2004), and a review of the "yes or no" determination of criminal responsibility when dealing with FASD-affected offenders (Mela & Luther, 2013).

Recent developments in the justice system. A new perspective is required in all dimensions of the justice system to enhance the appropriateness of this system for offenders with FASD. Researchers have suggested that this new perspective should involve a greater understanding of the cognitive impacts of FASD (Moore & Green, 2004), as well as a shift from punitive to therapeutic approaches (Mela, Tait, Levine, & Nicolaichuk, 2013). There has been a surge in media and research attention regarding justice issues and FASD over the last decade, and a growing awareness of FASD in Canadian criminal law (Roach & Bailey, 2009). In fact, this is such an important topic that in 2013, two formal gatherings occurred in Canada; "*FASD and the Law: A Conversation About Current Research and Practices*" was held in Vancouver, BC and "*Consensus Development Conference on Legal Issues of FASD*" took place in Edmonton, AB. The conversation continued, with "*FASD at the Frontline,"* held in 2014 in Regina, SK to highlight justice-related FASD research, and "*FASD and the Law Day 2015"*, again held in Vancouver. There have also been efforts to develop

screening tools that enable parole officers to identify youth who may be affected by FASD (Conry & Asante, 2010). As well, two recent Canadian Bar Association (CBA) resolutions were passed because the "…normative assumptions and the sentencing principles such as specific and general deterrence are not valid for those with FASD" (CBA, 2010) and there is a need to "improve access to justice" and accommodate the disability of FASD (CBA, 2013). There have also been initiatives to put forth a private member's bill to amend the criminal code to accommodate for FASD. The Edmonton Consensus Conference resulted in a 60-page document exploring the implications of FASD for the justice system, including how to better identify offenders with FASD; how the criminal justice system, family court, and family/child welfare system can better respond to and meet the needs of these offenders; how guardianship, trusteeship, and social support can be enhanced for these individuals; and what legal measures are currently in effect to prevent the disorder. Despite these efforts, there is a concerning lack of research focusing on justice interventions for offenders with FASD.

Meeting the Needs of Offenders with FASD

The needs of offenders with FASD do not always align with traditional justice approaches. Justice interventions may be most appropriate and effective in reducing recidivism when treatment is psychologically informed and guided by the offender's risk to society, profile of needs, and responsivity to treatment (Andrews et al., 1990). Most contemporary offender rehabilitation programs rely heavily on cognitive approaches, and assume that offenders have a strong degree of control over their own behaviour, particularly in terms of personal attitudes and abilities such as problem-solving, self-monitoring and evaluation, and resisting temptation (Day, 2011). Unfortunately, individuals with FASD tend to show marked deficits in these areas, struggling with attention, EF, and adaptive functioning (MacPherson et al., 2011).

Some preliminary work has been undertaken to explore how the justice process may be improved for offenders with FASD. A 2007 Roundtable on the economic impact of FASD in Canada suggested that matching release requirements with the unique strengths and weaknesses of offenders with FASD would reduce recidivism, as well as the costs associated with it (Public Health Agency of Canada, 2007). Community collaborations dedicated to providing appropriate case plans and supports for individuals with FASD are also being developed (Asante Centre, 2014), some of which may help to reduce recidivism (Olsen, & Debolt, 2002). These initiatives should focus on individual needs and strengths, and also incorporate external factors and emphasize environmental modifications and supports. Notably, some researchers assert that, "the most effective sentence for people with FASD

may be one that aims to change their living or social situation, rather than their behavior" (Fast & Conry, 2004, p. 164).

Although these efforts are promising, specific research on evidence-based justice interventions for FASD-affected offenders is very limited. Brown, Connor, and Adler (2012) recently published one article on potentially promising approaches for working with incarcerated youth with FASD. These approaches include implementing programs that are highly structured, consistent, predictable, individualized, and involve behavioural reinforcement; targeting adaptive and social functioning; and using behaviour therapy rather than cognitive therapy to replace maladaptive behaviours. They also suggested that treatment approaches should avoid peer group interventions, which may be inappropriate due to FASD-related social difficulties. Additionally, the authors further suggested removing youth from chaotic home environments, helping youth to translate new skills, building long-term individualized support and supervision in plans for the future, and engaging a mentor to assist in transition back to the community. McLachlan, Wyper, and Pooley (2013) also recently published a report based on a survey with substance abuse service providers, exploring promising practices for addictions treatment in young offenders with FASD. This report listed practices similar to Brown and colleagues' recommendations, as well as additional strategies to compensate for FASD-related neurocognitive deficits, including: less use of insight-based approaches, verbal strategies, and approaches that rely on attention/concentration/memory; more use of skill-building, extra support for youth to understand treatment content, and multi-modal learning integrating senses and physical learning; using concrete rather than abstract concepts; and teaching memory strategies. Finally, Mela and colleagues (2013) recently proposed that interventions for adult offenders with FASD should be life-long, extending beyond the justice system into transitional programs and the broader community, and that these systems of intervention may be most effective when coordinated by a mentor. The notion of mentoring aligns with Sterling Clarren's idea of the "external brain" (Kellerman, 2003), which asserts that individuals with FASD may achieve the most success with the help of a responsible person to navigate the responsibilities of daily life.

Summary and Conclusions

FASD poses a significant social and economic challenge in our communities. Individuals with FASD are a unique population, confronted with neurocognitive vulnerabilities that increase the likelihood of engaging in maladaptive, high risk, and criminal behaviours. Examination of the general offender population reveals core characteristic neurocognitive deficits, many of which are often identified in FASD.

Additionally, individuals with FASD tend to encounter adverse environmental experiences throughout their lives, which may increase their level of risk by amplifying the vulnerability of neurocognitive impairment. Perhaps as a consequence of this two-fold risk, individuals with FASD are disproportionately represented in the justice system. Unfortunately, a review of the current justice system practices reveals that this system is a poor fit for the FASD population, which may, yet again, amplify the likelihood of negative outcomes.

A strengths-based perspective suggests that when individuals with FASD are provided with appropriate and sufficient support, they will experience greater success. Working from this perspective, to continue this early progress and build momentum in the justice context, conceptualization of FASD and criminality needs to shift to a comprehensive model of understanding whereby neurocognitive functioning, psychology/mental health, and social/environmental experiences are considered. An intervention approach that incorporates an understanding of neurocognitive limitations, mental health issues, and other post-natal adversity may be more effective at addressing *all* risk factors and consequently bolstering an individual with FASD to engage in more pro-social as opposed to delinquent or criminal behaviour.

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Chapter 3. Neurocognitive Profile of Young Offenders with Fetal Alcohol Spectrum Disorder

Introduction

Fetal Alcohol Spectrum Disorder (FASD) is a life-long disability that can involve a myriad of physical, neurological, cognitive, socio-emotional, and behavioural impairments (Chudley et al., 2005). The term "primary disabilities" is often used to describe impairments in FASD that are directly related to the central nervous system (CNS) damage caused by prenatal alcohol exposure (PAE). The most commonly documented primary disabilities are deficits in cognition, learning and memory, academics, language and communication, visuo-spatial processing, motor ability, and attention problems and hyperactivity (see Mattson, Crocker, & Nguyen, 2011 for a review).

One area of cognition that is widely studied in FASD in both clinical and experimental contexts is higher-level executive functioning (EF) (Kodituwakku, 2009). EF describes complex cognitive processes that oversee thought and action under conscious control (Zelazo & Müller, 2002), and help an individual to adapt in novel situations (Hughes, 2011). EF is a broad term that encompasses many higher-level skills; some of the processes commonly discussed in the literature are planning and organization, abstract reasoning, problem-solving, decision-making, cognitive flexibility, working memory, and inhibition (Jurado & Rosselli, 2007; Miyake et al., 2001). EF is thought to be necessary for "appropriate, socially responsible, and effectively self-serving adult conduct" (Jurado & Rosselli, 2007, p. 213) and has been associated with life outcomes such as substance abuse, physical health, financial well-being, and criminality (Moffitt et al., 2011). Individuals with FASD appear to be *less* impaired on basic EF cognitive tasks, but have more difficulties with higher-level tasks relying on complex EF skills (Mattson et al., 2011). Specifically, relatively stronger abilities have been documented in the FASD population in basic language (McGee, Bjorkquist, Riley, & Mattson, 2009), simple visual-perceptive tasks (Kodituwakku, 2009), simple processing speed tasks (Burden, Jacobson, & Jacobson, 2005), fine motor skills, and some aspects of attention and areas of academics (Vaurio, Riley, & Mattson, 2011). However, complex functions such as inhibition (Burden et al., 2009), decision-making (Kully-Martens, Treit, Pei, & Rasmussen, 2013), working memory (Burden, Jacobson, Sokol, & Jacobson, 2005), cognitive flexibility (Coles, Platzman, Raskind-Hood, Brown, Falek, & Smith, 1997), complex visual-perceptual reasoning, and mathematics (Rasmussen & Bisanz, 2011) tend to be areas of more significant difficulty among individuals with FASD.

In addition to these primary deficits, individuals with FASD are also vulnerable to experiencing adverse outcomes that result from inadequate or inappropriate supports for their primary CNS difficulties. Researchers have identified disrupted school experience, mental health problems, confinement (hospital or incarceration), inappropriate sexual behaviours, and substance use issues as common adverse outcomes for this population (Clark, Lutke, Minnes, & Ouellette-Kuntz, 2004; Streissguth, Barr, Kogan, & Bookstein, 1996). Post-natal adversities such as neglect, abuse towards the child, exposure to substance abuse, parental separation, poverty, and trauma are also commonly reported in the FASD population, and the combined risk of PAE and poor caregiving environment has been referred to in the literature as "double jeopardy" (Carmichael-Olson, Oti, Gelo, & Beck, 2009). Researchers have also identified factors that may protect against negative outcomes, such as diagnosis before the age of 6 years, residing in a stable and nurturing home environment, and not being a victim of violence (Streissguth et al., 2004). Although these variables have been linked to better outcomes, unfortunately many individuals with FASD lack these protective factors. There is also a critical lack of interventions for adolescents and adults with FASD, which compounds the risk of negative outcomes (Petrenko, Tahir, Mahoney, & Chin, 2014).

FASD and the Justice System

Within the general population, a number of risk factors for delinquent behaviour have been identified in the literature. These include individual variables (e.g., substance abuse, male gender, exposure to violence, hyperactivity, cognitive difficulties, aggression), family variables (e.g., poor parent-child relationship, family conflict and abuse, home instability), poor school experience (e.g., negative attitude, academic failure), delinquent or antisocial peers, and exposure to neighborhood crime (Shader, 2003). EF impairment is also common in criminal populations (Hancock, Tapscott, & Hoaken, 2010; Hoaken, Shaughnessy, & Pihl, 2003; De Brito, Viding, Kumari, Blackwood, & Hodgins, 2013; Ogilvie, Stewart, Chan, & Shum, 2011). Examination of these risk factors reveals a high degree of overlap with the aforementioned individual and environmental variables characteristic of the FASD population. This raises the question of the increased likelihood of criminal behaviour among those with FASD.

Indeed, trouble with the law is a significant issue frequently documented among individuals with FASD, garnering increasing attention in academia and the media. In one study, 60% of adolescents and adults with FASD reported experiencing arrests, charges, convictions, and other forms of conflict with the law, and 35% reported being criminally incarcerated, with males at greater risk across these areas (Streissguth et al., 2004).

Alarmingly, the prevalence rates of FASD in correctional settings range from 10-23% in both youth (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011) and adults (MacPherson, Chudley, & Grant, 2011) systems, which greatly exceed the estimated rate of 1-4% for FASD in the general population (Stade et al., 2009; Thanh, Johnson, Salmon, & Sebastianski, 2014). Because many affected individuals show no physical symptoms and may possess adequate expressive vocabularies, FASD is considered an "invisible" disorder, and it has been suggested that many offenders were prenatally exposed to alcohol but have never been diagnosed (Fast & Conry, 2009). Also related to this notion of invisibility, there is a general lack of FASD awareness and training among service providers across disciplines, and especially in the justice system (Malbin, 2004; Page, 2001).

Once an individual with FASD enters the justice system, they may become vulnerable in a number of ways. They may be targets for exploitation, struggle to conform to the custodial setting, lack understanding about why they are there and end up learning more criminal acts, engage in a higher number of institutional incidents, acquire more institutional charges, and be less likely to complete correctional programming or be granted parole (Byrne, 2002; Conry & Fast, 2000; Mullins, MacPherson, Moser, & Matheson, 2014). Adult offenders with FASD have been reported to face numerous convictions as juveniles, a higher number of convictions as adults, a greater likelihood of failing under community supervision, disciplinary problems during incarceration, and re-incarceration within 6 months, than offenders without FASD (MacPherson et al., 2011). They also report a myriad of behavioural, cognitive, mental health, and social factors that contribute to their entry into the justice system as well as difficulties leaving the system (Pei, Leung, Jambolsky, & Alsbury, in press). In the juvenile system specifically, youth with FASD report their onset of trouble with the law as early as 12.8 years of age (Streissguth et al., 2004). Researchers have recently shown that youth with FASD receive criminal charges earlier in life, with a higher number of charges (though less serious) than non-FASD young offenders, and have a greater risk of re-offending (McLachlan, 2012). Once involved in the system, the neurocognitive, adaptive, and social difficulties associated with FASD may influence an affected youth's ability to navigate the legal process, with high rates of psycho-legal impairment among young offenders with FASD related to understanding arrest, interrogation, and trial processes (McLachlan, Roesch, Viljoen, & Douglas, 2014). Individuals with FASD have also been found to be suggestible (Brown, Gudjonsson, & Connor, 2011), and more likely to give false confessions or false testimonies (Roach & Bailey, 2009).

Given these issues, there is a dire need for increased FASD education and training for justice personnel (Byrne, 2002; Cox, Clairmont, & Cox, 2008), access to timely assessment

and diagnosis of FASD, enhanced methods for screening, identifying, and treating offenders suspected of having FASD (Burd, Selfridge, Klug, & Bakko, 2004), and for a review of the "yes or no" determination of criminal responsibility when dealing with FASD-affected offenders (Mela & Luther, 2013). Although some judges have begun to consider the impact of FASD in their sentencing decisions (Cox et al., 2008), formal assessments for the disorder are rarely undertaken (Vidovic, 2012) and the consideration of FASD in sentencing decisions holds more weight for juvenile as opposed to adult offenders, who are deemed less capable of rehabilitation (Verdun-Jones & Butler, 2013).

Neurocognition, Delinquency, and Criminal Behaviour

Brain function plays an important role in an individuals' propensity to engage in delinquent or criminal behaviours. In particular, many of the underlying brain mechanisms that have been associated with delinquent or criminal behaviours relate to higher-level neurocognitive abilities such as EF. Within the delinquency and crime literature, numerous EF processes have been associated with antisocial and offending behaviours, and brain imaging research further confirms the relationship between EF and antisocial and violent behaviour (Yang & Raine, 2009). For example, some of the most commonly reported areas of neurocognitive impairment among individuals who engage in delinquent, antisocial, or criminal behaviour include inhibition (Tremblay, Pihl, Vitaro, & Dobkin, 1994; Dolan, 2012), decision-making (De Brito et al., 2013; Syngelaki, Moore, Savage, Fairchild, & Van Goozen, 2009), working memory (Cauffman, Steinberg, & Piquero, 2005; De Brito et al., 2013; Hoppenbrouwers et al., 2013; Syngelaki et al., 2009), cognitive flexibility (Bergvall, Wessely, Forsmann, & Hansen, 2001; Tuominen et al., 2014; Dolan, 2012; Syngelaki et al., 2009), cognitive control (Schiffer et al., 2014), verbal ability (Munoz, Frick, Kimonis, & Aucoin, 2008; Romi & Manom, 2007; Manninen et al., 2013), and attention (Manninen et al., 2013; Belcher, 2014; Young & Thome, 2011).

Neurocognitive functioning in offenders with FASD. Adding to the social and environmental risk factors for delinquency commonly experienced by individuals with FASD, these individuals also experience neurocognitive difficulties in areas that have been implicated in criminal behaviour. Functionally, these difficulties could result in the inability to predict consequences, understand cause-and-effect, and exert control over strong impulses, and could foreseeably impair one's decision-making in a situation involving the temptation to engage in antisocial behaviours. Similarly, difficulties with mentally manipulating large amounts of information at once, paying attention, thinking flexibly, and using effective verbal communication strategies could lead to frustration or even aggression during interpersonal conflict.

Although it is well-established that individuals with FASD experience these multiple layers of risk, and some work has been undertaken to bring awareness to the justice-related vulnerabilities in FASD populations, only one study has comprehensively examined the neurocognitive profile of this group. As part of a larger research project in Saskatchewan, Harker (2014) explored whether 86 young offenders (aged 12 to 18 years) with FASD display a different neurocognitive profile than 111 young offenders without FASD. She examined a range of neurocognitive functions (verbal and visual memory, attention, cognition, language, verbal fluency, and inhibition) through a variety of measures. Although youth with FASD displayed significantly lower scores than the non-FASD group across all neuropsychological tests evaluated except inhibition, the *profile* of impairment was the same between groups. Also, both groups were significantly impaired relative to the norm (i.e., 1 or more standard deviations below the mean) across all tasks except inhibition. Harker speculated that the null finding related to inhibition was due to the difficulty of the inhibition task, which resulted in a small number of youth completing the measure, and those who did were among the "most capable" of the group because they were able to complete the task (Harker, 2014).

Harker's (2014) study represents an important first step in understanding the functional profile and unique needs of young offenders with FASD. Building on this research and increasing our knowledge of the neurocognitive strengths and areas of difficulty among offenders with FASD is important for understanding one of the factors potentially underlying criminal behaviour among offenders with FASD. This line of research has the potential to inform practice through the development of screening protocols or appropriate justice interventions to identify and support the needs of this vulnerable group.

Present Study

The overarching goal of this study was to explore the question: do young offenders with FASD show a unique neurocognitive profile compared to young offenders without FASD? A retrospective file review was conducted on clinical data from clients aged 12 to 20 years with and without an FASD diagnosis who attended Alberta Health Services Centerpoint Program. Centerpoint is a treatment program in Edmonton, Alberta offering mental health and behavioural support for youth in conflict with the law. This program provides a range of services including assessment, therapy, consultation, and education. Each client who attends the Centerpoint program undergoes a comprehensive neurocognitive assessment involving intellectual, academic, and neurocognitive testing.

In the present study, I examined the profile of a group of young offenders with FASD in Alberta to determine whether the needs of this group are *different,* or simply more *severe*

than young offenders without FASD, as Harker (2014) has suggested. This study allows us to compare young offender profile across provinces, increasing our ability to generalize findings about the population. As well, by examining performance on different neurocognitive tasks, this study further hones our understanding of the profile of functioning in this group. Knowing whether there are unique impairments in this group helps to clarify what areas of functioning are important to target with screening and intervention. This study also incorporates a gender and age analysis, which further informs our understanding of neurocognitive functioning in young offenders with and without FASD. The ultimate goal of this study is to contribute to the literature on offenders with FASD, and clarify whether or how PAE plays a role in the neurocognitive functioning of offenders. This information could provide important insight into how we conceptualize the FASD-affected offender, better identify individuals with FASD in the correctional settings, and determine whether they warrant differential treatment or additional supports in the justice system.

Hypotheses. Given that individuals with FASD have been shown in the literature to experience more difficulty with higher-level neurocognitive tasks relying on complex EF skills, relative strengths with more basic tasks, and that mathematics may be a specific area of academic difficulty in this population (Kodituwakku, 2007; Mattson et al., 2011; Rasmussen & Bisanz, 2011), the main hypotheses were that:

1. Young offenders with and without FASD will show similar scores on measures of basic neurocognitive functioning including verbal ability, simple processing speed, motor skills, and academic domains *other* than mathematics.
2. Young offenders with FASD will show significantly more impairment than young offenders without FASD on measures of higher-level neurocognitive functioning including memory, cognitive flexibility, inhibition, visual-perceptual reasoning, and mathematics.

Because crime rates are highest among youth who are older and male (Statistics Canada, 2013) in both general (Dauvergne & Turner, 2010) and FASD populations (Streissguth et al., 2004), the next hypothesis was that:

3. For young offenders both with and without FASD, older youth (16-20 years) will show greater impairment relative to the norm than younger youth (12-15 years), and males will show greater impairment than females across all areas of neurocognitive functioning.

Lastly, although rates of neurocognitive impairment are high in offender populations in general, individuals with FASD who are involved in the justice system are considered to be especially vulnerable. Thus, it was hypothesized that:

4. Young offenders with FASD will show a greater degree of *clinical* impairment than young offenders without FASD, relative to the norm. That is, a greater proportion of young offenders with FASD will have neurocognitive scores that are lower than 2 standard deviations below the mean for memory, cognitive flexibility, inhibition, and mathematics.

Methods

Participants. Eighty-one clinical files were reviewed for youth (76.5% male, 23.5% female) who had completed a comprehensive assessment through the Centerpoint program between 2000 and 2014. Thirty-eight of these youth had a documented FASD diagnosis (either previously diagnosed, or identified at the time of assessment), and 41 age- and gender-matched youth who had a confirmed lack of PAE, or no exposure reported, were identified for the Comparison group. The FASD group mean age was 15.7 years, SD = 1.51 (range 12.4 to 18.5), and the Comparison group mean age was 16.2 years, SD = 1.85 (range 12.6 to 20.3), which was not significantly different $t(79) = 1.36$ ($p = 0.179$). The gender distribution of groups was also similar, with 74% males in the FASD group and 79% males in the Comparison group X^2 (1, $N = 81$) = 0.56, $p = 0.608$. Demographic variables are presented in Table 3.1 (page 39, below).

Measures

Intelligence. For an overall picture of intellectual ability, full scale IQ and index scores were collected from the Wechsler intelligence scales: Wechsler Intelligence Scale for Children (WISC) – Third or Fourth Edition, and Wechsler Adult Intelligence Scale (WAIS) – Third or Fourth Edition, depending on the age of the client and date of assessment. In general, these scales are used to assess intellectual functioning in children and adults, categorizing abilities into verbal skills, non-verbal visual-perceptual skills, working memory, and processing speed, and also providing an overall full scale intelligence quotient (IQ) score. The Wechsler intelligence scales have high reliability and validity, supported by strict guidelines for standardization (Worthington, 2004).

Memory. Verbal memory was evaluated from client scores on the California Verbal Learning Test (CVLT; Delis, Kramer, Kaplan, & Ober, 2000) (either the children's version or second edition depending on the age of the youth at testing), which is a tool used to comprehensively measure verbal learning and memory. This test is shown to have adequate reliability, and discriminate between individuals with brain injury and healthy controls (Jacobs & Donders, 2007). Specifically, five scores from the CVLT were examined: rote verbal learning, short term free recall, short term cued recall, long term free recall, and long term cued recall. Auditory working memory scores were also collected from the working

memory index of the Wechsler intelligence scales. Visual memory was measured by the Benton Visual Retention Test – Fifth Edition (BVRT-5), which is a short test to assess visual-spatial perception, construction, and memory (Benton, 1992) with moderate reliability and validity (Messinis, Lyros, Georgiou, & Papathanasopoulos, 2009). The BVRT-5 can be administered to children and adults, and yields multiple results, including two main scores: one "all-or-nothing" score for the number of designs recalled correctly out of 10, and another for the total number of errors made when incorrectly reproducing designs. It also provides a supplemental score for the *types* of errors made in incorrect designs. The total correct and total error scores were used to assess broad visual memory, and the supplemental error types scores were later analysed for a qualitative examination of the types of visual memory impairments present in each group.

Cognitive flexibility*.* Cognitive flexibility was assessed from participant scores on Trail B of the Trail Making Test (TMT; Partington & Leitan, 1949). The TMT has long been established as a valid measure of brain dysfunction (Reitan, 1958). This measure involves two tasks: Trail A relies primarily on visual scanning and sequencing, processing speed, and motor speed, and Trail B is more complex, requiring shifted attention and cognitive flexibility (Zillmer, Spiers, & Culbertson, 2008).

Inhibition. Inhibition was assessed using the Stroop Test, which originated in the 1930s as a test to measure the "interference of conflicting word stimuli" (Stroop, 1935). It is commonly used to assess inhibition, selective attention, and frontal lobe damage (Demakis, 2004), and is popular due to its validity, reliability, and fast and simple administration (Golden & Freshwater, 2002). The Stroop test has three conditions: Color Naming, Word Naming, and Color/Word Switching; the Color/Word Switching condition was used to assess inhibition.

Verbal ability. Verbal scores were collected from the Wechsler verbal indices, which are comprised of core subtests measuring verbal concept formation, vocabulary, and verbal expression of social common sense and general knowledge (e.g., common places, people, or events).

Visual-perceptual reasoning. Visual-perceptual reasoning data was collected from the Wechsler perceptual index, which measures hands-on visual-spatial integration, and abstract perceptual and spatial reasoning.

Processing speed. Processing speed scores were collected from the Wechsler processing speed subtests, measuring visual scanning speed and speeded visuo-motor coordination. Scores from Trail A of the TMT, Stroop Color, and Stroop Word conditions were also collected to measure processing speed. Trail A involves hand-eye coordination and

number sequencing ability, and has been repeatedly shown in the literature to reflect processing speed (e.g., Salthouse, 2011). The Stroop Color and Stroop Word conditions are also commonly used measures of cognitive processing speed, and they evaluate the speed with which an individual can name familiar colours and read simple words. These three measures have been used as indicators of processing speed in previous forensic research as well (Kelly, Richardson, Hunter, & Knapp, 2002).

Motor functioning. Motor data was collected from the Finger Tapping Test (FTT), Grooved Pegboard Test (GPT), and Hand Dynamometer Test (HDT), which measure motor speed and control, motor dexterity, and hand grip strength, respectively (Dodrill, 1978; Prigatano & Hoffmann, 1997). These tools are part of the Halstead-Reitan neuropsychological battery and are frequently used to assess brain damage and lateral dominance, with the ability to distinguish brain-damaged individuals from controls (Prigatano & Hoffmann, 1997).

***Academics*.** Data was collected from the Wide Range Achievement Test – Fourth Edition or the Wechsler Individual Achievement Test – Second Edition (WIAT-II), both of which are commonly used measures of reading, writing, spelling, and mathematics with high reliability and validity (Breaux, 2009; Gander Publishing, n.d.).

Data analysis

Descriptive statistics. Descriptive data from neurocognitive scores were used to illustrate the overall profile of each group. Standard scores were transformed into z-scores for most subtests because not all of the tests described above are normed on the same scale, and calculating z-scores for each measure provided a consistent unit with which to evaluate the participants' performance on these tests. One exception was the BVRT-5, which does not produce standard scores, so raw scores were used in all BVRT-5 analyses.

To examine whether there were group differences in terms of the proportion of young offenders with neurocognitive test scores in the clinically significant range (i.e., 2 or more standard deviations below the mean), chi-squared tests were conducted for all measures except for the BVRT-5.

***Multivariate analyses*.** To compare group differences in neurocognitive domains, subtests were combined into categories reflecting overarching neurocognitive functions of memory, cognitive flexibility, inhibition, verbal ability, visual-perceptual reasoning, processing speed, and academics (see Table 3.2 below for subtests used to calculate domain scores). Motor skills were excluded in domain analyses due to small sample size (20 FASD and 7 Comparison participants). A single composite score was calculated for each domain by adding the subtest z-scores and calculating their average to determine the

overall mean. A multivariate analysis of variance (MANOVA) was then conducted with group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) as independent variables, and the domain composite scores as dependent variables.

Subtests were grouped together into composite domains for several reasons. First, this was done in part to reduce the number of dependent variables analyzed. As well, subtests were grouped together into categories that are conceptually similar from a clinical perspective, which was thought to maximize the clinical meaningfulness. In doing so, the domain scores were thought to be a more robust measure of the abilities analyzed.

Table 3.2.

Domain Subtests

Domain*	Subtests
Memory**	California Verbal Learning Test (5 conditions)
	Wechsler working memory index
Cognitive Flexibility	Trail Making Test (Trail B)
Inhibition	Stroop Test (Color/Word Switching condition)
Verbal Ability	Wechsler verbal index
Visual-Perceptual Reasoning	Wechsler perceptual index
Processing Speed	Trail Making Test (Trail A)
	Stroop (Color and Word conditions)
	Wechsler processing speed index
Academics	Wide Range Achievement Test
	OR
	Wechsler Individual Achievement Test
	(word reading, reading comprehension, math calculation, and spelling subtests)

*A motor domain score was not calculated due to small sample size on these measures.
**The BVRT-5 was not included in the memory domain because the test only produces raw scores.

In a second phase of analysis, another series of MANOVAs were conducted to examine differences *within* each domain. This was done to ascertain a more specific profile of neurocognitive functioning. MANOVAs were conducted again with group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) as independent variables, and z-scores from each measure (except for the BVRT-5) as the dependent variables. Post-hoc analyses of variance (ANOVA) were examined to determine where the difference(s) existed within the measures.

Throughout these analyses, statistical significance was defined as $p < 0.05$. Effect size was determined using partial-eta squared (ηp^2), which is commonly used in educational research to measure the variance in a dependent variable that is related to the independent variable, while partialling out the effects of other independent variables and interaction effects (Richardson, 2011).

Across analyses, IQ scores were not used to match groups because evidence in the neurodevelopmental disability literature suggest that matching groups on IQ has the potential to create an unrepresentative sample, whereby either the neurodevelopmentally impaired group has elevated IQ scores, or the typically-developing group has scores below what is expected in the general population (Dennis et al., 2009). Furthermore, IQ was not included as a covariate in any analyses because researchers argue against the notion that IQ tests measures an individual's aptitude or potential, and suggest rather that it more accurately reflects achievement and performance, which may change across the lifespan (Dennis et al., 2009). Also, the statistical and methodological considerations of analysis of covariance are such that a variable should ideally only be used as a covariate when the independent variable is assigned randomly, the relationship between the covariate and the outcome is of no significance to the research question, and the covariate is unrelated to the independent variable (Dennis et al., 2009). In this study, groups were not assigned randomly, and IQ may indeed be related to the independent variable considering that intellectual functioning is often impaired in FASD populations.

Results

Demographics. Participant age, gender, and full scale IQ scores are presented in Table 3.1 below. There were no significant group differences in terms of age, $t(79) = 1.36$ ($p = 0.179$) or gender, X^2 (1, $N = 81$) = 0.57, $p = 0.608$. However, the FASD group had significantly lower full scale IQ scores than the Comparison group, $F(1, 77) = 16.08$ ($p = 0.000$) ($\eta p^2 = 0.173$).

Table 3.1.

Participant Demographics

Measure	FASD (n = 38)	Comparison (n = 43)	*p*
Age in years	15.7 (12.4–18.5)	16.2 (12.6–20.3)	0.179
Gender	73.7% male	79.1% male	0.608
Full Scale IQ (range)	76.0 (45–102)	88.9 (63–127)	0.000

Domain comparison. In order to test the hypotheses that young offenders with FASD will show similar functioning on simple neurocognitive tasks (Hypotheses 1) but significantly more impairment on complex neurocognitive tasks (Hypothesis 2) relative to the Comparison group, a MANOVA was conducted with neurocognitive domain scores (except for BVRT-5 and motor scores) as dependent variables, and group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) as independent variables. This analysis revealed that there was a significant overall group difference on profile of scores across neurocognitive domains, $F(7, 62) = 3.11$, $p = 0.007$ ($\eta p^2 = 0.260$). A post-hoc ANOVA showed significant group differences with lower

scores in the FASD group than the Comparison group in all domains except inhibition, $F(1, 68) = 1.41$, $p = 0.240$, and a difference approaching significance in visual-perceptual reasoning, $F(1, 68) = 5.50$, $p = 0.050$ ($\eta p^2 = 0.055$). The FASD group had significantly lower domain scores than the Comparison group in memory, $F(1, 68) = 10.17$, $p = 0.002$ ($\eta p^2 = 0.130$), cognitive flexibility, $F(1, 68) = 14.40$, $p = 0.000$ ($\eta p^2 = 0.174$), verbal ability, $F(1, 68) = 6.50$, $p = 0.013$ ($\eta p^2 = 0.087$), processing speed, $F(1, 68) = 11.31$, $p = 0.001$ ($\eta p^2 = 0.143$), and academics, $F(1, 68) = 11.47$, $p = 0.001$ ($\eta p^2 = 0.144$). The domain profile is illustrated in Figure 3.1 below.

A separate ANOVA was conducted (because of small sample size on this domain) to examine group differences on motor functioning, with the motor composite score as the dependent variable, and group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) as independent variables, and no group effect was found, $F(1, 28) = 0.57$, $p = 0.457$. Results are included in Figure 3.1 below with other domain scores.

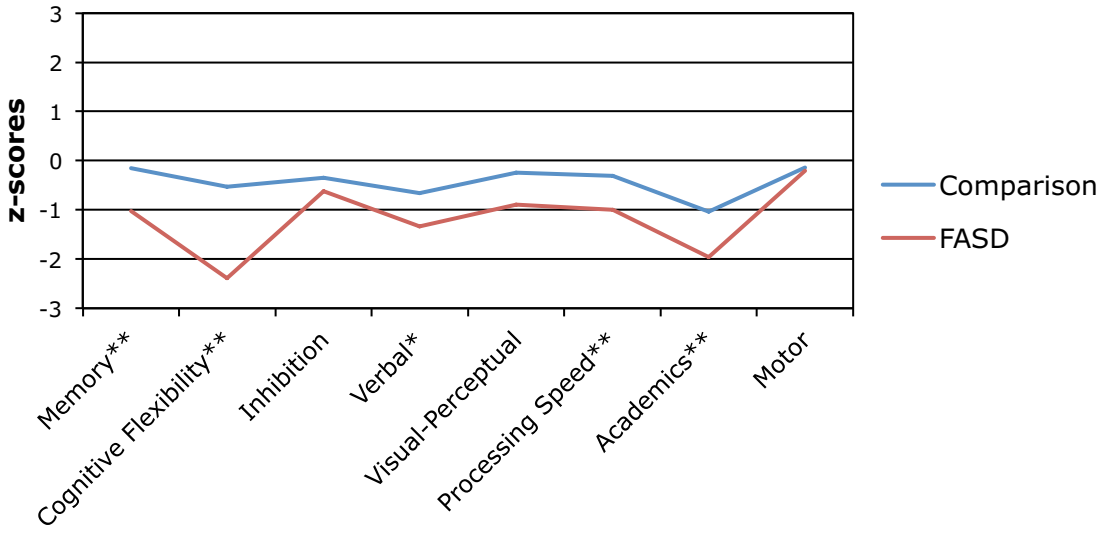

Figure 3.1. Profile of neurocognitive domain scores (*$p < 0.05$, **$p < 0.01$).

Age and gender differences. To test the hypothesis that within both groups, older and male youth would show more impairment relative to the norm than younger and female youth (Hypothesis 3), results from the initial MANOVA with neurocognitive domain scores (except for BVRT-5 and motor scores) as dependent variables, and group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) as independent variables were examined. There was a significant overall effect of age, $F(7, 62) = 4.78$, $p = 0.000$ ($\eta p^2 = 0.350$), and a post-hoc ANOVA revealed that domain scores on memory, $F(1, 68) = 4.69$, $p = 0.034$ ($\eta p^2 = 0.065$), cognitive flexibility,

$F(1, 68) = 5.57$, $p = 0.021$ ($\eta p^2 = 0.076$), and inhibition, $F(1, 68) = 5.30$, $p = 0.024$ ($\eta p^2 = 0.072$) were all significantly different between the younger and older groups. Specifically, older youth scored lower relative to the norm than younger youth on measures of memory (M = -.42, SD = .98 in the younger group, M = -.79, SD = 1.07 in the older group) and cognitive flexibility (M = -1.02, SD = 1.94 in the younger group and M = -1.87, SD = 1.92 in the older group), but performed better relative to the norm than younger youth on measures of inhibition (M = -.66, SD = .90 in the younger group, M = -.10, SD = .85 in the older group). It is important to highlight that because z-scores are standardized, age group differences do not suggest that one group scored lower than the other group *absolutely*, but rather *relative to the norm for their age*.

Next, contrary to my hypothesis that males both with and without FASD would show greater impairment relative to the norm than females, there was no overall gender effect on domain scores, $F(7, 62) = 1.03$, $p = 0.420$. However, there was a significant group membership by gender interaction on overall domain scores, $F(7, 62) = 2.24$, $p = 0.042$ ($\eta p^2 = 0.202$). Examination of post-hoc ANOVA analysis revealed that this significant group interaction was in the inhibition domain, $F(1, 68) = 5.46$, $p = 0.022$ ($\eta p^2 = 0.074$), with males scoring lower than females in the FASD group, but males scoring higher than females in the Comparison group. This interaction is represented in the Figure 3.2 below.

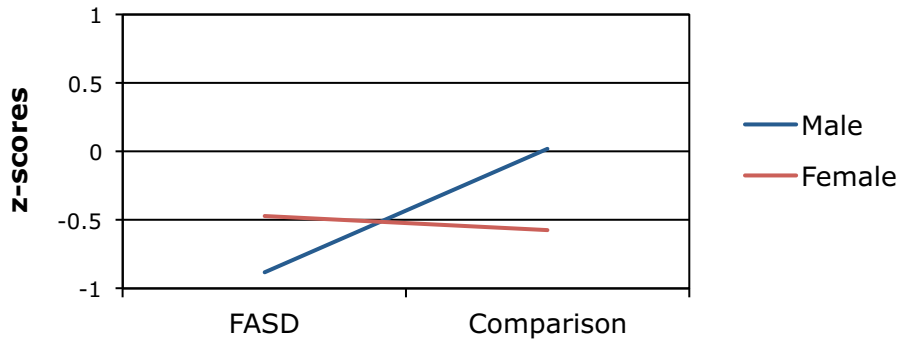

Figure 3.2. Group membership by gender interaction effect on inhibition domain scores.

To explore this interaction further, a post-hoc ANOVA was conducted with inhibition scores of only male young offenders as the dependent variable, and group membership (FASD or Comparison) and age group (younger versus older) as independent variables. This analysis revealed that males in the FASD group performed significantly lower than males in the Comparison group, $F(1, 56) = 7.81$, $p = 0.007$ ($\eta p^2 = 0.122$). A second post-hoc ANOVA with inhibition scores of only female young offenders as the dependent variable, and group membership (FASD or Comparison) and age group (younger versus older) as independent variables revealed no differences, $F(1, 15) = 0.84$, $p = 0.374$.

Age and gender trends were also examined for the motor domain, and no significant main effects or interactions were found (all *p*s > 0.05).

Subtest differences. To further explore group differences and test Hypotheses 1 and 2 (that young offenders with FASD would show similar scores on simple neurocognitive tasks but significantly more impairment on complex measures relative to the Comparison group), a second MANOVA was conducted with z-scores from each subtest (except for the BVRT-5 and motor subtests) entered as dependent variables, and group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) entered as independent variables. This analysis revealed that there was no overall effect of group, $F(18, 47) = 1.37$, $p = 0.193$, or gender, $F(18, 47) = 1.23$, $p = 0.276$, but there was an overall effect of age, $F(18, 47) = 1.97$, $p = 0.032$ ($\eta p^2 = 0.430$) (described in more detail below). Because this MANOVA approached significance, and given that the analyses were exploratory with a relatively small sample size, I looked further at the results of a post-hoc ANOVA (with subtest scores as dependent variables and group, age group, and gender as independent variables) because many were highly significant. These analyses revealed that there were statistically significant group differences across a number of the subtests, as illustrated in Figure 3.3 and Table 3.3, and described below.

Specifically, in terms of intellectual functioning, the FASD group scored significantly lower than the Comparison group on verbal, $F(1, 64) = 5.29$, $p = 0.025$, working memory $F(1, 64) = 9.92$, $p = 0.004$, and processing speed indices, $F(1, 64) = 7.93$, $p = 0.006$, but both groups showed similar scores on perceptual reasoning, $F(1, 64) = 3.46$, $p = 0.068$.

Academically, the FASD group scored lower than the Comparison group on word reading, $F(1, 64) = 8.61$, $p = 0.005$, reading comprehension $F(1, 64) = 9.47$, $p = 0.003$, and spelling $F(1, 64) = 8.90$, $p = 0.004$, but not mathematics $F(1, 64) = 3.02$, $p = 0.087$.

Next, scores on the CVLT showed that the FASD group was significantly more impaired than the Comparison group on all measures of verbal learning and memory, including rote verbal learning, $F(1, 64) = 6.86$, $p = 0.011$, short term free recall, $F(1, 64) = 5.80$, $p = 0.019$, short term cued recall, $F(1, 64) = 4.47$, $p = 0.038$, as well as long term free, $F(1, 64) = 5.08$, $p = 0.028$, and long term cued recall, $F(1, 64) = 4.24$, $p = 0.044$.

Analysis of the TMT scores showed that the FASD group displayed significantly poorer performance than the Comparison group on Trail B, $F(1, 64) = 12.42$, $p = 0.001$, but not Trail A, $F(1, 64) = 1.31$, $p = 0.257$.

On the Stroop test, the FASD group scored significantly lower than the Comparison group on the Word condition, $F(1, 64) = 11.58$, $p = 0.001$, and the Color condition, $F(1, 64)$

= 5.83, p = 0.019, but not the Color/Word Switching condition, $F(1, 64) = 1.45$, p = 0.233. A summary of these scores is presented in Table 3.3 below.

Table 3.3.

Mean Subtest Scores

Subtest	Group	Mean z-score	SD	p	ηp^2
Inhibition (Stroop C/W Switching)	FASD	-.77	.80	.233	.022
	Comparison	-.10	.89		
Motor ability					
Finger tapping right	FASD	.44	1.26	.458	.029
	Comparison	.70	1.13		
Finger tapping left	FASD	.10	1.26	.330	.050
	Comparison	.42	1.19		
Grooved pegboard right	FASD	-.68	1.42	.838	.002
	Comparison	-.60	.93		
Grooved pegboard left	FASD	-1.00	1.31	.524	.022
	Comparison	-.57	.85		
Hand dynamometer right	FASD	.07	1.08	.940	.000
	Comparison	-.12	.82		
Hand dynamometer left	FASD	.12	.95	.855	.002
	Comparison	-.03	.90		
Visual-perceptual (Wechsler index)	FASD	-.83	1.07	.068	.051
	Comparison	-.25	1.20		
Verbal ability (Wechsler index)	FASD	-1.33	.89	.025	.076
	Comparison	-.58	1.02		
Memory					
Verbal learning (CVLT)	FASD	-1.15	1.13	.011	.097
	Comparison	-.44	1.32		
Verbal ST free (CVLT)	FASD	-.75	1.19	.019	.083
	Comparison	-.25	1.06		
Verbal ST cued (CVLT)	FASD	-.48	1.13	.038	.065
	Comparison	-.04	1.22		
Verbal LT free (CVLT)	FASD	-.67	1.17	.028	.074
	Comparison	-.20	1.28		
Verbal LT cued (CVLT)	FASD	-.45	1.17	.044	.062
	Comparison	-.08	1.08		
Visual memory correct (BVRT-5)*	FASD	6.42	1.77	.097	.038
	Comparison	7.21	1.69		
Visual memory errors (BVRT-5)*	FASD	5.92	3.72	.041	.057
	Comparison	4.00	2.64		
	FASD	-1.69	.80	.002	.134

Working memory (Wechsler index)	Comparison	-.44	1.05		
Processing speed					
Hand-eye/sequencing (Trail A)	FASD Comparison	-.12 .14	1.18 .88	.257	.020
Color naming (Stroop Color)	FASD Comparison	-1.30 -.70	.85 .88	.019	.083
Word naming (Stroop Word)	FASD Comparison	-1.01 -.12	1.07 .90	.001	.153
Processing speed (Wechsler index)	FASD Comparison	-1.36 -.77	.86 1.04	.006	.110
Academics					
Word reading	FASD Comparison	-2.01 -.79	1.54 1.17	.005	.119
Reading comprehension	FASD Comparison	-1.81 -.72	1.09 1.15	.003	.129
Spelling	FASD Comparison	-1.89 -.80	1.17 1.23	.004	.122
Mathematics	FASD Comparison	-2.40 -1.74	.74 1.01	.087	.045
Cognitive flexibility (Trail B)	FASD Comparison	-2.20 -.63	2.19 1.46	.001	.163

*Means and standard deviations for the BVRT-5 are in raw scores.

Two separate MANOVAs were conducted with the BVRT-5 data because the test does not produce standard scores, and the motor functioning data (Finger Tapping, Grooved Pegboard, and Hand Dynamometer tests) because the number of youth who completed these measures was small. In both cases, scores from the neurocognitive tasks were the dependent variables, and group membership (FASD versus Comparison), age group (younger versus older), and gender (male versus female) were independent variables. Results of these analyses are also included in Table 3.3 above. On the BVRT-5, there was no overall group effect, $F(2, 71) = 2.23$, $p = 0.115$. However, post-hoc ANOVAs revealed that although the FASD group and Comparison groups showed similar performance on the number of correct designs, $F(1, 72) = 2.83$, $p = 0.097$, the FASD group made significantly more errors than the Comparison group on designs that were reproduced incorrectly, $F(1, 72) = 4.32$, $p = 0.041$ ($\eta p^2 = 0.057$). These results are illustrated in Figure 3.4. With regards to error types specifically, there was no significant overall group effect, $F(6, 67) = 1.59$, $p = 0.163$, but post-hoc ANOVA revealed that the FASD group made significantly more perseverative errors than the Comparison group, $F(1, 72) = 4.01$, $p = 0.049$ ($\eta p^2 = 0.053$),

but not errors of omission, distortion, rotation, misplacement, or size (all *p*s > 0.05). On motor tasks (Finger Tapping, Grooved Pegboard, and Hand Dynamometer) there was no significant overall group effect $F(6, 14) = 0.30$, $p = 0.925$, and no differences identified in post-hoc ANOVA for any subtest, regardless of which was the dominant hand (all *p*s > 0.05). Motor scores are presented with other subtests (except BVRT-5) on Figure 3.3 below.

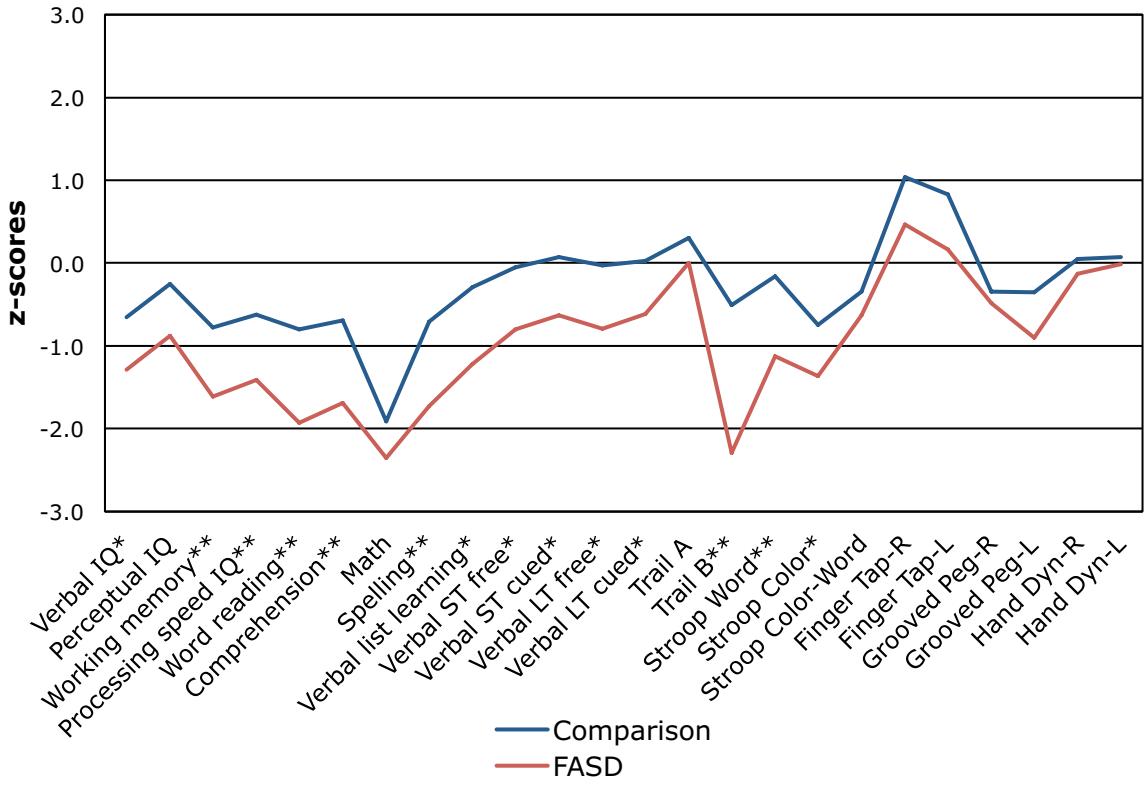

Figure 3.3. Neurocognitive subtest profile (excluding the BVRT-5) (*$p < 0.05$, **$p < 0.01$).

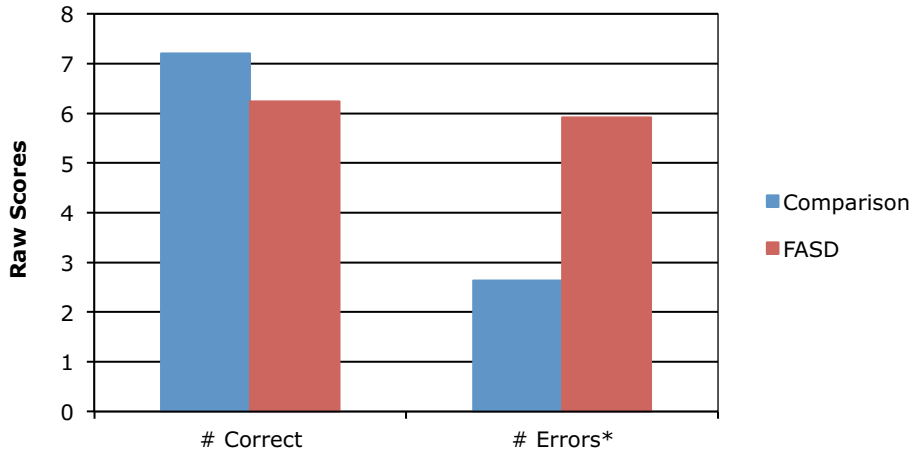

Figure 3.4. Group comparison of performance on the BVRT-5 (*$p < 0.05$).

Age and gender differences. Age and gender effects on subtest scores were also explored at the subtest level. There were significant differences between the younger and older groups on several CVLT subtests, and Trails A and B (represented in Table 3.4 below). Overall, older youth scored lower relative to the norm than younger youth on all verbal memory tasks, including short term free recall, $F(1, 64) = 4.18$, $p = 0.045$, short term cued recall, $F(1, 64) = 4.61$, $p = 0.036$, long term free recall, $F(1, 64) = 5.33$, $p = 0.024$, and long term cued recall, $F(1, 64) = 6.65$, $p = 0.012$, but there were no age differences in rote verbal learning, $F(1, 64) = 3.83$, $p = 0.055$. There was a significant age effect on TMT performance, with the older group showing more impairment relative to the norm than the younger group on Trail A, $F(1, 64) = 8.95$, $p = 0.004$, and Trail B, $F(1, 64) = 6.17$, $p = 0.016$. A significant overall gender effect was also found on the Trail A subtest, $F(1, 64) = 5.41$, $p = 0.023$ ($\eta p^2 = 0.078$), with males in both the FASD and Comparison groups (M = -.34, SD = 1.23) showing significantly lower scores than females (M = .66, SD = .45). No other age, gender, or interaction effects were identified.

Table 3.4.

Significant Age Group Differences

		Mean (SD)			
Measure		Young	Old	*p*	ηp^2
CVLT					
	Short term free	-0.25 (1.05)	-1.45 (0.85)	.045	.061
	Short term cued	0.13 (0.74)	-1.09 (0.94)	.036	.036
	Long term free	-0.09 (0.80)	-1.27 (1.06)	.024	.024
	Long term cued	0.09 (1.11)	-0.91 (1.18)	.012	.094
TMT					
	Trail A	0.20 (1.35)	-0.40 (0.67)	.004	.123
	Trail B	-0.99 (1.66)	-2.09 (1.29)	.016	.088

Comparison with normative data. To test the hypothesis that a greater proportion of the young offenders with FASD than those without FASD would have neurocognitive scores that are clinically impaired (i.e., lower than 2 standard deviations below the mean) for memory, cognitive flexibility, inhibition, and mathematics (Hypothesis 4), chi-squared tests were conducted to analyze group differences, and the results are illustrated in Figure 3.5 below. In partial support of the hypothesis, a greater proportion of the FASD group than the Comparison group had clinically impaired scores in the areas of working memory IQ, X^2 (1, $N = 80$) = 10.63, $p = 0.001$ and cognitive flexibility (Trail B test), X^2 (1, $N = 78$) = 9.17, $p = 0.003$. In addition, the FASD also showed significantly more clinical impairment in terms of verbal ability (Wechsler verbal index, X^2 (1, $N = 80$) = 4.81, $p = 0.035$), processing speed (Wechsler processing speed index, X^2 (1, $N = 80$) = 4.69, $p = 0.031$, Stroop Word condition, X^2 (1, $N = 79$) = 6.06, $p = 0.019$, and Stroop Color condition X^2 (1, $N = 79$) = 5.91, $p = 0.018$) and academics other than mathematics (word reading, X^2 (1, N

= 81) = 12.28, p = 0.000, reading comprehension, X^2 (1, N = 79) = 14.22, p = 0.000, and spelling, X^2 (1, N = 81) = 10.52, p = 0.001). Contrary to my hypothesis, there were no statistically significant group differences on measures of inhibition (Stroop Color/Word Switching), math, or verbal learning and memory (CVLT). Furthermore, there were no group differences in perceptual reasoning IQ, Trail A, or any motor measure (all ps > 0.05).

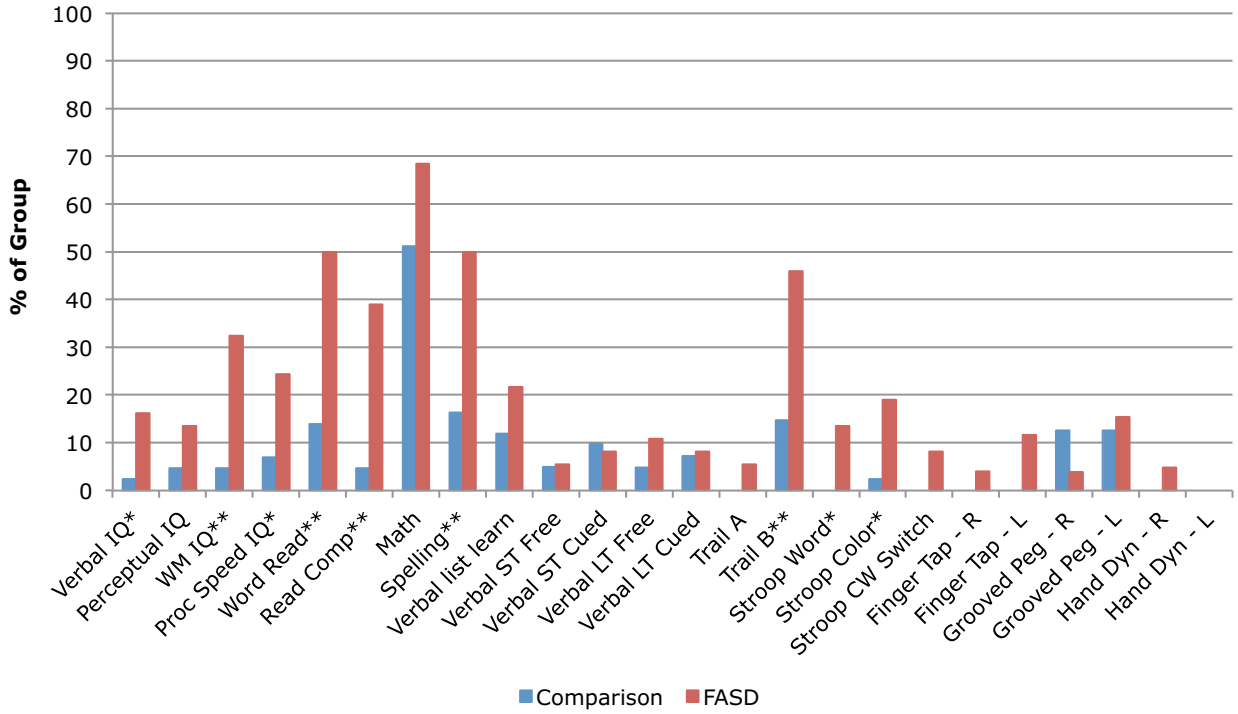

Figure 3.5. Proportion of youth who were clinically impaired, based on chi-squared tests (<2SD below the mean) (*p < 0.05, **p < 0.01).

Discussion

The over-representation and vulnerability of individuals with FASD in the justice system has sparked important questions about how to best understand and support these individuals. Some researchers and justice professionals propose that offenders with FASD are a distinct group, warranting differential treatment and services (Pei et al., in press). An abundance of studies of the general offender population have linked impaired brain function with criminal behaviour, but despite what is known about the damaging neurological effects of PAE, little work has been undertaken to examine the neurocognitive profile of offenders with FASD. Thus, in the current study I sought to examine the neurocognitive profile of young offenders with FASD, compared with the profile of young offenders without FASD. A retrospective file review was conducted on clinical records from youth who completed comprehensive neurocognitive assessments through a community-based treatment program. A total of 81 records were reviewed, and data was collected on a range of clinical

test scores for 38 youth with FASD and 43 age- and gender-matched youth without FASD (Comparison group).

Group differences. An analysis of scores across domains of neurocognitive functioning revealed that overall, the FASD group showed a significantly different profile of performance compared with the Comparison group. In addition to examining broad domains of function, closer examination of specific areas within those domains was also conducted through subtest analysis. Contrary to my hypothesis, there was not an overall group effect at this subtest level, though this difference approached significance and the FASD group displayed significantly lower scores than the Comparison group on some, but not all tests.

Inhibition. The finding that the FASD group was *not* significantly more impaired than the Comparison group on the complex task of inhibition at the domain or the subtest level, or in terms of clinically significant impairment (i.e., scores <2 standard deviations below the mean), was surprising given that multiple studies have shown individuals with FASD to have significant deficits in this area (Connor et al., 2000; Mattson, Goodman, Caine, Delis, & Riley, 1999; Rasmussen & Bisanz, 2009). However, Harker (2014) also found that young offenders with FASD did not show inhibition deficits relative to a comparison group. This contradiction may be explained by the finding in the current study that there was a significant gender effect for inhibition scores whereby males in the FASD group performed significantly worse than males in the Comparison group, but females in both groups had similar scores. Thus, inhibition deficits among male young offenders with FASD as identified in this study are in keeping with what would be expected based on the preponderance of existing literature. However, female young offenders with FASD may have a relative strength in this area. Previous studies of inhibition and FASD (Connor et al., 2000; Mattson et al., 1999) were conducted with small sample sizes, one of which was male-only, therefore gender differences may have been missed.

Considering the relative paucity of research on gender differences in FASD, and even fewer studies on the Stroop Color/Word Switching task specifically, the current study offers a novel contribution to the FASD and inhibition literature in general, and more specifically clarifies the neurocognitive profile in the young offender FASD population. The gender effect in this study has important practical implications in that, due to inhibition differences, males and females may differ in the types of crimes they commit (e.g., more impulsive crimes in males), and there may also be gender differences in terms of what forms of intervention approaches may be most effective for reducing recidivism.

Motor skills. Consistent with the hypothesis that young offenders with FASD would show similar motor abilities to young offenders without FASD, performance on these tasks

was no more impaired in the FASD group than the Comparison group at either the domain or subtest level. This corresponds with previous research documenting that fine motor skills are relatively unimpaired in FASD populations (Tamana et al., 2014; Vaurio et al., 2011). In the context of criminal behaviour, these findings suggest that motor abilities may not distinguish young offenders with FASD from those without.

Visual-perceptual reasoning. Contrary to expectations, there were no statistically significant group differences on visual-perceptual reasoning scores at either the domain or subtest level, or in terms of clinical impairment. Compared with the other neurocognitive measures examined in the current study, visual-perceptual reasoning appears to be a relative area of strength for young offenders with FASD. That said, further investigation into performance on visual-spatial tasks of increasing complexity is warranted, as some researchers have shown that individuals with FASD are relatively unimpaired on *simple* perceptual tasks, but more impaired on complex tasks requiring visual motor integration (Kodituwakku, 2009).

Verbal ability. Also contrary to my hypothesis, young offenders with FASD showed significantly more impairment than the Comparison group on verbal IQ and a greater proportion of clinical impairment in this area. Previous studies of language skills in FASD populations have yielded mixed results, however some researchers propose that complex language with a heavier cognitive load (e.g., social communication) may be especially vulnerable in this group (Coggins, Timler, & Olswang, 2007). Considering that verbal impairment is one of the most robust predictors of delinquency (Gibson, Piquero, & Tibbetts, 2001; Munoz et al., 2008), the finding that even simple language was impaired in the current FASD group suggests that individuals with FASD who have verbal deficits may be at particular risk of engaging in criminal behaviours.

Memory. At both the domain and subtest levels of analysis, the FASD group showed significantly lower scores than the Comparison group in all areas of memory except for visual-spatial memory. Specifically, working memory was significantly more impaired in the FASD group versus the Comparison group, and a significantly higher proportion of clinical impairment in this area was present in the FASD group relative to the Comparison group. These findings are congruent with my hypothesis as well as a number of studies showing working memory deficits in the FASD population (e.g., Green et al., 2009; Rasmussen, 2005). The FASD group also showed significant impairments relative to the Comparison group on measures of verbal memory (though a similar proportion of clinical impairment), but not on one of the main visual-spatial memory scores (total number of designs correctly reproduced) from the BVRT-5. Research related to memory profile in FASD populations has

yielded inconsistent results (Mattson et al., 2011), with some researchers suggesting that verbal/auditory memory may be more vulnerable than visual-spatial memory to the damaging effects of PAE (e.g., Willford, Richardson, Leech, & Day, 2004), but other researchers arguing the reverse (Uecker & Nadel, 1996). The current study offers new evidence that within the young offender population, verbal memory seems to be significantly impaired, but visual-spatial memory may be an area of relative strength among individuals with FASD. Practically speaking, the finding that both verbal and working memory are significantly more impaired in the FASD group relative to the Comparison group, but that visual-spatial memory was not, has important implications for understanding criminal behaviour in FASD and for guiding intervention. For instance, working memory deficits in young offenders with FASD may lead to difficulties remembering the rules of an ongoing activity, understanding complex tasks, following multi-step instructions, or considering the consequences of one's past choices to inform decision-making in the present. As well, relative strengths in visual-spatial memory mean that young offenders with FASD may be more likely to remember important justice-related information such as probation orders when verbal information is paired with visual representations.

Despite the relative strength in visual-spatial memory scores, the FASD group also made significantly more perseverative errors than the Comparison group, which aligns with previous researchers reporting perseverative visual memory errors in adolescents with FAS (Carmichael Olson, Feldman, Streissguth, Sampson, & Bookstein, 1998). Perseveration has long been observed in populations with brain damage (Hudson, 1968), and some clinical researchers have identified three categories of impairment: *stuck-in-set*, or the inappropriate maintenance of a response, *recurrent*, or unintended repetition of a previous response, and *continuous*, or inappropriate repetition over prolonged periods (Sandson & Albert, 1984). Combined with the severe deficits in cognitive flexibility among the FASD group in the current study, the perseverative errors observed may reflect an underlying difficulty of young offenders with FASD becoming "stuck-in-a-rut" of negative behaviour. A combination of cognitive inflexibility and perseveration could translate into behavioural rigidity among these youth, which may have implications for repeat offending.

Processing speed. Another unexpected finding from the current study is related to processing speed. It was hypothesized that both groups would show similar performance on measures of processing speed because this is a relatively simple neurocognitive function, and previous research has shown that for some children with FASD, simple processing speed is relatively unaffected (Burden, Jacobson, & Jacobson, 2005). Contrary to this previous research, the FASD group in the current study were significantly more impaired

than the Comparison group on most measures of processing speed (processing speed IQ, Stroop Color condition, Stroop Word condition), and a greater proportion of the FASD group than the Comparison group had clinically significant impairments on these measures. The finding that performance on the Trail A task was not significantly lower in the FASD group relative to the Comparison group is in keeping with previous research showing no significant impairments with this task specifically (Tamana, Pei, Massey, Massey, & Rasmussen, 2014; Vaurio et al., 2011). Considering the relative simplicity of the Trail A task compared with the other measures in this study, it could be that processing speed impairments experienced by young offenders with FASD are limited to more effortful cognitive speeded tasks, as has been proposed in previous research with the general FASD population (Burden et al., 2005). Notably, the FASD group showed higher scores on Trail A compared with most other measures, suggesting that basic processing speed may be another area of relative strength in this group.

Academics. The FASD group was significantly more impaired than the Comparison group on the academic domain, and at the subtest level of analysis, the FASD group showed significantly greater deficit and a greater proportion of clinical impairment than the Comparison group in all academic areas but mathematics. The finding that math scores were not significantly more impaired in the FASD group relative the Comparison group was initially surprising given the abundance of research suggesting math-specific difficulties in FASD (Rasmussen & Bisanz, 2011). However, this finding appears to reflect the fact that *both* groups were significantly impaired rather than that the FASD group was not. The Comparison group also showed profound impairment in mathematics, and in fact, math scores in both groups were the area of most severe clinical impairment when compared with normative data. Also contrary to the hypothesis that the FASD and Comparison groups would show similar scores in the academic tasks of reading and spelling, the FASD group actually showed significantly more impairment in these areas than the Comparison group.

These findings raise broader questions around the relationship between academic performance and offending behaviour; a relationship that has long been explored by researchers (Beebe & Mueller, 1993; Keilitz, Zaremba, & Broder, 1979). Several theories exist that attempt to explain this relationship, including the "susceptibility hypothesis," where the underlying neurological deficits that relate to academic problems also make individuals more susceptible to aggressive or delinquent behaviours, the "school failure" hypothesis where school failure leads to a series of negative experiences that influence an individual's self-identify, the "differential treatment hypothesis" where individuals with learning disabilities are more likely than non-disabled peers to get caught and charged for

their delinquent behaviour, and the "explicit learning disability hypothesis" which suggests that negative attitudes due to school failure foster maladaptive behaviours that increase risk of delinquency such as truancy and association with negative peers (Zamora, 2005). Given the myriad of neurological, behavioural, and social difficulties characteristic of the FASD population in general, it is difficult to know which theory (or theories) may best explain offending behaviour in these individuals, and there are likely a number of mechanisms underlying the relationship between school experience and offending behaviour in this population. It is clear from the current study that academic abilities are a notable area of deficit for young offenders with FASD, suggesting that learning problems may be a specific risk factor for involvement in criminal behaviours for this group.

Cognitive flexibility. Another finding with important practical implications is that the domain most severely impaired in the FASD group relative to the Comparison group was cognitive flexibility. Additionally, the FASD group showed a far greater proportion of clinically significant impairment than the Comparison group in this area. Combined, these findings are consistent with previous research, where individuals with FASD showed significant deficits on a test of cognitive flexibility (Trail B task) that stood out even relative to a comparison group with ADHD (Vaurio, Riley, & Mattson, 2008). Indeed, researchers have proposed that problems with cognitive flexibility may be one of the core deficits related to PAE (Kodituakku, Kalberg, & May, 2001). In the context of criminal behaviour, difficulty with cognitive flexibility could relate to an inability to adapt to unfamiliar or unexpected situations, problems with breaking familiar patterns of maladaptive thoughts or behaviours, and difficulty replacing these with novel positive decisions or choices. Findings from the current study suggest that these difficulties may be especially relevant for young offenders with FASD and may warrant targeted flexibility-specific interventions efforts; for instance, these individuals may achieve more success if provided with consistent and predictable structure in their lives, given strategies to plan for unexpected outcomes, or taught more adaptive responses to situations that tend to get them into trouble.

Age and gender trends. With regards to age group differences, there was some evidence supporting the hypothesis that older youth would show more impairment relative to the norm than younger youth, and males would show more impairment than females across neurocognitive areas. Across groups, older offenders showed greater impairment relative to the norm than younger offenders on measures of verbal memory, simple processing speed, and cognitive flexibility. In the FASD population specifically, similar age-related findings have been documented where adolescents with FASD showed worse performance relative to the norm than children on tasks of simple processing and cognitive

flexibility, however verbal memory was *not* significantly more impaired relative to the norm in the adolescent group (Tamana et al., 2014). Conversely, other researchers have reported no age-related differences on tasks of simple processing or cognitive flexibility, but significant differences on tasks of more complex cognitive flexibility also involving inhibition (Rasmussen & Bisanz, 2009). Notably, in both of these studies, the samples were younger than that in the current study, ranging in age from 5 to 17 and 8 to 16 years, respectively.

The finding that both groups of offenders in the current study experienced age-related differences in cognitive flexibility, verbal memory, and simple processing speed may indicate that these aspects of neurocognitive impairment become more pronounced with age in offender populations, particularly around the age of 18 to 20 years. Further research with older justice-involved youth would help to clarify the age-related differences in neurocognitive functioning, particularly longitudinal studies to ascertain how these areas of functioning change over time. As well, early intervention approaches that aim to strengthen these abilities in at-risk groups may help protect youth against later involvement in crime.

Other than the group by gender interaction described above related to inhibition, gender effects were only evident in Trail A, with females performing better than males in both groups. This finding is consistent with studies of processing speed in the general population, showing that females have advantages on speeded tasks involving digits, letters, and rapid naming (Roivainen, 2011). This congruency with the general population, combined with the current finding that performance on Trail A was relatively unimpaired in both groups again suggests that basic processing speed may be relatively unimpaired among young offenders and may not be particularly helpful in distinguishing youth at risk of criminal behaviour, or identifying young offenders with FASD.

Limitations. One of the challenges inherent in all FASD research is the difficulty of ensuring that comparison groups are not prenatally-alcohol exposed. This is especially complicated when working with young offenders, who tend to experience health problems, poor relationships, marginalization, problem behaviours in addition to their criminal offending, and numerous post-natal life adversities (Smythe & Eaton-Erickson, 2009). It is possible that young offenders without an FASD diagnosis may meet the diagnostic criteria upon assessment, even though they have never had access to diagnostic services. As such, efforts were made through review of clinical records to ensure reasonable confidence that clients included in the Comparison group were not prenatally-alcohol exposed. Moreover, the Centerpoint program employs an FASD-trained psychologist, and thus any youth who came through the program with suspicions of FASD underwent a comprehensive assessment to determine whether they met the criteria for diagnosis. In the cases where youth had

documented PAE or were suspected of being affected by FASD, they were excluded from the Comparison group altogether.

Another related limitation in this study is that I was unable to control for the multitude of environmental factors that impact offending behaviour, such as peer group at the time of offending, family background, school experience, and broader community variables. Due to the fact that this was a retrospective file review and participants were not actively recruited or interviewed, there were no means of confirming these variables with the youth. However, given that the high risk youth population in general (including individuals with *and* without FASD) tends to experience a number of these risk factors, it was assumed that both the FASD and Comparison groups in this study had been exposed to some of these factors.

Also, because this study was a retrospective file review, the research questions, hypotheses, and neurocognitive domains evaluated were restricted by the measures that were used at the time the participants were assessed. Furthermore, information was not collected about the types of offenses committed by the youth.

Future research. The current study offers novel contributions to our understanding of neurocognitive profile among young offenders with FASD, and it also raises important questions that may guide future research goals. First, some researchers argue that in the FASD population, formal performance-based psychological measures of neurocognitive functioning lack ecological validity and do not reflect behavioural outcomes as reported by caregivers (Rai, 2014). Researchers in the general offender population have found that some measures of "hot" cognitive processes, or functions that are involved in situations with high levels of emotion and motivation, may have additional ecological validity in predicting recidivism (Beszterczey, Nestor, Shirai, & Harding, 2013). Future studies that incorporate both experimental measures of "hot" executive function and behavioural reports may provide a more comprehensive picture of how young offenders with FASD are functioning in their daily life, and what areas of neurocognitive deficit render an individual most vulnerable to behavioural difficulties. Similarly, research linking neurocognitive profile to the types and patterns of offending behaviour among individuals with FASD would clarify how different components of neurocognitive functioning may lead an individual to engage in particular forms of criminal behaviour. This has important intervention implications, as treatments could be tailored to target the areas of neurocognitive impairment most related to severe behaviour problems, and serious or violent offenses. Finally, an important area that was not explored in the current study is the relationship between mental health and offending behaviour. Considering the high prevalence of both mental health problems (Pei, Denys, Hughes, Rasmussen, 2011) and justice-involvement among individuals with FASD

(MacPherson, Chudley, & Grant, 2011; Popova et al., 2011), research exploring this relationship could inform interventions and potentially foster more positive outcomes.

Summary and Conclusion

The goal of this study was to determine whether the neurocognitive profile of young offenders with FASD differs from the profile of young offenders without FASD. To do so, a retrospective file review was conducted with data collected during comprehensive neurocognitive assessments in an Alberta young offender treatment program. Results of this study indicate that young offenders with FASD display a unique profile of neurocognitive functioning relative to young offenders without FASD. The FASD group showed significant impairments relative to the Comparison group across numerous areas of functioning, including cognitive flexibility, memory (verbal and working memory), academics (except for math), complex processing speed, and verbal ability. Interesting, male young offenders with FASD showed significant impairments in inhibition, but this was not true for females. Notably, young offenders with FASD also showed relative strengths in *simple* processing speed, motor tasks, visual memory, and visual-perceptual reasoning ability.

Characterizing the vulnerabilities of young offenders with FASD has important implications for offender sentencing and programming. With clearer knowledge of the specific areas of neurocognitive deficit experienced by this group, justice stakeholders may be better able to make FASD-informed court decisions, and more effective offender treatment efforts may be designed that take into consideration areas of impairment and build on areas of strength. This research also has implications for FASD screening protocols, whereby undiagnosed offenders who experience difficulties congruent with this profile may be referred for a comprehensive neurocognitive assessment and potential diagnosis. Lastly, knowing that some areas of neurocognitive functioning are more significantly impaired in young offenders with FASD, early interventions may be developed to support children who experience deficits in these areas in order to reduce the risk that they become justice-involved, and improve their chances of positive outcomes.

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Chapter 4. A Unique Response to Offenders with Fetal Alcohol Spectrum Disorder: Perceptions of the Alexis FASD Justice Program

Introduction

Fetal Alcohol Spectrum Disorder (FASD) refers to the damaging effects of alcohol on a developing fetus. Individuals with FASD experience a myriad of difficulties ranging from physical abnormalities to learning problems and impaired social and emotional functioning (Chudley et al., 2005). FASD is a leading cause of developmental disability in the Western world, with prevalence estimates at 1-4% of the general Canadian population (Stade et al., 2009; Thanh, Johnson, Salmon, & Sebastianski, 2014). The common challenges experienced by individuals with FASD are often categorized under the areas of "primary disabilities" and "adverse outcomes." Primary disabilities stem directly from the central nervous system damage caused by prenatal alcohol exposure (PAE). These may include physical abnormalities such as facial dysmorphology, growth deficiencies, and congenital anomalies and malformations (Chudley et al., 2005), and difficulties with intelligence, learning and memory, academics, language and communication, visuo-spatial and motor skills, attention, hyperactivity, and executive functioning (Mattson, Crocker, & Nguyen, 2011). Adverse outcomes are difficulties that result from the interplay between primary disabilities and inappropriate or inadequate supports for the individual (Streissguth, Barr, Kogan, & Bookstein, 1996). Commonly reported adverse outcomes for individuals with FASD include disrupted school experience, mental health problems, substance abuse issues, inappropriate sexual behaviours, and trouble with the law.

FASD and the Justice System

The issue of FASD is a growing concern in the justice system, with increased media and research attention over the last two decades. Compared with the general population, the prevalence of FASD in justice settings is disproportionately high. Both youth (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011) and adults (MacPherson, Chudley, & Grant, 2011) with FASD are over-represented in Canadian correctional settings with prevalence estimates of 10-23% (Fast, Conry, & Loock, 1999; MacPherson et al., 2011). It is also believed that many offenders would meet the criteria for FASD but remain undiagnosed due to the "invisibility" of the disorder. That is, many affected individuals may lack physical signs of disability and appear to have adequate expressive language skills, and justice professionals may lack awareness of the disorder (Malbin, 2004; Page, 2001).

A number of factors likely contribute to the behaviours that lead individuals with FASD into the justice system. For instance, many of the neurocognitive deficits common in FASD overlap with impairments documented in antisocial or offender populations, especially in

terms of executive functioning (EF). EF refers to higher-level cognitive processes that are involved in conscious control of thoughts and behaviour (Zelazo & Müller, 2002) and guide adaptive responses to novel situations (Hughes, 2011), and includes skills such as inhibition, cognitive flexibility, and working memory (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). EF is also related to important long-term functional outcomes such as substance use, physical health, financial well-being, and criminality (Moffitt et al., 2011). It is therefore not surprising that deficits in the areas of inhibition (Tremblay, Pihl, Vitaro, & Dobkin, 1994; Dolan, 2012), decision-making (Seguin et al., 2007), working memory (Cauffman, Steinberg, & Piquero, 2005; De Brito et al., 2013; Hoppenbrouwers et al., 2013; Syngelaki et al., 2009), cognitive flexibility (Bergvall, Wessely, Forsmann, & Hansen, 2001; Tuominen et al., 2014; Dolan, 2012; Syngelaki et al., 2009), and attention (Manninen et al., 2013; Belcher, 2014; Young & Thome, 2011) are all commonly documented in individuals who engage in delinquent, antisocial, or criminal behaviour.

In addition to the neurocognitive deficits that may contribute to offending behaviour among individuals with FASD, some researchers have shown that these individuals may also experience problem behaviours such as impulsivity, teasing and bullying, dishonesty (e.g., lying, stealing, cheating), cruelty, destruction of property, physical aggression, and self-injury (LaDue, Streissguth, & Randels, 1993; Nash et al., 2006; Rasmussen, Talwar, Loomes, & Andrew, 2008). Social and adaptive difficulties are also often reported in FASD populations, such as immaturity, social ineptness, vulnerability to manipulation and suggestibility, and weaker moral judgment (Byrne, 2002; Malbin, 2004; Mela & Luther, 2013; Page, 2001; Schonfeld, Mattson, & Riley, 2005). Offenders with FASD experience other co-morbid mental conditions such as substance-related disorders, attention-deficit hyperactivity disorder, conduct disorder, antisocial personality disorder, opposition defiant disorder (Vidovic, 2012), schizophrenia, and anxiety (Mela, Tait, Levine, & Nicolaichuk, 2013), that may increase the risk of offending and complicate interventions efforts.

Broader environmental factors may also influence the likelihood that an individual with FASD will engage in criminal behaviour. For instance, perception of life stress, caregiver supervision and warmth, and family conflict may relate to delinquency in youth with PAE (Lynch, Coles, Corley, & Falek, 2003). Unfortunately, many individuals with FASD experience adverse post-natal factors such as living outside of biological families (Streissguth et al., 2004), unstable home environments (Streissguth et al., 1991), neglect, violence, post-natal exposure to parental substance abuse, parental divorce and separation, poverty, and other major trauma (Carmichael Olson, Oti, Gelo, & Beck, 2009). The two-fold

impact of PAE *and* adverse life experiences has a deleterious effect on neurodevelopment and is sometimes referred to as "double jeopardy" (Carmichael-Olson et al., 2009).

The very factors that may lead to criminal behaviour in individuals with FASD may also render them more vulnerable once in the justice system. In correctional settings, individuals with FASD tend to struggle to conform to custodial requirements, become targets for victimization, misunderstand why they are incarcerated in the first place, learn more criminal behaviours, become involved in more incidents and acquire more charges while institutionalized, have difficulty completing correctional programming, and are less likely to be granted parole than offenders without FASD (Byrne, 2002; Conry & Fast, 2000; Mullins, MacPherson, Moser, & Matheson, 2014). As well, adult offenders with FASD are more likely to fail under community supervision, experience disciplinary problems during incarceration, and recidivate within 6 months after release than offenders without FASD (MacPherson et al., 2011). In general, FASD-affected offenders face more juvenile and adult convictions than offenders without FASD (Macpherson et al., 2011).

Offender Rehabilitation

The most widely cited theoretical paradigm of offender assessment and rehabilitation is the Risk-Needs-Responsivity (RNR) model (Andrews, Bonta, & Hoge, 1990). According to this model, *risk* refers to the likelihood that an offender will recidivate based on a number of criminogenic factors known to predict future criminal behaviour (e.g., procriminal attitudes, substance abuse, peers involved in crime). *Needs* refer to offender characteristics and circumstances that, if targeted and changed, are expected to lower the risk of recidivism, and *responsivity* is based on the notion that interventions must match the offender's ability to respond to and benefit from treatment. The RNR model highlights the importance of matching justice services to individual learning preferences, motivation level, and abilities, as well as the contextual circumstances of each offender (Andrews et al., 1990; Ward, Mann, & Gannon, 2007). Importantly, according to the RNR model, the level of treatment provided to an offender should match their level of risk, with highly intensive services reserved for high-risk cases, while lower-risk offenders receive routine, minimal, or no intervention (Ward, Melser, & Yates, 2007). Furthermore, researchers have shown that when offender needs are not appropriately matched with treatment efforts (i.e., high-risk offenders in low intensity treatment, or vice versa), the risk of reoffending can actually *increase* (Lowenkamp & Latessa, 2004; Lowenkamp, Latessa, & Holsinger, 2006).

Although the RNR framework has been established as a "premier treatment model" employed across the world (Ward, Melser, & Yates, 2007), it has also been subject to a number of criticisms, primarily centering around the model being limited in its focus on

reducing risk rather than promoting "human good," and lacking tools that can be applied in practice (see Ward, Melser, & Yates, 2007 for a review). The Good Lives Model (GLM) is a more recent approach to offender rehabilitation that manages risk while at the same time using a strengths-based perspective to promote offender goals (Ward & Stewart, 2003). GLM builds on the concepts of RNR in targeting offender needs, but focuses more on *human* needs rather than *criminogenic* needs and on promoting psychological well-being (Ward & Stewart, 2003). According to this model, in order to lead an enriched life, basic human "goods" are required, derived from physical, psychological, and social nourishment, such as health, creativity, knowledge, and friendship (Ward & Stewart, 2003).

Current intervention approaches. The current consensus in the offender treatment literature is that the best way to intervene is by assessing and targeting offender risk and needs, increasing offender motivation, improving skills through practice, providing positive reinforcement, seeking continuous environmental support, evaluating outcomes, and giving feedback to offenders (Wilkinson, 2012). Moreover, effective programs should be grounded in theory, targeted to a variety of factors for change, focused on building healthy relationships with clear supports and boundaries while being sensitive to offender diversity, implemented with integrity, and based in the community (Brazao, da Motta, & Rijo, 2013).

Contrasting the traditional retributive model of criminal justice, and consistent with current best practices, restorative justice focuses on rehabilitation rather than punishment, and repairing the damage caused by the crime. This model is founded on the belief that crime is primarily a violation of people and relationships rather than of the law, and involves the victim, offender, and community (Allen, 2003; Bergseth & Bouffard, 2013) working collectively to repair the damage caused by the offense (Ward & Langlands, 2009). Research has shown that restorative justice can enhance victim and offender satisfaction, reduce recidivism, improve restitution compliance (Latimer, Dowden, & Muise, 2005), and can even be effective with offenders who have committed more serious crimes (Bergseth & Bouffard, 2013).

Changing Our Intervention Approach for Offenders with FASD

We know that justice approaches may be most effective when guided by an understanding of the offender's risk to society, profile of needs and strengths, and responsivity to treatment (Andrews, Zinger et al., 1990), and that according to the current Canadian justice model, sentencing should match the severity of the offense as well as the *offender's degree of responsibility* (Roach & Bailey, 2009). Therefore, a comprehensive assessment of offender functioning is necessary when working with individuals with FASD. Most current offender rehabilitation programs are based on the assumption that offenders

have a strong degree of control over their own behaviour, and they rely heavily on cognitive intervention approaches, requiring that offenders focus on their personal attitudes, and have the abilities to problem-solve, self-monitor, and resist temptation (Day, 2011). Unfortunately, offenders with FASD do not typically possess these abilities, and may struggle with attention, executive function, and adaptive functioning (MacPherson et al., 2011).

Specific research on evidence-based interventions for FASD-affected offenders is scarce, but some preliminary work sheds light on potentially promising practices for working with this population. Structure, consistency, and predictability; individualized approaches focusing on behavioural reinforcement and adaptive social functioning; compensating for FASD-related neurocognitive deficits; and avoiding group interventions due to social difficulties are all suggested to be important (Brown, Connor, & Adler, 2012; McLachlan, Wyper, & Pooley, 2013; Mela et al., 2013). Beyond these approaches targeting the individual, it is also recommended that treatments strive to protect or remove FASD-affected individuals from chaotic home environments; teach them to generalize new skills outside of treatment; build long-term supports, taking transition times into consideration; and engage the support of a mentor (Brown et al., 2012; McLachlan et al., 2013; Mela et al., 2013). Researchers have also recently suggested that cultural identity may play a significant role in boosting resilience among offenders with FASD (Rogers, McLachlan, & Roesch, 2013). Brown and colleagues (2014) developed the acronym "DEAR" as a general guide to working with offenders with FASD: **D**irect language, **E**ngage support systems, **A**ccommodate needs, and **R**emain calm.

Despite these notable and noble aims, none of the recommendations above are derived from the empirical evaluation of FASD-specific justice programs. Moreover, all of this work has been focused on youth populations (Brown et al., 2012; McLachlan et al., 2013; Rogers et al.; 2013), and one study was geared specifically toward substance abuse treatment (McLachlan et al., 2013). As such, there is still a critical need to evaluate the effectiveness of interventions for FASD-affected offenders, particularly adults.

Alexis Nakota Sioux Nation Justice Model

One community that has attempted to understand and address the unique needs of adult offenders with FASD is the Alexis Nakota Sioux Nation in northwest central Alberta. In the early 1990's, a community justice society was formed. This society combined provincial court with Aboriginal justice concepts to provide judicial services that are accessible, focused on treatment rather than punishment, and considerate of individual circumstances and histories (Allen, 2003). In recent years, the Alexis Justice Committee determined that

effective judicial services were not being delivered for individuals with FASD because of a lack of access to diagnostic services, funding, and coordination between assessment and justice systems. In response, in 2011, a new initiative was undertaken to merge the Alexis justice model with the Northwest Central Alberta (NWC) FASD Services Network clinical services to form the Alexis FASD Justice Program (AFJP). Through this partnership, the Alexis Justice Committee refers adult offenders (referred to as "clients" in the program) suspected of being affected by FASD for a neurocognitive assessment, and results are used to provide guidance to the court for FASD-informed considerations. The goals of this collaboration are to increase access to FASD assessment and diagnostic services, improve justice outcomes for adults in the Alexis community, decrease costs associated with ineffective justice services, and increase community capacity to meet the needs of these individuals. Shortly after the conception of the AFJP, researchers from the University of Alberta were invited to work with the Alexis Justice Committee and the community to assess its impact for clients, service providers, and the broader community.

Examining the Alexis FASD Justice Program

In the current study, I sought to examine how the Alexis FASD Justice Program (AFJP) is impacting the justice process for clients with FASD by exploring the perspectives of justice professionals and FASD service providers involved in the program. I focused on service providers because of their knowledge about the development and implementation of the program, and because their regularly scheduled Alexis Justice Committee meetings provided an opportunity for data collection. The study was guided by the overarching research question: in what ways do Alexis FASD Justice Program service providers believe that combining clinical and justice services is enhancing the justice process for clients with FASD? To answer this question, two semi-structured focus groups were conducted.

The goal of this study was to explore the ways in which innovative programs such as the AFJP can improve the justice process for offenders with FASD. This is important given the over-representation of individuals with FASD in justice settings and the vulnerabilities that they experience once involved in the system. Programs and practices that recognize individual needs and support rehabilitation have the potential to reduce the likelihood of re-offending, and ultimately build more healthy communities. This research also has the potential to highlight areas where more progress is needed in program development and implementation. This information is critical, because identifying challenges both within the program (e.g., resource limitations) and outside of the program (e.g., systemic barriers) clarifies what obstacles need to be overcome for program effectiveness. Overall, studying

the challenges and successes of the AFJP will help to establish new evidence to inform how we might improve existing programs and build future FASD-informed justice services.

Methods and Procedures

Participants. Participants were recruited through snowball sampling, whereby the study was announced during several Alexis Justice Committee meetings to garner interest, and members of the Committee were encouraged to invite their colleagues who have worked with the program. Snowball sampling was chosen as a recruitment method because the busy schedules of service providers can be difficult to coordinate, and the pre-existing Alexis Justice Committee meetings provided a convenient opportunity to share information about the study. All justice professionals and FASD clinical service providers from the NWC FASD Services Network who were engaged in the AFJP were invited to participate, and notified of the date the focus groups were scheduled to occur. In total, 18 individuals participated: 2 provincial court judges, 1 defense council, 2 probation workers, 1 Royal Canadian Mounted Police officer, 1 volunteer court worker, 1 psychologist, 1 physician, 2 occupational therapists, 1 speech-language pathologist, 2 FASD key workers, and 4 administrative staff. Written consent was obtained from all participants on the day of the focus groups before discussions began.

Data collection. Two semi-structured focus groups were conducted to explore the perspectives of participants. Focus groups were chosen as a method of data collection because the AFJP is a highly collaborative program, with many of its activities conducted by teams of professionals (e.g., committee meetings, FASD assessments), and focus groups are intended to reflect this dynamic through an emphasis on group discussion and interaction (Kitzinger, 1995). Focus groups can also generate a wider range and type of data than individual interviews, given that multiple individuals participate simultaneously (Rabiee, 2004). As well, they are effective at collecting data from many participants in a short period of time, which was important for this population given their significant time constraints. The first focus group was conducted with *both* justice professionals and FASD service providers and a second focus group was conducted with the clinical service providers only (see Appendix for scripts). Both focus groups lasted approximately 1 hour each, and were facilitated by the primary researcher with the assistance of a note-taker. The joint (justice and clinical) focus group occurred over lunch in Stony Plain, Alberta, at the same location used for regular Justice Committee meetings. The clinician focus group occurred approximately 2 months later over dinner at a University of Alberta conference room in Edmonton, which was deemed to be the most convenient and central location for all participants. Both focus groups were audio-recorded and transcribed verbatim for analysis.

Initially, the study was designed to involve three focus groups: 1) one large group with *both* justice and clinical service providers, 2) one smaller group with clinical service providers only, and 3) one smaller group with justice professionals only. After the first and second focus groups were conducted, it was decided that a point of saturation had been reached where the research questions were answered and no new information was arising. Also, because justice professionals had volunteered to participate in several focus groups prior to the current study, it was felt that an additional justice-specific focus group would place an unnecessary burden on their time.

Data analysis. Data was analyzed using thematic analysis (TA), described by Braun and Clarke (2007) as "the foundational method for qualitative analysis" (p. 4) with the outcome of "identifying, analysing, and reporting patterns (themes) within data" (p. 6). The advantages of TA include flexibility, accessibility, and applicability across various theoretical frameworks. Following the analytical process outlined in Braun and Clark, I 1) became familiar with the depth and breadth of the data through active immersion (in this case, reading transcripts), 2) produced initial codes (which organized the data into meaningful units), 3) looked for broad themes and sub-themes among the codes, 4) reviewed and refined themes with a second researcher, 5) defined and named themes, and 6) completed final analysis, identifying vivid examples of data representing themes and answering the research questions.

Braun and Clarke (2007) recommend that several methodological decisions be explicitly stated from the outset. In this study, themes were derived *inductively*, driven bottom-up from the data itself rather than top-down from an overarching theoretical model (Thomas, 2006). Analysis was at the *semantic* rather than latent level, where interpretation is employed to establish patterns, meanings, and implications of the data, but not to seek to identify any underlying meaning (Braun & Clarke, 2007). The epistemological perspective fit within an *essential/realist* model as opposed to a constructionist model, where the focus was on the experiences and realities of the participants rather than the social factors that influence or "construct" these experiences.

Findings

Analysis of the focus groups revealed three themes regarding service providers' understandings of the ways in which the AFJP is enhancing the justice process for clients with FASD: building capacity, humanizing the offender, and creating bridges. An additional theme – moving forward – related to the challenges that will need to be overcome as the AFJP continues to grow and develop. These themes are represented in Figure 4.1 below.

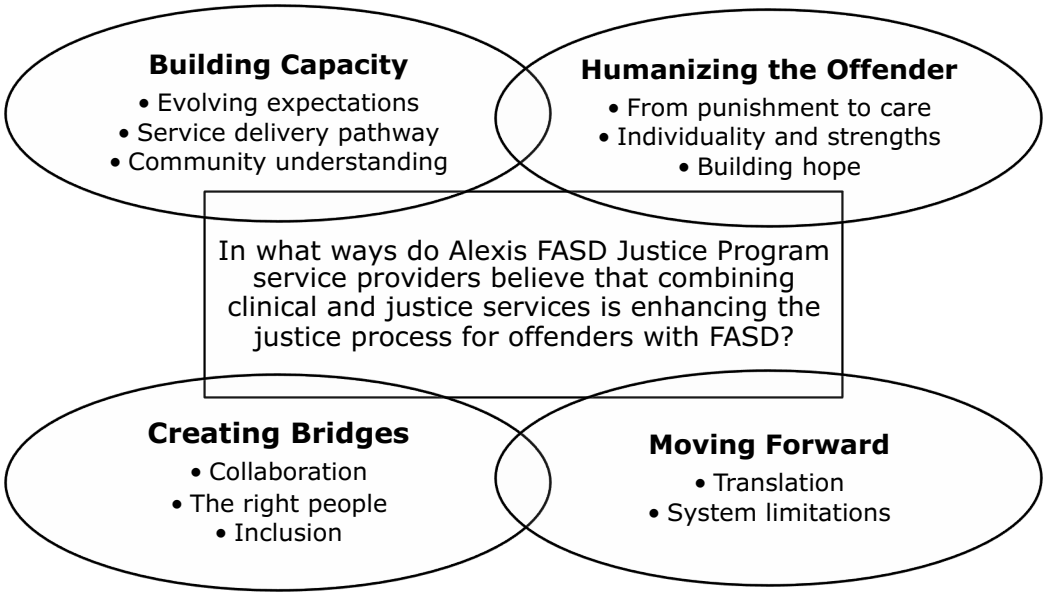

Figure 4.1. Focus group themes and subthemes.

Building capacity. Participants spoke about the wide-ranging impact of the AFJP across systems forming a foundation for enhanced capacity to support individuals with FASD. Discussions of capacity building stretched across three areas: evolving professional expectations, an improved service delivery pathway for clients, and enhanced community understanding.

Participants shared their thoughts about how professional expectations are changing as a result of the AFJP. For instance, they spoke of **evolving expectations** within the justice system as a whole, whereby "success" is no longer measured by reduced rates of justice contact. In fact, one participant noted that clients "may indeed be coming back more often, but that's not a negative thing, that shows that they're making the connection with services… we bring them back for reviews to see how they're doing… they're positive appearances." Another participant described evolving expectations around the role of the justice system:

> …the argument still goes on among judges, among prosecutors, 'send them to jail, that's what we do.' Otherwise you stick them on probation and 'I don't want to hear about it again'… I think there's been fermenting for a long time – if I could use that word – various sort of pockets of people who disagree with that and want to see positive outcomes.

Thus, service providers are noticing evolving expectations and attitudes about the fundamental purpose of the justice system and their role within it, ultimately building capacity of the system to better support clients with FASD.

Both justice and clinical professionals also offered their thoughts about the impact of the AFJP on the **pathway of service delivery** for their clients. Justice professionals discussed using information gleaned from the neurocognitive assessments to increase their knowledge of client functioning, which increases their capacity to make more appropriate decisions. As one participant noted: "…more information is really good because the crucial issue that determines what door – jail or in the community – is very often determined by what was making… that person tick." Similarly, one clinical service provider explained that the AFJP is contributing to enhanced follow-up support for clients, extending the service delivery pathway: "one of the real interesting elements for me anyway is the notion of the ongoing support… one of the real reliefs or resources has been the mentors as a means to help actually implement some of the recommendations." The participant elaborated, explaining that "the follow-up portion is more unique to this group, the clients that I deal with in other routes, quite often they have no one." Participants also spoke of the justice system "opening up," with legal professionals engaging in training specifically related to FASD, and showing a willingness to modify justice protocols and procedures: "I'm really grateful that they chose to try to understand." These discussions reveal that the AFJP is impacting the service delivery pathway by facilitating better-informed court decisions, extending supports beyond the clinic and courtroom by way of follow-up services, and at a broader level through an increased openness of the justice system to learn about FASD and make tangible changes to the way justice work is carried out. Overall, this speaks to the capacity of service providers to offer comprehensive and appropriate supports for clients.

A third avenue through which AFJP service providers perceive the program to be building capacity is **increased community understanding**. As one participant described: "as a result of having mentors in the community and having increased community understanding… we are getting a lot of adult referrals." That is, the presence of service providers in the Alexis community has created more conversations about FASD and increased the receptiveness of community members to seek clinical services. Another element of this increased community understanding relates to education and awareness of FASD in general. Participants discussed "the fact that a person has been assessed as having FASD has a negative connotation to it… because there isn't a total awareness… just based on their behaviour or the way people see them, they get kind of bullied." Another participant elaborated on the changing understandings of FASD in the community:

> The community is starting to understand FASD as a brain injury, but they don't necessarily understand… some of my clients they'll say 'well I think we should go to trial, because they're FASD therefore they can't convict me'… that's a community education thing and I notice that it's getting better so I don't think it'll last much longer.

By raising awareness and education in the community about FASD, the AFJP appears to be improving receptiveness to receive services and ultimately building capacity in the community to understand and support individuals with FASD.

Humanizing the offender. Another theme identified in the focus groups is the notion of viewing individuals involved in the program as *people* rather than *offenders*. In general, participants explained that AFJP service providers "start treating [clients] like people" and "treat them with integrity." The concept of humanization is apparent in many facets of the program, including the general program practice of using the term "client" rather than "offender." In particular, participants discussed this concept reflected in several subthemes: shifting from punishment to care, recognizing client individuality and strengths, and building hope.

Participants spoke of the idea of shifting the focus of justice **from punishment to care**. Overall, AFJP service providers discussed their goals of making sure clients feel safe and valued, emphasizing "being respectful and kind, and making sure [the clients] are not so terrorized and worried about the assessment process." According to one participant, the AFJP provides "an opportunity for [clients] to actually experience safety and trust. And that they know that they matter, which is absolutely core, you need to know that you matter in this world." Another participant described an element of compassion, emphasizing the importance of understanding the clients' difficulties: "sure she's got legal issues, but would not any of us have legal issues if we had been through similar elements?" As a result of these efforts, one justice service provider explained that, "I have the sense that they're being cared for more effectively." Increased client care was also apparent in that service providers recognize the importance of meeting basic needs rather than focusing on client offenses. For instance, one participant described this shift in terms of increased flexibility:

> …the notion of crime, therefore punishment somehow will change behaviour, and when it doesn't… well we'll punish harder. We'll punish more, we'll punish longer, we'll punish again. Behaviour should change… it doesn't change the way that you typically expect. But provide housing support… provide guidance, provide mentoring… that is much better compared to punishment.

Therefore, through creating a sense of safety, approaching clients with compassion and flexibility, and recognizing the critical importance of meeting basic needs, AFJP service providers are treating clients as people who deserve adequate care rather than criminals who deserve punishment. This shift in perspective may have long-term implications, as one participant noted that, "this blanket of support, I believe, helps to reduce the number of times they come in conflict with the law."

A second humanistic sentiment shared by participants was the adoption of an **individualized and strength-based understanding of clients**. One participant spoke of

the importance of this approach, explaining that the AFJP has "the potential to get people off that conveyor belt [of the justice system] and put them into a situation where their individual strengths and weaknesses are recognized and to have positive outcomes getting them out of that system entirely." Importantly, despite significant client difficulties, participants also acknowledged remarkable areas of strength: "I am frequently astounded at some of the performance abilities, and they exist in isolation of major deficits." They also emphasized the importance of creating "a circumstance where [client] strength can be used to the best of their abilities." Some participants framed client strength as resilience: "I really commend them for having such resilience to survive this long." Similarly, it was recognized that "really, when you come down to the brass tacks of some of these assessments and you look at 'wow is that person actually ever doing well, given their severe deficits.'"

Next, participants spoke commonly of **hope** among clients and their families, and service providers themselves. For instance, the increased understanding that comes from the neurocognitive assessment process means that:

> [Clients] have a better understanding of them selves… and families have a better understanding of the person who has caused much frustration, and you know hopelessness and you know things like that. So there is a change in thinking and a change in trying to cope… there is that sense of relief. Like, somebody is taking care of me. I don't have to try and do it myself.

According to participants, hope also comes from clients' recognition that they are being understood and that they may have a more successful future ahead:

> …it gives them hope instead of just being confined to constantly in the court system. And they may still be coming back, but it's on lesser types of charges… I really notice that my clients, that the mentorship, the diagnosis, the realization that the court understands the issues, that they have hope. Which really, really helps me in directing them through the system because they're taking it from a positive rather than just a defeatist point of view.

Importantly, not only has the AFJP instilled a sense of hope among clients and their families, but service providers also report that they are more hopeful themselves. One participant discussed being overwhelmed by a lack of resources, but noted, "I still have hope. I still have hope continuing to do what I'm doing."

Creating bridges. The third theme identified in the focus groups was the idea that people from a wide range of disciplines and backgrounds have come together with the common goal of supporting more positive outcomes for AFJP clients. As one participant explained: "we have a dedicated group of folks who… have a vested interest in doing what's within their power to change the things that they can." Within this theme, participants spoke of the highly collaborative nature of the team, involving the "right" kind of people for the work, and including families and community members in the process.

Despite the fact that service providers come from a wide variety of professional backgrounds, participants spoke frequently of creating bridges through **collaboration**. Participants described setting aside professional rules or limitations in order to find a common ground: "we get an opportunity to experience the collaboration… that is really quite inspiring to see people not so attached to the rules… they can do something all for a greater good." One participant highlighted the cooperation of the team, explaining that "it goes back to that inter-disciplinary expertise and none of us feeling threatened by it, that it's something that we welcome." Another participant attributed some of the successes of the AFJP to multi-disciplinary networking: "…it's the people, the chance to brainstorm and to put a face to the name… it's just so neat to have that chance to interact with so many different disciplines… It's so important." The concept of networking was particularly relevant in terms of the rural geography of the AFJP: "…in the rural areas we have a unique opportunity. We can complain that we don't get the same resources as the city does, but you know who the other people are and that's a real, real advantage." The rural geography appears to allow for stronger relationships and connections between service providers as well as a better understanding of the circumstances of clients who have "an ongoing relationship with the law" in those areas. The reciprocal nature of the AFJP was also highlighted:

> We're also given an opportunity for information to go back and forth, to find out what's helpful… And we get the information back, they're willing to take that to heart, and they run draft documents by folks to say, are we a little closer?

Together, these discussions emphasize the importance of cooperation, networking, and reciprocity in building bridges between professions, with the ultimate shared goal of supporting clients.

Stemming from these conversations about collaboration, participants expressed that the AFJP team is comprised of the **right kind of people**. In general, service providers were described as people "who have heart" and "who feel there is value… they're taking away something that makes their work more meaningful." Service providers were also characterized as "people who are really, really good at their jobs, so they are subject matter experts." Flexibility was also highlighted, which "…makes a difference for [the clients] and being able to open up to maybe, you know, have a little bit more faith in the system or that somebody is going to help them navigate that nasty road." As illustrated by these discussions, the AFJP team is characterized as a group of experts who see value in helping others, and are willing to go above and beyond their formal roles by being flexible in support of their clients.

Importantly, the bridges being created by the AFJP are not limited to service providers, but are **inclusive** of clients' families and their community as well. One participant discussed the importance of getting "feedback on the process… representation of community members, elders, and leaders… on what they see would be effective… is there something that ought to be changing?" Families are also involved in this process: "a lot of our clients have burned a bridge or two and families are tired… within this project I think it's just a neat resource to be able to collaborate not only with some of the support team members, but also at times even family members that do resurface and want to get more involved."

Moving forward. Despite the perceived positive impacts of the AFJP in terms of building capacity, humanizing the offender, and creating bridges, service providers felt that there is still more work to be done. In the words of one clinical service provider: "I don't know we can even say we've got the tip of the iceberg, it's like we've got the snowflake on the iceberg." In particular, participants described challenges related to translating the work of the AFJP into long-term supports, as well as limitations that exist at a systemic level.

Justice professionals shared the sentiment that **translating** the work being done within the program to long-term supports for clients is a challenge, with one participant explaining that "the sentence that I craft is only a small piece of the package. If it's not translated into the kinds of concrete things that are recommended typically in the assessment reports, then how far does it go?" Similarly, one clinical participant noted that, "I never know what happens on the other end. There's no kind of closure on these clients… You send this out into the ethernet and something happens." This lack of translation may be especially relevant in Aboriginal communities, where one participant explained that "the non-profits or voluntary sector organizations… They're just not there. And so the linkages we can try to create some new things hasn't happened yet." Overall, although conversations revealed that the AFJP is enhancing the service delivery pathway for clients, participants noted that there is more room for improvement, especially in Aboriginal communities.

Next, although the AFJP has appeared to prompt some system-level improvements, participants explained that **systemic limitations** continue to exist. One participant explained that, unfortunately "the court doesn't have the power to do the things that I know this client needs. They can't mandate a caring family, they can't mandate a place to live." Moreover, despite improved services for individuals through the neurocognitive assessment and justice processes, there remains a disconnect between systems such as justice and corrections, which participants noted would benefit from increased support for incarcerated individuals involving mental health and additions treatment, as well as vocational and life

skills training. Overall, although service providers discussed significant impacts stimulated by the AFJP, several barriers need to be overcome to move forward in providing effective supports and ongoing services for justice-involved clients with FASD.

Summary and Discussion

Despite what is known about the vulnerability and over-representation of individuals with FASD in the justice system, there is a paucity of interventions for offenders with FASD. Current discussions in the justice system emphasize the importance of screening protocols, diagnostic assessments when FASD is suspected, special consideration of FASD during sentencing, and even specialized courts to divert affected individuals from the traditional system (Fetal Alcohol Spectrum Disorder & Justice, 2015). Previous researchers have made some recommendations for working with young offenders with FASD, but there is currently no empirical evidence indicating how to best meet the needs of this group.

Given the lack of research related to FASD-informed justice interventions, there is a critical need to document and analyze the process of programs such as the AFJP, and explore whether and how they impact the justice experience of clients with FASD. Therefore, in the current study I sought to explore the perspectives of AFJP service providers through semi-structured focus groups. The participants in this study shed light on several important ways in which the program may be enhancing the justice process for clients with FASD. Four themes were identified from the focus groups: *building capacity, humanizing the offender, creating bridges*, and *moving forward*.

According to justice and clinical service providers, the AFJP is *building capacity* in several avenues to support clients with FASD. Participants reported that the AFJP is leading to evolving expectations in the justice system, which allows for better long-term services while also engaging and building awareness in the community. This wide-reaching enhancement of practice is congruent with what researchers in offender rehabilitation recommend: that treatment should be based in the community (Brazao et al., 2013) and seek to create continuous environmental support (Wilkinson, 2012). This also aligns with what is recommended for supporting FASD-affected offenders through life-long services (Mela et al., 2013). The current study reveals that the AFJP is working in line with these best practice suggestions; participants reported a positive experience and the belief that they are making valuable impacts.

A second major finding identified in the focus groups was the idea of *humanizing the offender*, whereby service providers conceptualize their clients as people rather than criminals. This finding is congruent with a human needs approach that researchers suggest is an important element of treatment for offenders in general, such as the Good Lives Model

(Ward & Stewart, 2003). This positive and individualized approach is also thought to be a promising strategy for offenders with FASD specifically (Brown et al., 2012; McLachlan et al., 2013; Mela et al., 2013). The finding that AFJP service providers are adopting this humanistic perspective is consistent with previously recommended practices, as they strive to make clients feel safe and valued, work from a place of compassion, meet their clients' basic needs, and recognize client strengths, which results in more hope among clients, their families, and service providers themselves. As well, in humanizing their clients, AFJP service providers are in a better position to adapt to client diversity and understand the risk factors and client needs that may be contributing to their offending behaviour, which is shown in the literature to allow for more effective intervention efforts.

The next theme of *creating bridges* highlights the collaborative nature of the AFJP team through inter-disciplinary cooperation, networking, and reciprocal communication between professions to improve practice. Service providers were characterized as experts who find value and meaning in being part of this process, and who are willing to be flexible in the ways that they support their clients. Importantly, the bridges created by the AFJP extend beyond the service providers themselves and include clients' families and their community, who are invited to provide feedback and participate in the process. Family and community involvement is important, considering that offenders with FASD have been shown to struggle with community employment and support from families (MacPherson et al., 2011). Overall, by creating these bridges, AFJP service providers are able to explore client needs from numerous perspectives, identify and target multiple areas for intervention, and engage a strong system of support: practices that have been established as important components of offender treatment and are suggested as promising for offenders with FASD (Brazao et al., 2013; Brown et al., 2014).

Despite the perceived positive impacts described by AFJP service providers, several barriers exist in the way of meeting client needs. The last theme identified in the current study related to these challenges and the work that needs to be done in order for the program to continue to move forward. Specifically, participants discussed the challenge of translating their work into long-term supports for their clients, and the limitations that exist at a systemic level, where gaps prevent the adequate coordination of services to meet client needs.

In sum, this study reveals that AFJP service providers perceive themselves to be working in ways that are congruent with what researchers recommend in general offender treatment, and what has been suggested as promising practices for offenders with FASD. The current study expands the application of these practices to adults in an Aboriginal

community, which offers a unique contribution to the literature. As well, this study provides insight into what barriers must be overcome to continue moving forward with this type of work. In the context of theoretical frameworks for offender rehabilitation, the AFJP seems to be working in line with both the Risk-Needs-Responsivity and Good Lives models. That is, AFJP service providers assess an offender's neurocognitive profile (i.e., establish what are the individual's *needs*), and use this understanding to tailor their treatment approach to his or her level of functioning (i.e., accounting for offender learning style or *responsivity*), all the while framing the client as a *human* and focusing on individuality and strengths.

Limitations and future research. One limitation of this study is that it focused solely on the perspectives of service providers. The experiences of other stakeholders, such as clients who participate in the program, their families, as well as community members are also crucial to explore. An exploration of these perspectives would shed more light onto client needs and how (or whether) the AFJP is making a difference for clients, families, and the community. For instance, researchers exploring the perspectives of family members of individuals with FASD (Radford-Paz, 2013) have highlighted the complexity of working with FASD-affected offenders, suggesting that neurocognitive and social impairments, as well as overwhelming environmental demands contribute to criminal behaviour in adults with FASD. Other researchers have recently reported on the perspectives of adult offenders with FASD in terms of what factors contribute to entry into the justice system and becoming "trapped" in the system once involved (Pei, Leung, Jambolsky, & Alsbury, in press). Exploring the perspectives of AFJP clients, families, and community members would reveal valuable information about the risks and needs of clients with FASD, how criminality in FASD is conceptualized in the Alexis community, and how the AFJP influences these factors. As well, studying the perspectives of clients, families, and community members may reveal additional priorities that could guide the direction of the AFJP as it continues to develop and progress. The current study takes an important first step toward understanding one perspective related to enhancing the justice process for offenders with FASD, and paves the way for future exploration of these other perspectives.

A second limitation of this study is that, because data was collected through focus groups rather than individual interviews, findings spoke more to system- or group-level experiences than individual experiences. Given the highly collaborative and multi-disciplinary nature of the AFJP, focus groups were deemed to be the most appropriate and effective means of gathering information about this program and the most reflective of its overall dynamic. However, future research could explore individual experiences in order to understand the impacts of the AFJP at a deeper, more detailed level. As well, although this

study offers insight into the broader impacts of the AFJP, additional research could explore more pragmatically *how* this work is being conducted. That is, research related to the practical strategies used by justice professionals, clinicians, and mentors in their work, or research into tangible changes to the justice process and protocols (e.g., FASD training for judges, simplified language for sentencing conditions) would be especially useful for developing other FASD-informed justice interventions.

Finally, another critical focus for future research will be to monitor the long-term outcomes of clients who participated in the AFJP, as well as the factors that influenced these outcomes. Past research indicates that supervision and structure, education and employment, positive peers, and financial and social support may serve as protective factors against criminality among individuals with FASD (Radford-Paz, 2013). Studying outcomes of clients who participated in the AFJP would add to the evidence of FASD-specific risk and protective factors, and also reveal potential targets for intervention.

Conclusion

There is a persistent call from the academic, clinical, and justice realms for more effective treatment for justice-involved individuals with FASD, but also a dire lack of research on justice interventions for this group. The Alexis FASD Justice Program is an innovative partnership between the justice system and FASD clinical services in an Aboriginal community in Alberta that uses neurocognitive assessment findings to inform court decisions. In the current study, AFJP service providers shared their perspectives on how the program is enhancing the justice process for individuals with FASD, and what barriers need to be overcome to allow for continued program growth. These perceptions are important to examine and document because they lay the groundwork for understanding whether and how we might make meaningful changes in the lives of an especially vulnerable group of individuals. Ultimately, this understanding promises to strengthen our ability to support rehabilitation, reduce recidivism, and enhance well-being for our clients, their families, and the communities in which they live.

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Appendix

Focus Group Script #1 (justice professionals and FASD service providers combined)

Guiding question: *In what ways do justice professionals and FASD service providers involved in the AFJP believe that the program is enhancing the justice process for offenders with FASD?*

1. What impact has combining the Alexis Justice Program with FASD clinical services had on client outcomes?
    - *Prompt*: How did it ensure that appropriate supports were put into place?
    - *Prompt*: How did it affect recidivism?
    - *Prompt*: Were there any adverse effects?
2. How has this partnership changed the system in which you work?
3. In what ways could this partnership be improved?
4. What lessons learned from this partnership could be shared with the broader justice system to better meet the needs of all offenders with FASD?
5. How do you feel you are contributing to this partnership?

Focus Group Script #2 (FASD Clinical Service Providers)

Guiding question: *In what ways do FASD service providers work differently when justice-involvement is a factor?*

1. What do you do to support and advocate for clients involved in the justice system?
2. In what ways is working with justice-involved clients different than working with non justice-involved clients?
    - *Prompt*: Are your recommendations/support strategies different because you're working with the justice system?
    - *Prompt*: How does working with the justice system change the way you conceptualize assessment/diagnosis/intervention?
3. What has helped you to understand the justice system and to do your job more effectively?

Chapter 5. Final Conclusion

Fetal Alcohol Spectrum Disorder (FASD) refers to a range of deficits resulting from prenatal alcohol exposure (PAE), including difficulties with learning, cognition, behaviour, and social and emotional functioning (Chudley et al., 2005). Unfortunately, related to these deficits, individuals with FASD are also at risk of experiencing life-long difficulties with mental health, inappropriate sexual behaviours, disrupted school experiences, confinement (in hospitals or correctional settings), substance abuse, and trouble with the law (Streissguth, Barr, Kogan, & Bookstein, 1996). Indeed, this population commonly reports justice-involvement (Streissguth et al., 2004), and both youth (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011) and adults (MacPherson, Chudley, & Grant, 2011) with FASD are over-represented in correctional settings. Once involved in the system, offenders with FASD may experience further victimization (Byrne, 2002; Conry & Fast, 2000). However the current justice model is not set up to adequately support this vulnerable group (Malbin, 2004; Pei, Leung, Jampolsky, & Alsbury, in press; Roach & Bailey, 2009).

It has been proposed that one of the "fundamental" factors underlying criminal behaviour in FASD is neurocognitive impairment (Institute of Health Economics, 2013), but very little empirical research has been conducted to help us understand specifically how this factor impacts criminality in FASD, or how consideration of neurocognitive functioning can inform treatment. Given these research gaps, the goal of the current dissertation was to explore the ways in which an understanding of neurocognitive functioning of offenders with FASD can impact service delivery for this population. This was done through three distinct but related papers. Paper 1 was a literature review focusing on how neurocognitive deficits relate to criminal behaviour in the general population, and how these impairments may interact with other adaptive and social difficulties that often characterize the lives of individuals with FASD and lead to justice-involvement. The goal of Paper 2 was to examine the differences in neurocognitive profile between a group of young offenders with FASD and a Comparison group without FASD. Finally, Paper 3 was intended to take this research a step further, by exploring perceptions of a justice intervention program informed by the unique neurocognitive needs of FASD-affected clients.

Understanding Neurocognitive Impairment in Offenders with FASD

A review of the literature of the offender population in general reveals that neurocognitive function plays a significant role in an individual's propensity to engage in delinquent and criminal behaviour. Notably, the areas of neurocognitive impairment commonly documented in offender populations align closely with many of the core deficits documented in FASD populations. In addition to neurocognitive vulnerability, individuals

with FASD also often experience significant post-natal adversity that, when combined with neurocognitive impairment, may amplify an individual's risk of engaging in delinquent and criminal behaviours. Clearly, this is an area that warrants continued research to fully understand the interaction between neurocognitive vulnerability and environmental adversities.

Our current justice system is based on the notion that offenders are cognitively intact and have the capacity to understand the link between behaviour and consequences, but this is not always true for offenders with FASD (Malbin, 2004). As well, offender treatment programs are typically based in cognitive approaches, which require self-insight and the ability to problem-solve, self-monitor, and resist temptation (Day, 2011), which again, may not be appropriate considering the neurocognitive difficulties of individuals with FASD. The misalignment between justice approaches and the needs of offenders with FASD means that many of these individuals may be misunderstood or under-supported.

We know that some of the most effective offender treatment approaches adhere to the Risk-Needs-Responsivity model and are based on an understanding of the offender's risk to society, areas of need, and responsiveness to treatment (e.g., Koehler, Losel, Akoensi, & Humphreys, 2013). As such, it is important to seek a comprehensive understanding of the biological, psychological, and social vulnerabilities and factors that contribute to criminal behaviour, because the combined influence of risk factors leading to antisocial and criminal behaviours is exponentially larger than the influence of individual risk factors alone (Raine, 2002). Thus, when conceptualizing the offending behaviour of an individual with FASD, consideration of all the factors that have impacted that individual throughout his or her life, including sources of resilience, will help to provide an understanding of what may have led to problem behaviours and to reveal targets for intervention to support positive outcomes.

Neurocognitive Profile in Young Offenders with FASD

Building on the idea that neurocognitive functioning plays a significant role in criminal behaviour among individuals with FASD, the goal of Paper 2 was to compare the neurocognitive profile of young offenders with FASD with a non-FASD comparison group. A retrospective file review was conducted on data collected through neurocognitive assessments in a young offender treatment program. On the whole, young offenders with FASD showed a unique profile of functioning relative to the Comparison group, with significantly more impairment than the Comparison group in cognitive flexibility, memory (verbal and working memory), academics (except for math), complex processing speed, verbal ability, and among males only, inhibition. Importantly, the FASD group also showed *relative* strengths in the areas of simple processing speed, fine motor ability, visual

memory, and visual-perceptual reasoning. These findings are the first to show significant differences in the neurocognitive profile of young offenders with FASD, which offers empirical evidence that this group may warrant differential treatment in the justice system.

Responding to the Needs of Offenders with FASD

For the last several years, the Alexis Nakota Sioux First Nation has been attempting to address the unique needs of offenders with FASD through a partnership between justice and clinical services. Built on a community-based justice program, adult offenders suspected of being prenatally exposed to alcohol are referred for a neurocognitive assessment, the outcome of which is communicated to the court for consideration in judicial decision-making. This innovative program is one of the first to use the functional profile of offenders with FASD to inform the justice process. The goal of Paper 3 was to explore this process using focus groups with justice and clinical service providers involved in the program. According to service providers, the program is responding to the unique needs of offenders with FASD through building capacity, humanizing the offender, and creating bridges, but there exists several challenges that will need to be overcome to continue moving forward with this work.

Contribution and Implications

With this dissertation, I have advanced our understanding of the unique neurocognitive profile of offenders with FASD, which may impact a vulnerability to criminal justice involvement, and reveal what factors should be considered in our responses and service delivery initiatives. With that in mind, I have also examined the experiences of service providers who have prioritized a comprehensive understanding of the needs of offenders with FASD in an effort to support these individuals to move out of the justice system towards healthier and more successful lives. This research bridges youth and adult justice systems, and underscores the importance of awareness and knowledge of FASD among professionals working with offender populations. Conclusions drawn from this dissertation are consistent with a holistic approach to understanding criminality in FASD, taking into account the biological, psychological, and social factors that influence offending behaviour. In particular, offenders with FASD may experience specific areas of neurocognitive deficit that could inform targeted treatments including prevention efforts and screening protocols. Finally, this research showcases one way through which neurocognitively-informed intervention may enhance the justice process for individuals with FASD.

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