Finding a Middle Ground: Advancing the Feminist Pathways Paradigm Through Integration with "What Works" with Adolescent Offenders

by

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Abstract

The purpose of this dissertation was to advance the feminist pathways paradigm by integrating theory and methods from a mainstream correctional perspective to enhance our understanding of adolescent offenders. This dissertation used archival data provided by the Pathways to Desistance project (Mulvey, 2012), a longitudinal study of 1354 adjudicated adolescent offenders (1170 male, 184 female), recruited from Philadelphia and Phoenix, designed to examine persistence and desistance from criminal behaviour over time. Study 1 generated a theoretically integrated typology and tested the stability of this typology over time using a series of latent profile analyses (LPA) generated at baseline, and at 12, 24, and 36-month follow-ups. Subsequently, using latent difference score (LDS) modeling within a structural equation modelling (SEM) framework, Study 2 examined the relationship between victimization and offending across three time-points, and further examined whether changes in internalizing mental health deficits and substance abuse mediated this relationship. Results of Study 1 suggest that youth can be classified into three groups: a *minimal-needs* class with negligible needs in all domains, a *comprehensive-needs* class with high-needs in all domains with the exception of internalizing mental health deficits, and a *complex-comprehensive-needs* class scoring high on all domains in addition to elevated internalizing mental health disorders. Similar profiles emerged at each time-point examined. However, an additional class, characterized by elevated alcohol use and moderate antisocial personality, emerged at the 36-month follow-up. Overall, results of Study 1 suggest that the heterogeneity of the treatment profiles of adolescent offenders increases over time, and there are more similarities than differences between males and females in their treatment profiles.

Results of Study 2 revealed a significant relationship between victimization and subsequent offending; however, neither changes in substance abuse nor changes in internalizing mental health deficits mediated this relationship. As such, these results suggest that this causal sequence of events detailed by feminist pathways proponents may not hold up with longitudinal data. In light of these findings, it is recommended that future research continues to leverage the feminist pathways paradigm with "what works" to gain a better understanding of gender similarities and differences in adolescents' pathways to crime.

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CHAPTER 1

General Introduction

The study of women and girls involved in the justice system has historically been neglected, in large part due to their small numbers and lower level of risk for recidivism compared to their male counterparts. Further, it is well established that females tend to commit less serious acts relative to males (for review, see Moffitt, Caspi, Rutter, & Silva, 2001); subsequently, as services are typically reserved for offenders characterized as high risk, the needs of women and girls have historically been neglected (Chesney-Lind & Pasko, 2013). However, over the past several decades there has been increased interest in understanding the needs of female offenders as this population is becoming increasingly more complex (e.g., increased mental health needs; Derkzen, Booth, McConnell, & Taylor, 2012), and continues to be one of the fastest growing segments of the prison population (Guerino, Harrison, & Sabol, 2011; Public Safety Canada, 2012).

One of the largest ongoing debates in corrections pertains to whether or not females are similar or different compared to their male counterparts in terms of a) what brings them to the criminal justice system, and b) their treatment needs. Prominent developmental criminologists/psychologists (Loeber & Farrington, 2000; Moffitt, 1993), and mainstream correctional researchers (e.g., Andrews & Bonta, 2010; Andrews et al., 2011; Gendreau, Smith, & French, 2006) maintain that general theories of criminal conduct are sufficient to explain crime, irrespective of gender, race or ethnicity. Stemming from what is often referred to as the gender-neutral perspective (e.g., Rettinger & Andrews, 2010), risk factors with the most empirical support include criminal history, criminal attitudes, antisocial peers, personality deficits (e.g., impulsivity), family/marital

dysfunction, substance abuse, educational/vocational difficulties, and the inappropriate use of leisure time (Andrews & Bonta, 2010). Mainstream correctional researchers operating through the lens of gender-neutrality have found support for the gender-invariance of these risk factors in both adolescent (e.g., Simourd & Andrews, 1994) and adult samples (e.g., Andrews et al., 2011).

In contrast, a group of researchers collectively known as feminist pathways researchers, including applied correctional feminists (e.g., Van Voorhis, 2012) and feminist criminologists (e.g., Belknap, 2007), argue that the etiology of female offending is unique from that of males. Specifically, according to feminist pathways researchers, female offending behaviour is often catalyzed by trauma (e.g., childhood victimization), which is then further exacerbated by economic marginalization and the comorbid occurrence of substance abuse and mental health difficulties (e.g., Belknap, 2007; Chesney-Lind & Shelden, 2003; Daly, 1992). Notably, there is some overlap among the risk factors identified as salient by the mainstream correctional perspective and feminist pathways researchers (e.g., substance abuse). Generally, however, gender-neutral scholars tend to minimize the importance of hypothesized uniquely female risk factors (also referred to as gender-responsive factors or female-specific factors). For example, Andrews and Bonta (2010) suggest that "a history of being victimized may well contribute to crime but […] it does so through the Big Four" (i.e., criminal history, criminal attitudes, antisocial associates, and antisocial personality; p. 512). Conversely, feminist scholars argue that treatment of uniquely female needs is "not simply a means to another end, but a priority" (Van Voorhis, 2012, p. 125).

Importantly, the theoretical divide between gender-responsive and gender-neutral scholars has narrowed over the last decade as researchers from both camps have begun to acknowledge the importance of theoretical integration (e.g., Brennan et al., 2012; Rettinger & Andrews, 2010; Salisbury, 2007). However, given the state of the literature as it pertains to the importance of hypothesized gender-responsive factors relative to hypothesized gender-neutral risk factors, what should be targeted in treatment remains controversial. While some researchers advocate that treatment should be gender-responsive and address female-specific needs (i.e., victimization, dysfunctional relationships, poor socioeconomic conditions, mental health, and substance abuse; Covington & Bloom, 2006), developmental criminologists and mainstream correctional researchers argue that effective correctional treatment should target risk factors purported to be applicable to both males and females (e.g., antisocial attitudes, criminal peers, antisocial personality; Andrews & Bonta, 2010; Dowden & Andrews, 1999; Lipsey, 2009) and that gender-responsive factors are best thought of as specific responsivity factors (i.e., factors that can interfere with or enhance the efficacy of treatment; Andrews & Bonta, 2010) rather than direct treatment targets.

Despite the focus on different factors, both disciplinary camps seek to explain how an individual becomes engaged in crime over the life course by examining the interrelationships among various factors related to criminal behaviour, and subsequently, whether meaningful types of offenders can be delineated premised upon these factors. Notwithstanding this common goal, the preferred methodology, as well as the research standards and principles associated with each camp, are markedly different. Specifically, developmental criminologists (e.g., Loeber & Farrington, 2000) and correctional

researchers (e.g., Andrews & Bonta, 2010) argue that pathways into crime can only be examined with longitudinal, multi-wave data so that one can understand the temporal and causal nature of various risk factors.

In contrast, feminist researchers have historically examined pathways qualitatively by analyzing in-depth narratives that detail the life events that have shaped women's and girls' criminal behaviour (e.g., Daly, 1992, 1994). Encouragingly, a number of quantitative typology-building studies have added to this body of qualitative research (e.g., Brennan, Breitenbach, Dieterich, Salisbury, & Van Voorhis, 2012; Jones, Brown, Wanamaker, & Greiner, 2014; Salisbury & Van Voorhis, 2009). However, most studies that have examined variables embedded within the feminist pathways paradigm have used adult samples (i.e., women); as a result, studies on adolescent offenders, informed by this perspective are largely underdeveloped. Further, quantitative studies that have examined how feminist pathways-informed variables cluster together have traditionally done so with cross-sectional data (i.e., treated as static variables, methodologically speaking). Although typologies for offenders have been examined among adolescent samples of mixed gender composition (e.g., Brennan, Breitenbach, & Dieterich, 2008; Jones et al., 2014), no studies have longitudinally examined the same sample to explore the stability of typologies over time (for an exception, see Dembo et al., 2008). Additionally, no studies have examined whether typologies are age-graded (i.e., whether typologies are stable throughout adolescence and early adulthood, or vary as a function of the age of the population under study). Thus, the current study as proposed, will address these gaps in evidence by examining the stability of an adolescent offender typology over

time (incorporating both gender-neutral and gender-informed risk factors), using quantitative methods—namely, latent profile analysis.

In addition to typology research treating pathways-informed variables as static, much of the quantitative research has tried to tease apart the causal relationships among these variables using cross-sectional or single-wave data to assess the constructs of interest (e.g., Salisbury & Van Voorhis, 2009). Although applied correctional feminists suggest that interventions need to target gender-responsive risk factors (e.g., victimization, dysfunctional relationships, substance abuse, and mental health; Covington & Bloom, 2006), no studies have examined how changes in these variables are related to changes in offending behaviour or how these factors are interrelated across time. As such, the present study will fill this void by using two structural mediation models to examine the relationship between victimization, internalizing mental health disorders, substance abuse, and delinquency over time with longitudinal data.

In sum, the goal of this research is to further investigate feminist pathways models through integration with theory and methods from a mainstream correctional perspective (i.e., Personal, Interpersonal, Community-Reinforcement theory [PIC-R]; Andrews & Bonta, 2010). Specifically, Study 1 generated a theoretically integrated typology of youthful offenders (by merging tenets from both the mainstream correctional and feminist camps), and tested the stability of this typology over time using a series of latent profile analyses (LPA). Subsequently, using latent difference score (LDS) modeling within a structural equation modelling (SEM) framework, Study 2 examined the relationship between victimization and offending across three time-points, and further

examined whether changes in internalizing mental health deficits and substance abuse mediated this relationship.

To begin, a brief overview of key terms used throughout this document will be presented. This will be followed by a summary of the theoretical perspectives guiding this study, including corresponding evidence. Additionally, typological research that has been generated by each perspective will be summarized to set the context for Study 1 (i.e., generating latent profiles of adolescent offenders and testing their stability over time), followed by a brief review of studies that have examined change over time in risk/need factors to provide further rationale for Study 2 (LDS mediation models).

Gender-Neutral, Gender-Responsive, and Gender-Informed Needs

Prior to discussing the two theoretical perspectives guiding this study, a number of key concepts should be clarified. Mainstream correctional perspectives contend that a number of risk factors for crime are *gender-neutral*—that is, equally relevant (both in form and in function) for males and females (Andrews & Bonta, 2010; Rettinger & Andrews, 2010). Evidence for the gender-neutrality of risk factors has been generated by: a) identifying and validating risk factors in predominantly male samples, using mainly recidivism studies and then, b) testing the validity of these same risk factors on samples of women/girls using similar methods. Arguably, one problem with this method is the inability to identify risk factors that may be salient for females, but not for males. It should also be noted that mainstream correctional proponents define a treatment need as a risk factor that has been empirically linked to recidivism; as such, the terms risk and need are often used interchangeably (i.e., it is not a treatment target unless it is also a risk factor).

In contrast, g*ender-responsive* factors can be defined as treatment needs that have been identified as important for females. These factors have primarily been identified using qualitative interviews with women and girls. Although more recent quantitative support has been generated, this work has primarily been cross-sectional in nature. Due in part to this methodological shortcoming, the feminist pathways paradigm does not distinguish between treatment needs with, or without, an empirical link to recidivism. Nonetheless, as gender-responsive factors have been identified without incorporating a male comparison group, this approach suffers from the same limitations as that used to identify gender-neutral risk factors (i.e., the inability to identify if gender-informed risk factors are also important for some males).

What can be thought of as a middle ground between these two approaches is simply taking an approach that is *gender-informed.* Taking a gender-informed approach means that the researcher a) incorporates both males and females in their sample, b) includes factors that are hypothesized to be salient for males *and* females, drawing from multiple theoretical perspectives, and c) is interested in both similarities and differences between males and females (Blanchette & Brown, 2006). Notably, the present study has taken this middle ground approach.

Mainstream Criminological/Correctional Perspective

Prominent developmental criminologists and psychologists (e.g., Loeber & Farrington, 2000), and mainstream correctional researchers (e.g., Andrews & Bonta, 2010), maintain that general theories of criminal conduct are sufficient to explain crime, irrespective of gender, race or ethnicity. One model aligned with this perspective is the Personal, Interpersonal, Community-Reinforcement model (PIC-R) of criminal behaviour

(Andrews & Bonta, 2006, 2010). This perspective contends that criminal behaviour emerges as a by-product of diverse interactions between personal (e.g., personality), interpersonal (e.g., relationships with family and peers), and community-based factors (e.g., neighbourhood) that produce cost-reward contingencies that favour criminal conduct. Specifically, the probability of engaging in crime increases as one's perceived cost to reward ratio for committing criminal acts decreases (Andrews, 1982; Andrews & Bonta, 2006, 2010). Notably, this model has been operationalized to inform correctional treatment, and is referred to as the RNR ("Risk/Need/Responsivity") principles, or more generally, "What Works".

Criminogenic needs. Of particular importance to the present study is the *need principle*. According to this principle, targeting dynamic risk factors—also referred to as criminogenic needs— is an essential component of effective treatment. Within the extant literature, the individual-level risk/need factors emerging as most predictive of recidivism (i.e., *The Big Four*) include (1) criminal history, (2) antisocial personality factors (e.g., impulsivity), (3) antisocial peers (i.e., social support for crime), and (4) antisocial attitudes (i.e., attitudes supportive of crime). These are followed in predictive strength by (5) substance abuse, (6) family factors, (7) employment/school, and (8) leisure/ recreation. Collectively, these eight factors are known as the *Central Eight* (Andrews & Bonta, 2010). Notably, criminal history, a static risk factor, is simply used to gauge one's overall level of risk. However, given their dynamic nature and demonstrated empirical link to criminal behaviour, the other seven risk factors are potentially viable treatment targets in correctional settings and can be described as dynamic risk factors or criminogenic needs (Bonta & Andrews, 2007).

A large body of literature has amassed over the last several decades supporting the tenets of this theory and the RNR principles. Meta-analytic research has garnered support for: 1) the predictive validity of the *Central Eight* risk factors (Andrews, Bonta, & Wormith, 2004; Bonta, Law, & Hanson, 1998; Cottle, Lee, & Heilbrun, 2001; Dowden & Brown, 2002; Gendreau, Little, & Goggin, 1996); 2) the utility of risk assessment instruments that are premised on the *Central Eight* (Andrews et al., 2011; Coulson, Ilacqua, Nutbrown, Giulekas, & Cudjoe, 1996; Lowenkamp, Holsinger, & Latessa, 2001; O'Keefe, Klebe, & Hromas, 1998; Olver, Stockdale, & Wong, 2012; Raynor, Kynch, Roberts, & Merrington, 2000; Rettinger & Andrews, 2010); and 3) the treatment of these factors to improve correctional outcomes (Andrews & Bonta, 2006; 2010; Andrews et al., 1990; Dowden & Andrews, 1999; 2000).

Although research on females is still catching up to that on males, there is meta-analytic evidence that these *Central Eight* risk factors are also important for female offenders (Andrews et al., 2011; Green & Campbell, 2006; Hubbard & Pratt, 2002; Simourd & Andrews, 1994); however, the amount of evidence in support of this relationship is more abundant for males than for females. Further complicating matters is that while this perspective argues that risk/need factors for crime are largely gender-invariant, an opposing group of scholars—a group who has contributed to the contemporary feminist pathways perspective- argues that a number of unique criminogenic need factors not fully captured within the Central Eight are additionally relevant to women and girls.

Contemporary Feminist Pathways Perspective

Stemming primarily from qualitative interviews with women offenders (Arnold, 1990; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996), and corroborated by more recent quantitative research (e.g., Jones et al., 2014; Salisbury & Van Voorhis, 2009; Van Voorhis, Wright, Salisbury, & Bauman, 2010), the feminist pathways perspective has evolved over the last 30 years into a collection of work that supports the notion that girls and women enter into crime through different channels than boys and men.

It should be noted that the term pathways as used by feminist researchers is used to denote the relationship among various risk factors found to be salient to women's lives, extracted from life-history narratives. Although a pathway in the most literal sense implies a causal sequence of events, feminist pathways researchers have used diverse data collection strategies (cross-sectional, retrospective life history calendars, official records) that do not necessarily support causal statements to sequence the life events that have shaped a women's criminal behaviour. Keeping this definitional caveat in mind, the contemporary feminist pathways perspective has garnered support from four independent, but complementary bodies of literature, each of which is briefly summarized below.

Foremost, qualitative research has carried out detailed interviews with girls and women to retrospectively create a narrative of the events that they believe led them to crime (Arnold, 1990; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996). Specifically, this early work exposed the unique social circumstances and negative life events that put girls and women at risk for criminal behaviour, including but not limited to trauma or victimization, internalizing

mental health disorders, economic marginalization, poor parenting, reduced self-efficacy, and dysfunctional relationships. Each of these factors is hypothesized to contribute to a female's decision to commit criminal acts as a means of survival. For example, to escape violence or abuse within one's home, girls are forced to adopt a number of survival strategies that are often criminalized including running away to flee the abuse, substance use to cope with the trauma endured, and prostitution to be able to survive financially while living on the streets. Notably, although a number of common paths to offending have been generated with qualitative data, a common limitation of qualitative research more generally is the relatively small sample sizes that are used. How reliable these pathways are with larger samples, and how well they will hold up to statistical cross-validation merits investigation.

Second, quantitative prevalence studies have detailed differences between males and females in domains believed to be salient to female offenders, often established with cross-sectional data, including (though not limited to) victimization and trauma, mental health deficits, and substance abuse. Although estimates vary as a function of the type of trauma, how trauma is defined, and the population being studied (Kerig & Becker, 2012), a number of studies have documented higher rates of victimization and trauma among female offender populations (Belknap & Holsinger, 2006; Cauffman, Feldman, Waterman, & Steiner, 1998; Dembo, Williams, & Schmeidler, 1993). Further, a large body of prevalence-type research has amassed underscoring the prevalence of substance abuse, depression, anxiety, and other psychopathologies (e.g., PTSD, ADHD) among female delinquent populations (Abram et al., 2004; Dixon, Howie, & Starling, 2004; Drapalski, Youman, Stuewig, & Tangney, 2009; Teplin, Abram, McClellan, Dulcan, &

Mericle, 2002; Ulzen & Hamilton, 1998). While psychopathology is also common among incarcerated boys and men (e.g., Drapalski et al., 2009; James & Glaze, 2006; Teplin et al., 2002), previous work highlighting gender differences in mental health has found higher rates of mental health problems among females compared to males (Cauffman, 2004; James & Glaze, 2006; Timmons-Mitchell et al., 1997).

A third stream of empirical literature that has supported the feminist pathways paradigm is typology-building research that has classified female offenders into meaningful groups based upon shared characteristics. Notably, these studies have each utilized various statistical techniques to formulate typologies of female offenders (e.g., cluster analysis, path analysis, multidimensional scaling); as such, there is some variability in the number of subtypes identified by each study. However, despite methodological variation, gendered subtypes of offenders have emerged within each study (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson, Yahner, & Dugan, 2008). Given the importance of this work for the present study, a more detailed summary of typological research is carried out below.

Mainstream correctional research has also found support for several of the tenets of the feminist pathways perspective, despite not setting out to explicitly examine its merits. Specifically, a number of studies using offender samples have established a) the relationship between abuse and subsequent delinquency with prospectively collected longitudinal data (e.g., Lemmon, 1999; Widom & Maxfield, 2001); b) the correlational relationship between early trauma/victimization and substance use and internalizing mental disorders (e.g., Grella, Stein, & Greenwell, 2005); and 3) the co-morbidity of

these risk factors in samples of adult offenders and delinquent youth using cross-sectional data (King et al., 2011; Marquart, Brewer, Simon, & Morse, 2001).

Using Theory to Inform Effective Interventions

Effective intervention is a critical component of any strategy aiming to reduce rates of re-offending. Traditionally, correctional treatment programs have been assigned to offenders on the basis of individual risk factors that have been identified through a structured assessment tool. Although this linear approach is a useful way to determine one's overall risk to re-offend, "accumulating risk factors and either counting or scoring them does little to increase the understanding of the etiologic processes or how interventions might be optimally timed, constructed or delivered" (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001, p. 848). An understanding of how risk factors work together to influence adolescent delinquent behaviour can not only help identify individuals most in need of preventative interventions, but it can also help form the foundation for developing these interventions. Additionally, confirming that changes in one variable results in changes in another would provide support for targeting those factors in treatment.

Typology-building research. Typological research is one analytical tool that has been used to understand how risk factors cluster together. Although a number of useful offender typologies have been developed over the last 20 years, the role that gender plays in discriminating types of youthful offenders has not yet fully been explored. While some quantitative typological work has begun to study female offenders (e.g., Brennan et al., 2012; Jones et al., 2014; Marquart et al., 2001; Simpson et al., 2008), few studies have

examined combined samples of males and females to discern if there are truly gender differences in how risk/need factors cluster together.

Further complicating matters is that correctional treatment programs stemming from traditional theories of crime (e.g., PIC-R]; Andrews & Bonta, 2010) tend to focus on "gender-neutral" risk/need factors. Although these risk/need factors have received considerable empirical support, the feminist pathways perspective argues that females have unique constellations of treatment targets, some of which have not garnered as much empirical attention (e.g., trauma/victimization, mental health), that are equally important to consider.

In practice, the consideration of gender-informed needs is essential as there is evidence that among women, gender-informed programs are more effective than traditional treatment programs at reducing rates of re-offending (Gobeil, Blanchette, & Stewart, 2015). Further, the need for a reliable gender-informed typology of adolescent offenders is vital as there is mounting evidence that different types of female offenders do exist (e.g., Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008), that gender-neutral risk assessment tools may work differentially for these various subtypes of offenders (Reisig, Holtfreter, & Morash, 2006), and that gender-responsive programming may only be effective for certain types of offenders who present gendered risk/need factors (i.e., trauma & mental health; Day, Zahn, & Tichavsky, 2014).

Typologies of offenders. Arguably one of the most cited typologies of adolescent offending is Moffitt's (1993) developmental theory of crime. In short, Moffitt suggests that there are two types of offenders: 1) life-course-persistent (LCP) offenders who begin

exhibiting antisocial behaviour in childhood and continually worsen in adulthood; and 2) adolescent limited offenders (ALO), who typically do not begin exhibiting antisocial behaviour until adolescence, engage in minor forms of delinquency in adolescence, but then desist upon entering early adulthood. Although this theory and the types of offenders discussed within it has received a significant amount of empirical support, more recent research suggests that a dual taxonomy may be an oversimplification of offending etiology (for a review see Piquero, 2008). Further, creating a typology on the basis of a common offending pattern arguably overlooks individual variations within each trajectory.

Feminist pathways researchers argue that females' pathways to crime are differentiated from males on the basis of subtle, contextual differences. As such, trajectory-based typologies may not suitably represent these nuances. In contrast, developing subtypes of offenders based upon the constellation of risk factors they present can help to understand how various risk/need factors cluster together, irrespective of their direct relationship with risk, or their anticipated offending pattern.

A number of studies that have examined types of offenders based upon their risk/need profiles (Brennan et al., 2008; Dembo & Schmeidler, 2003; Onifade, Nyandoro, Davidson, & Campbell, 2010; Simourd, Hoge, Andrews, & Leschied, 1994). Using cluster analysis, Simourd and colleagues (1994) examined the risk/need profiles of 256 male youthful offenders using the Level of Service Inventory (YLS-I; Andrews, Robinson, & Hoge, 1984) and found five subtypes of offenders classified on the basis of 10 domains reflective of the *Central Eight* (Andrews & Bonta, 2010) including: a) *a low risk type* (45%), who scored low across all domains; b) a *generalized high risk/need*

group (31%), who scored high on family, attitudes, and criminal history domains, and moderate on the parent, companions, personality and leisure domains; c) a *difficulties in the community type* (10%), who scored high on personality problems, delinquent peers, inappropriate use of leisure time, and problems at school; d) a *family and personal distress type* (7%), who had high scores on family finances and the personality domain; and e) an *economically disadvantaged type* (5%) who had difficulties in family finances and accommodations (note that approximately 3% of the cases were unclassifiable). Notably, this study was comprised entirely of males; thereby, the extent to which similar profiles would emerge for females could not be discerned.

Addressing this limitation, Onifade and colleagues (2010) used cluster analysis to identify subtypes of delinquent youth based upon their subdomain scores on the Youth Level of Service/Case Management Inventory (Hoge & Andrews, 2002). Using a sample of court-involved male (n = 144) and female (n = 164) youthful offenders, they identified five subtypes of offenders: 1) a *minimal risk* group with no significant risks on any subscale (n = 149; 48% female), 2) an *antiauthority risk* group, with educational and personality deficits (n = 90; 62% female), 3) a *drug involved peer risk* group (n = 30; 55% female), 4) a *court-involved group*, with a significant criminal history and drug involvement (n = 14, 62% female), and a *comprehensive-risk group* who scored high on almost all domains (i.e., educational deficits, inappropriate use of leisure time, antisocial attitudes, poor parental relations, and antisocial personality; n = 25; 48% female). Overall, these results suggest that males and females have relatively equal distributions across various subtypes of offenders. However, the items included were limited to

traditional risk factors (i.e., the *Central Eight)*, and therefore may not be capturing the gender-responsive risk/need factors hypothesized to be unique among female youth.

Typologies of female offenders. As previously mentioned, there is mounting evidence that different types of female offenders do exist (e.g., Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008), that gender-neutral risk assessment tools may work differentially for these various subtypes of offenders (Reisig et al., 2006), and that gender-responsive programming may only be effective for certain types of offenders who exhibit gendered risk/needs (i.e., trauma & mental health; Day et al., 2015). In light of these findings, the gendered nature by which girls and women enter into crime, and the inherent differences in risk/need factors they may possess, are important elements to consider when developing a typology of offenders.

One of the earliest attempts at creating a typology of female offenders was a study carried out by Kathleen Daly (1992). Daly (1992) qualitatively examined the biographies—developed from presentence reports—of 40 women offenders and identified five pathways for women offenders on the basis of their shared characteristics**:** 1) *street women* (*n* = 10) who ran away from home to escape an abusive environment, abused drugs and alcohol as a means to cope, dropped out of school and lost interest in legitimate employment, and lived off the avails of prostitution; 2) *harmed and harming women* (*n* = 15) who suffered abuse/neglect as children resulting in emotional and psychological damage, were labeled trouble as youth and had chaotic home lives, which led to drug/alcohol abuse as a result of poor coping skills; 3) *drug-connected women* (*n* = 6) who had a limited criminal history, but both experimented with and sold drugs with

family members or a male partner; 4) *battered-women* (*n* = 5) who were physically abused by their partner and whose criminal involvement was directly related to their relationships; and 5) *other/economically motivated women* (*n* = 4) whose primary motivation for crime was the desire for a secure and comfortable lifestyle. Overall, Daly's (1992) research suggests that there are a number of common themes in women offenders' lives that permeate multiple pathways including victimization, substance abuse, mental health difficulties, economic marginalization, and involvement with antisocial significant others.

Interestingly, in a study that is not cited nearly as frequently as this early work, Daly (1994) tested these pathways using a sample of males (*N* = 40) from the same court matched on age, ethnicity and offence type. Overall, she found some overlap among classifications between males and females, particularly in the *harmed and harming men* (*n* = 5), *drug-connected men* (*n* = 2), and *street men* (*n* = 16). However, an additional pathway accounted for the remaining males in her sample (*n* = 14), which was entitled the *costs and excesses of masculinity*. This pathway represented a group of men whose crimes were the result of explosive violence in an attempt to control or dominate others, being at the wrong place at the wrong time, and committing crimes as a means to increase one's social status. When the distributions for each path were examined in tandem it was found that more males fit into the street category than women (40% vs. 25%) and that more women than men were classified as harmed and harming (20% vs. 37.5%) and drug-connected (5% vs. 12.5%). Only 35% of the men fell into the uniquely male pathway—namely, the costs and excesses of masculinity pathway.

Overall Daly's work (1992, 1994) is important because it highlights the multiple pathways to crime that women and men take. Further, while there is some overlap in pathways for males and females, there are also some clear differences. Importantly, this early typological work was based upon the life histories of adult offenders. As such, these types of offenders cannot necessarily be generalized to adolescent offenders.

Notably, a considerable body of qualitative work contextualizing the paths women take into crime has since followed Daly's (1992) work (Arnold, 1990; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Dehart, 2008; Gilfus, 1992; Richie, 1996). Additionally, more recent studies have utilized various quantitative statistical techniques to formulate typologies of female offenders (e.g., cluster analysis, path analysis, multidimensional scaling), and despite methodological variation, gendered subtypes of offenders have emerged within each study (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al. 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008).

However, a large proportion of this evidence has stemmed from studies on *adult* female offenders (vs. girls). For example, Simpson and colleagues (2008) interviewed high-risk incarcerated women offenders ($N = 351$) and collected life-event calendar data for the three years prior to incarceration. The research team found substantial overlap with Daly's (1992) harmed and harming women, drug connected women, and battered women, thereby providing support for gendered pathways into crime.

Echoing these findings in a survey of 500 women newly admitted to prison, Marquart and colleagues (2001) identified a subset of women "who had used mental health services that came from a chaotic family situation characterized by poor parental

relationships, and usually some form of abuse (i.e., physical, mental, and sexual) that often culminated in the woman running away as a means of escape" (p. 320).

In another study that built upon Daly's qualitative work, Salisbury and Van Voorhis (2009) conducted a quantitative test of women's pathways to crime in a sample of 313 women probationers. Using path analysis, three gendered pathways were delineated, including: 1) *a childhood victimization model*, which explains how early victimization, mental health and substance abuse culminates, resulting in criminal behaviour; 2) *a relational model*, which reflects how dysfunctional intimate relationships led to reductions in self-efficacy, an increase in substance use and mental health difficulties (i.e., anxiety/depression), and subsequently offending; and 3) *a social and human capital model*, which revealed an interaction of social (i.e., relationship dysfunction, poor family support) and human capital deficits (i.e., employment/financial and educational difficulties), and low self-efficacy which led to continued criminal behaviour.

Overall, the results of Salisbury and Van Voorhis' (2009) study are consistent with previous pathways research (Daly, 1992), and therefore, is a welcome addition to a body of work that has historically been supported with qualitative research. However, the inclusion of a male comparison group would facilitate a better understanding of pathways to crime that are truly gendered.

More recently, Brennan and colleagues (2012) used a quantitative taxonomic method to evaluate women's pathways into crime using a sample of 718 serious and chronic women offenders (Mean age = 36.75). Importantly, this study included not only gender-responsive variables, but also the full spectrum of gender-neutral variables.

Overall, using K-Means cluster analysis[2], the researchers found eight distinct groups of offenders which were further classified into in four broader groups: 1) two *normal functioning, drug-dependent* groups who were characterized predominantly by their excessive drug use; 2) two *victimized/battered women* groups, who had criminal and abusive partners, and a lifelong history of both child and adult victimization (physical and sexual); 3) two *socialized-subcultural pathways*, characterized by serious marginalization exacerbated by educational and employment deficits, criminal peers and living in a high-crime neighbourhood; and lastly, 4) two a*ggressive-antisocial pathways*, who represented groups of women with histories of abuse (physical and sexual), mental health needs, hostile criminal personalities, and a host of other risk/need factors. Notably, of the eight pathways identified, six contained factors considered to be gender-responsive, thereby highlighting the importance of including these variables in taxonomic studies of female offenders. Additionally, several pathways included a number of gender-neutral factors (e.g., antisocial personality, housing and financial problems) suggesting that these factors are equally important in understanding variation in females pathways to crime.

Brushett (2013) carried out a latent class analysis of women offenders ($N = 400$) using a large number of explanatory variables, including a combination of gender-responsive and gender-neutral risk factors. Overall, her results suggest that women offenders can be classified into three groups. The first class was comprised of women who were low risk, and had few gender-neutral or gender-responsive risk factors. Class two and class three had a combination of gender-responsive and gender-neutral risk

[2] K-means cluster analysis is an iterative partition-based method that seeks to find a user-specified number of clusters (K), represented by their centroids (i.e., the mean of all points in the cluster); Jain, 2010)

factors; women in both classes scored high on at least half of the Central Eight criminogenic risk factors in addition to a number of gender-responsive risk factors. There were, however, also a number of differences between these two classes. Specifically, one class evidenced more problems in the domains of mental health, antisocial attitudes, and educational needs, whereas the other had significantly more issues with substance use and intimate partner relationship dysfunction. Overall, the classes found in this study were in line with many of those found in previous taxonomic work with women. Most importantly, however, this study exemplifies the importance of incorporating multiple theoretical perspectives when delineating types of women offenders.

Overall, these five aforementioned studies demonstrated that there is substantial heterogeneity among women offenders. However, none of these studies incorporated a male comparison group, thereby limiting any conclusions regarding whether or not any of the risk/need factors were truly unique to women and girls. Additionally, qualitative and quantitative taxonomic research to date has been based primarily on samples of women (vs. girls). Notably, there are three recent exceptions (Brennan et al., 2008; Brennan, 2008; Jones et al., 2014).

Brennan's (2008) study examined typologies among female juvenile offenders (*N* = 1175, mean age = 15.5 years) from three state juvenile justice facilities. Using data obtained from the Youth Correctional Officer Management Profiling for Alternate Sanction (COMPAS) risk and needs assessment, a measure that includes key factors from traditional theories (e.g., criminal associates, impulsivity) and feminist-pathways informed variables (e.g., physical/sexual abuse, SES), a K-Means clustering technique revealed seven types of female delinquents (see Table 1).

Table 1

Brennan's (2008) Female Delinquent Typology

	n (%)	Characteristics
1	156 (13.3)	Low delinquency, socially withdrawn, hostile, internalizing, low self-control
2	107 (9.1)	Serious delinquency, low self-control, delinquent peers, drug use, promiscuity, and parental abuse.
3	201 (17.0)	Lower delinquency, internalizing (social withdrawal/anxiety) but has positive family life, good self-control, and good social controls.
4	230 (19.6)	Low delinquency, low needs ("normal youth").
5	153 (13.0)	Socially marginalized, sexual abuse and victimization, hostile, internalizing pattern of social withdrawal and anxiety.
6	173 (14.7)	Serious family abuse (neglect/physical/ sexual abuse), but otherwise resilient.
7	155 (13.2)	Impulsive, hedonists, high drug use, serious promiscuity.

Of particular relevance to the present study, clusters 2, 5 and 6 identified groups of girls who had been abused; this lends support to feminist pathways scholars that emphasize early victimization as a catalyst for female delinquency (e.g., Chesney-Lind & Sheldon, 1998; Daly, 1992; Dehart, 2008; Gilfus, 1992). Overall, this study was theoretically strong, had a large sample, and incorporated a large number of explanatory variables. However, the absence of a male comparison group limits the ability to draw any conclusions regarding the gender-specificity of these delinquent subtypes.

Addressing this limitation, Brennan and colleagues (2008) applied a multiple cluster analysis technique to examine the taxonomic structure of a sample of 1572 delinquents (72% male) on the basis of a number of risk/need factors. The majority of the

risk factors incorporated were similar to those outlined within the PIC-R theory of criminal behaviour (i.e., attitudes, personality, school, leisure, peer relations, family, etc.); however, although not explicitly stated, several gender-responsive variables were also included (e.g., sexual abuse, physical abuse, and SES). Overall, they found evidence for seven clusters of offenders including: 1) two clusters of *Internalizing Youth* who express hostility towards others, are socially isolated and one of which suffered abuse or neglect, 2) two clusters of *Low-Control Youth*, who were primarily characterized by impulsivity, low empathy, and aggression, 3) two clusters of *Normative Delinquents* who came from stable family backgrounds, but engaged in crime as a result of either a risky lifestyle or by accident, and a cluster representing *Subculturalized or Socialized Delinquents*, who had inadequate socialization within their family upbringing (see Brennan et al. [2008], for a full list of defining variables).

Interestingly, there is substantial overlap among subtypes of offenders identified by Brennan and previous taxonomic research. For example, the two *Normative Delinquent* clusters are very similar to Moffitt's (1993) adolescent limited offender. Further, one of the *Low Control* clusters (i.e., Low Control B: Early Onset, Versatile Offenders with Multiple Risk Factors) is in line with what Moffitt (1993) proposes is a life-course persistent offender. Lastly, and of particular importance to this study, one of the *Internalizing Youth* clusters (i.e., Internalizing Youth A- Withdrawn, Abused & Rejected) maps on to what feminist pathways researchers argue is unique to girls and women, namely a history of abuse, low SES, and family dysfunction. Overall, this study found evidence for what might be considered a gendered pathway to crime. However, one of the primary limitations of this study was that while a sizable amount of females

were incorporated into the sample (*n* = 440), there were few distinctions made as to how males and females were differentially classified, or, for that matter, how many of the unclassifiable/hybrid cases were in fact females.

A more recent study has addressed this limitation. Specifically, Jones and colleagues (2014) utilized a novel quantitative approach—namely, multi-dimensional scaling (a cluster-type analysis)—to delineate types of offenders on the basis of both gender-neutral and gender-responsive risk/need factors in a sample of male (*n* = 1175) and female (*n* = 663) youthful offenders serving a term of probation in New York State. Overall, the authors found evidence for a gendered pathways theme that emerged exclusively for the subset of female offenders. Specifically, there was a subset of female offenders who had suffered abuse, were economically marginalized, had mental health issues, and were largely responsible for minor forms of delinquency. However, a theme reflecting a more traditional antisocial pathway depicted in the mainstream correctional literature was also evident. Specifically, this subgroup of offenders presented a number of traditional risk factors (e.g., criminal attitudes, antisocial peers) and committed more serious offences (e.g., assault). Interestingly, there were also a large percentage of males who fell into a mixed pathway, comprised of a combination of gender-informed and gender-neutral factors suggesting that gender differences in subtypes of offenders may not be so clear cut. It should be noted that one limitation of this study was that males and females were examined separately. Therefore, the authors were unable to attest to whether the gendered pathway theme was comprised exclusively of females, or whether some males may have been classified as such, if analyzed in a combined sample.

Despite this limitation, Jones and colleagues' (2014) results do suggest that there may be a unique amalgamation of gendered risk factors among certain groups of female offenders. However, there are likely additional subgroups of offenders that are relevant for both males and females that are characterized by more traditional risk factors. As such, the authors suggest that feminist and mainstream correctional perspectives may in fact complement one another when attempting to delineate subtypes of offenders based upon the risk/need factors they present.

In sum, these studies have each utilized various statistical techniques to formulate typologies of female offenders (e.g., qualitative methods, cluster analysis, path analysis, multidimensional scaling); as such, there is some variability in the number of subtypes identified by each study. Importantly, despite this methodological variation, gendered subtypes of offenders have emerged within each study (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al. 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008). However, a common limitation is that the types of offenders were generated using cross-sectional data, at a single time point. Therefore, it is unclear how stable these profiles are over time.

Dynamic risk/need typologies. Megargee (1977) suggests that in order to better inform treatment, a typology should be dynamic. Specifically, a typology needs to take into account the changes in an individual over time as a result of correctional treatment or simply the passage of time, such that this change is reflected in their classification to a particular class (Megargee, 1977). However, to this author's knowledge, only one study has explicitly examined the stability of typologies over time. Specifically, Dembo and colleagues (2008) created a typology of offenders delineated by family, peer, education

and mental health risk factors. Using a sample of 137 youthful offenders (52% male) placed in a diversion program, a latent profile analysis was used to examine typologies that emerged at two time points (baseline and 1 year later). This was followed up by a latent transition analysis to determine if the typology and typological membership was stable over time.

Overall, Dembo et al. (2008) found that youth could be classified into two groups at Time 1: one class scored high on each of the four risk areas under study, including family relationships, peer relationships, mental health experiences, and education, and one class had few problems in any of these risk areas. A second LCA analyzed the same factors at Time 2 (i.e., one year follow-up) and revealed the same two-class solution. Through examination of change between classes at each time point, there were two classes of latent transition: a class that demonstrated change (e.g., changes from few factors at Time 1 to many factors at Time 2 or vice versa) and a class that demonstrated stability (e.g., few factors at Time 1 and Time 2 or vice versa). A number of covariates were examined in relation to the latent class membership at each time point including gender, ethnicity (Hispanic vs. non-Hispanic), age, and race (Anglo-American vs. non-Anglo-American); only age was found to be significant, with younger youth more likely to have more problems at baseline than older youth. Lastly, an ANOVA found that the different classes of offenders could be distinguished based upon their self-reported offending behaviour over the follow-up period with those evidencing many problems at both time points self-reporting the most delinquent behaviour.

Overall, Dembo and colleague's (2008) study was a novel addition to typological research where longitudinal designs are notably absent. Further, although primarily

informed by the developmental psychology literature, unlike most traditional typological research the variables included in their analysis included both traditional risk factors (i.e., peer relationships) and gender-responsive risk factors (i.e., mental health, maltreatment in the context of one's family). However, despite the inclusion of these gender-responsive risk factors, and although gender was examined as a covariate, no further observations were made as to how females differed from males on any of the risk areas under study. Further, given that the sample was comprised of youth participating in a diversion program, the average age of youth at baseline was 14.32 years of age (*SD* = 1.70). Therefore, how well these results would generalize to an older or high-risk sample is unknown. Additionally, only two time points were used to examine stability over time. Arguably, the types of risk factors that cluster together might change as one approaches early adulthood, and therefore further research with multiple time-points is needed.

Identifying dynamic treatment targets. The development of a typology would identify groups of offenders that may require unique treatment programs, and further, could provide evidence as to whether or not there are profiles that emerge exclusively for females. However, equally important to understand is whether gender-responsive needs are indeed promising treatment targets. Quantitative research that has tried to tease apart the causal relationships among gender-responsive variables has used cross-sectional or single-wave data. Subsequently, the causal relationship, or simply the direction of the relationship among feminist informed variables is only speculative. Additionally, a number of pathways-informed variables are treated as static (e.g., a history of trauma), or have been examined with retrospective, cross-sectional data, thereby treating them as static, methodologically speaking. Although applied correctional feminists suggest that

interventions need to target gender-responsive factors (e.g., victimization, dysfunctional relationships, substance abuse, and mental health; Covington & Bloom, 2006), no studies have examined how changes in these variables are related to changes in offending behaviour or how these factors are interrelated across time.

Correctional interventions informed by mainstream correctional perspectives, such as RNR, are designed to target risk factors believed to be a) changeable/treatable, and b) linked to reducing one's risk to reoffend (i.e., criminogenic needs). Historically, studies that have examined dynamic variables relied on one-time evaluations of risk (i.e., single-wave design) to assess the predictive validity of these constructs. However, according to change theorists, a risk factor can only truly be considered as such if a) it is correlated to the outcome of interest, b) it is measured prior to the outcome of interest, c) it is truly dynamic (i.e., changes are to be expected), and d) when change in the risk factor occurs, changes in the outcome of interest are also evident (Kraemer et al., 1997). Importantly, risk factors stemming from RNR arguably meet three of the aforementioned criteria (i.e., a, b & c). However, few studies have examined *changes* in dynamic variables, accomplished either through treatment or simply the passage of time, to subsequent reductions in recidivism (Douglas & Skeem, 2005); this gap in the literature is especially prominent in the adolescent offender literature.

Importantly, multi-wave studies do exist (e.g., Andrews & Wormith, 1984; Hanson & Harris, 1998; Quinsey, Book, & Skilling, 2004; Quinsey, Coleman, Jones, & Altrows, 1997); however, the majority of these have had small samples, thereby limiting generalizability, and have used two-wave designs to account for change. For example, a recent study by Schlager and Pacheco (2011) examined how scores on the LSI-R changed

across time among a sample of adult male parolees (*N* = 179) between their entry into a program (e.g., work release program, residential inpatient program, half-way house, or day reporting centre) and a 6-month follow-up assessment. Notably, this study excluded recidivism data and was therefore only able to attest the ability of the LSI-R to capture change over time, and not whether this change was related to an improved outcome. Nonetheless, using paired t-tests the authors found evidence of statistically significant change between the two assessment periods in both the composite total score and most individual domain scores, with the exception of the alcohol/drug and emotional/personal subscales. Surprisingly, the criminal history domain also demonstrated significant change, despite being a static variable. The authors suggest that this "anomaly is likely attributable to scoring error by individual LSI-R administrators" (p. 550). Arguably, this calls into question the validity of these adjacent results. Notwithstanding this methodological shortcoming, this study demonstrated that criminogenic needs, as identified by the LSI-R and targeted within case management plans, positively change over time.

Research on sex offenders has also demonstrated that positive changes in dynamic risk factors are associated with reductions in recidivism. Specifically, studies that have examined the Violence Risk Scale- Sexual Offender version (VRS-SO; Olver, Wong, Nicholaichuk, & Gordon, 2007)—a tool designed to assess change through treatment targets linked to sexual re-offending, treatment readiness, and the offenders' ability to cope during and after treatment- have shown an association between positive progress in treatment and reductions in recidivism (Beggs & Grace, 2011; Olver & Wong, 2011).

Notably, these studies only utilized two assessments to assess change, one pre- and one post-intervention.

Although the aforementioned studies have been useful in demonstrating that dynamic variables are indeed changeable, and that positive change in dynamic variables can be linked to reductions in recidivism, these studies used dual-point designs. It has been suggested that research designs should incorporate at least three waves to increase the probability of detecting change (Brown, St. Amand, & Zamble, 2009), and to avoid some of the common methodological shortcomings of using change scores within a dual point design (e.g., regression towards the mean, reliability of the change score, increased estimates of variance; McArdle, 2001). Notably, in the last several years, dynamic re-assessment studies with more than two time-points and larger samples have been carried out (Brown et al., 2009; Howard & Dixon, 2013; Jones, Brown, & Zamble, 2010).

Brown et al. (2009) examined the extent to which dynamic risk factors, measured on three separate occasions, could add to models comprised of only static factors in the prediction of recidivism. Using a sample of adult male offenders from Canada ($N = 136$), five static measures and 18 dynamic measures measured on three separate occasions (pre-release, 1 month post-release, and 3 month post-release) were used. Overall, Cox regression with time-dependent covariates and receiver operating characteristic (ROC) analysis found that the re-assessment of dynamic risk factors significantly added to models of static risk ($AUC = .89$ vs. $AUC = .81$, $p < .01$).

Jones and colleagues (2010) carried out a follow-up study by extending their follow-up to 6.5 years, adding another wave of data (6 months post release), and compared more naturalistic ratings made by parole officers to those made by graduate

researchers in their earlier study (see Brown et al., 2009). Again, using Cox regression with time-dependent covariates and ROC analysis, Jones et al. found comparable results to the first study with combined static and dynamic models having the strongest predictive validity for both researcher (AUC = .86) and parole officer assessments (AUC= .83).

More recently, Howard and Dixon (2013) conducted a study using a large multi-wave offender dataset in the United Kingdom (*N* = 196,493) to compare the predictive validity of a violence risk assessment instrument when measured repeatedly over time compared to a one-time assessment of risk. This study used data obtained from the Offender Assessment system (OASys)—a structured clinical risk-needs assessment tool- and an actuarial assessment tool designed to predict violent offending embedded within this larger assessment (i.e., OASys Violence predictor; OVS). The seven dynamic variables incorporated within the OVS included: accommodation, failure to recognize the impact of offending, employability, alcohol use, current psychiatric treatment, temper control, and antisocial attitudes. Using cox-regression with time-dependent covariates, the results showed that both the initial score on the OVS, and changes in dynamic risk factors within the OVS, significantly predicted recidivism better than a model of static risk factors, or a one-time assessment of dynamic risk factors. Notably, this study was also limited to a sample of males.

Addressing this limitation, Greiner, Law, and Brown (2014) examined the extent to which dynamic factors change over time (across 4 waves of data collected 6 months apart) and whether the re-assessment of dynamic risk factors improves predictive accuracy. Using a sample of 497 women offenders released into the community, they

found that 6 of the 7 dynamic risk factors examined (i.e., employment, marital/family, community functioning, personal/emotional, criminal associates, and criminal attitudes)—representative of 6 of the Central 8—decreased among offenders who did not re-offend. Additionally, results suggested that proximal assessments of dynamic risk were better predictors of recidivism than more distal assessments of risk. In sum, this study lends support to the utility of the repeated assessment of dynamic risk factors. However, this study was limited in that it failed to incorporate a male comparison group and was restricted to variables stemming from a traditional correctional perspective.

Taken together, these studies have provided evidence that certain dynamic risk factors are indeed changeable (e.g., Schlager & Pacheco, 2011) and that the addition of time-dependent dynamic variables to static models can improve recidivism prediction (e.g., Brown et al., 2009; Greiner et al., 2014; Howard & Dixon, 2013). However, with the exception of one study (i.e., Greiner et al., 2014) research on dynamic change has thus far been limited to studies comprised predominantly or entirely of male offenders, and, with the exception of Howard and Dixon's study, most studies have had relatively small samples. Furthermore, the variables incorporated have been limited to traditional risk factors (e.g., *Central Eight*). Notably, feminist pathways researchers have yet to utilize longitudinal data to demonstrate causality, or more simply, demonstrate the direction of influence among these variables. However, given that this group of researchers has delineated a number of unique causal pathways to crime for women and girls, it seems that the logical next step is to demonstrate, with quantitative re-assessment data, that these causal relationships truly exist.

Summary and Purpose of Present Studies

In sum, despite the wealth of empirical support the feminist pathways perspective has garnered over the last 20 years, there are several limitations underscored throughout the previous section that warrant further attention. Foremost, although developmental and life course perspectives of crime emphasize that age matters and that early onset offenders have distinct risk factors relative to those who start offending later in life (e.g., Sampson & Laub, 2003; Moffitt, 1993), most studies to examine feminist pathways variables have used adult samples (i.e., women); as a result, the age-graded nature of typological membership within this body of literature is largely underdeveloped. Second, quantitative research that has tried to tease apart the causal relationships among these variables has often used cross-sectional or single-wave data. Consequently, the casual relationship among feminist informed variables is only speculative. Third, pathways-informed variables are generally treated as static (e.g., a history of trauma). Although applied correctional feminists suggest that interventions need to target gender-responsive risk factors (e.g., victimization, dysfunctional relationships, substance abuse, and mental health; Covington & Bloom, 2006), no studies have examined how changes in these variables are related to changes in offending behaviour or how these factors are interrelated across time. Lastly, although more recent evidence suggests that gender-responsive models can be complemented by the integration of traditional criminological components (e.g., Brennan et al., 2012; Jones et al., 2014), historically, the scope of much of the feminist pathways research has been limited to the factors that inform their own theoretical stance (e.g., trauma, relational dysfunction, substance abuse etc.).

Indeed, one such model, namely the PIC-R model of criminal behaviour has identified a number of risk factors argued to be gender-invariant (i.e., the *Central Eight*; Andrews & Bonta, 2010) and therefore may complement elements of the feminist pathways paradigm. However, this body of work is not without its own set of limitations.

Typological research conducted by mainstream correctional psychologists and developmental criminologists has generally been carried out with the intent of delineating subgroups of offenders on a continuum of risk. While some typologies have been developed to highlight qualitative differences among various groups of offenders parallel to those conducted by feminist pathways researchers, these typologies are limited in that the samples are comprised predominantly of adult men (vs. girls or women). Notably, there has been more research done with adolescent samples stemming from this traditional perspective, relative to the feminist pathways perspective. However, while there are some exceptions (e.g., Brennan et al., 2008), these studies have failed to incorporate gender-responsive variables that may highlight important qualitative differences among females and males (e.g., Simourd et al., 1994; Onifade et al., 2010).

Additionally, although this perspective argues that pathways into crime can only be examined with longitudinal, multi-wave data so that one can understand the temporal and causal nature of various risk factors, few studies have utilized more than a dual-point design to tease apart the direction of influence among these variables. While this body of work (i.e., dynamic re-assessment studies) has grown over the last decade, the majority of this research has been interested in the utility of adding dynamic variables to static models to enhance risk assessment. While valuable, these studies are less interested in understanding the temporal order of various risk factors, as the proposed study intends to

do. Further, the research thus far has been limited to adult male samples; the study of dynamic risk is virtually absent within the literature on adolescent delinquency. Lastly, dynamic change studies stemming from the mainstream correctional perspective have been primarily informed by traditional risk factors; gender-responsive variables that may add incrementally to our understanding of offender change have largely been ignored.

The purpose of this dissertation is to address many of the aforementioned limitations. Specifically, unlike previous typological work that has developed a typology of offenders within a theoretical silo (e.g., Simourd et al. 1994, Onifade et al., 2010), Study 1A takes the lead of others (e.g., Brennan et al., 2008; Brennan et al., 2012; Jones et al., 2014) and constructs a theoretically integrated typology of youthful offenders, using latent profile analysis, by merging tenets from both the mainstream correctional and feminist perspectives. Additionally, unlike previous studies that have limited their samples to solely females or males, this study incorporates both males and females, analyzed in combination (vs. separately) to be able to speak not only to gender differences in class assignment, but also to gender similarities. Study 1B tests the stability of the emergent profiles over time (using multi-wave data) to speak to the whether a) similar treatment profiles emerge over time, and b) treatment profiles become more complex, or simpler over time (i.e., are there more or less *types* over time). Lastly, to inform gender-informed correctional treatment initiatives, Study 2 examines whether there was a causal relationship between victimization and offending using multi-wave structural equation modelling (i.e., latent difference score mediation modelling), whether changes in internalizing mental health deficits or substance abuse are able to explain this relationship, and further, whether gender moderates this mediated relationship, should

one exist. Results of this study will provide preliminary evidence as to whether or not these factors are viable treatment targets in adolescent offender populations.

CHAPTER 2

Study 1: Building a Gender-Informed Typology to Improve Service Delivery for Adolescent Offenders Using Cross-Sectional and Multi-Wave Data

Study Rationale

Effective intervention is a critical component of any strategy to reduce rates of re-offending. Traditionally, correctional treatment programs have been assigned to offenders on the basis of individual risk factors that have been identified through a structured assessment tool. Although this linear approach is a useful way to determine one's overall risk to re-offend, "accumulating risk factors and either counting or scoring them does little to increase the understanding of the etiologic processes or how interventions might be optimally timed, constructed or delivered" (Kraemer et al., 2001, p. 848). An understanding of how risk/need factors work together to influence adolescent delinquent behaviour can not only help identify individuals most in need of preventative interventions, but it can also help form the foundation for developing these interventions.

Typological research is one analytical tool that has been used to understand how risk factors cluster together. Although a number of useful offender typologies have been developed over the last 20 years, the role that gender plays in discriminating types of youthful offenders has not yet fully been explored. While some quantitative typological work has begun to study female offenders (e.g., Brennan et al., 2012; Brushett, 2013; Jones et al., 2014; Marquart et al., 2001; Simpson et al., 2008), few studies have examined combined samples of males and females to discern if there are truly gendered differences in how risk/need factors cluster together.

Further complicating matters is that correctional treatment programs stemming from traditional theories of crime (e.g., Personal Interpersonal Community-Reinforcement [PIC-R]; Andrews & Bonta, 2010) tend to focus on "gender-neutral" risk/need factors—factors assumed to be equally important for both males and females. Although these risk/need factors have received considerable empirical support, the feminist pathways perspective argues that females have unique constellations of treatment targets, some of which have not garnered as much empirical attention (e.g., trauma/victimization, mental health), that are equally important to consider.

The importance of including gender-responsive factors in typological work—that will ultimately inform treatment delivery—is exemplified by research that has documented the high rates of victimization, substance use, and mental health issues among girls and women in conflict with the law (e.g., Belknap, 2001; Belknap & Holsinger, 2006; Covington, 2001; McClellan, Farabee, & Crouch, 1997; Wasserman, McReynolds, & Schwalbe, 2010). The feminist pathways perspective contends that the confluence of these factors is unique to females (i.e., the pathways males take to crime are inherently different from females), and therefore there is a need for gender-specific treatment regimens for girls and women. Indeed, there is a substantial amount of research that has supported the comorbidity of these factors, particularly among female offenders (Cauffman et al., 1998; Huskey & Tomczak, 2013; Marquet et al., 2001; Ruiz, Douglas, Edens, Nikolova, & Lilienfeld, 2012; Salisbury & Van Voorhis, 2009; Turner, Finkelhor, & Ormrod, 2006).

Importantly, there is evidence that male juvenile offenders with a history of trauma also display both internalizing (i.e., anxiety, depression) and externalizing

behaviours (i.e., aggression, attention deficit hyperactivity) (King et al., 2011; Steiner, Garcia, & Matthews, 1997). Therefore, it is important that research be carried out with combined samples of males and females to determine if there are truly gender differences in the comorbidity of the aforementioned factors, and subsequently, whether treatment programs developed to address this confluence of factors may be equally beneficial for males and females who display these factors.

Irrespective of one's theoretical orientation, typologies aimed at examining qualitative differences among offenders (vs. placing them on a continuum of risk) often do so with cross-sectional data. However, understanding how treatment needs cluster together, and whether the way in which they cluster together changes over time, is important to understand, particularly among adolescent offenders given that the influence of certain criminogenic risk factors decreases with age (van der Put et al., 2012). Indeed, as adolescence is a time of development flux, it is likely that a typology of youthful offenders will change over time.

Research Questions and Hypotheses

The research questions guiding this study and the hypotheses stemming from them are as follows:

Study 1A. Can meaningful types or classes of offenders be delineated adopting a gender-informed approach (i.e., incorporating gender-responsive and gender-neutral risk factors) and will feminist-informed subtypes emerge comprised predominantly of females? In line with previous studies examining the taxonomic structure of adolescent delinquents (e.g., Brennan et al., 2008; Dembo & Schmeidler, 2003; Onifade et al., 2010), and those carried out with women and girls (e.g., Brennan 2008; Brennan et al.,

2012; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008) it was expected that several distinct groups of offenders would emerge. Importantly, the number of subtypes that surface is largely related to the chosen analysis and the number of variables included in the analysis; as the present study has incorporated 10 variables, it was hypothesized that four types of offenders would emerge on the basis of previous taxonomic research: 1) an *overall low-need class*; 2) a *victimized/internalizing class* with evidence of victimization, deficits in mental health, and serious substance abuse; 3) a *normal functioning/drug dependent class* who have significant substance use problems, but few other risk factors, and 4) *a traditional antisocial class* that possess the *Big Four* risk factors (i.e., criminal history/dynamic criminal involvement, antisocial peers, criminal attitudes, antisocial personality; Andrews & Bonta, 2010).

Based on previous qualitative and quantitative research that has found groups of women and girls characterized by a histories of abuse, trauma, mental health, and substance use (e.g., Brennan et al., 2012; Daly, 1992; Holfreter & Morash, 2003; Jones et al. 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008), it is hypothesized that class/typological membership will differ based on gender. Nonetheless, as prior research that has incorporated male comparison groups has found that male and female classes will not be mutually exclusive (e.g., Daly, 1994; Greiner, Brown, & Skilling, 2011), it is hypothesized that there will be some males who will fall into predominantly female latent classes and some females who fall into predominantly male latent classes.

Study 1B: How stable are these profiles over time (i.e., do the same number and types of offenders emerge at various time-points, using the same sample)? Given that the majority of typological research has used cross-sectional data, whether the same types

of offenders would emerge at each time point was primarily exploratory in nature. However, it was hypothesized that this typology would not be stable over time for two reasons. Foremost, as the sample reaches early adulthood, the diversity in subtypes of offenders will likely widen as a result of having the opportunity for more life experiences. For example, approaching early adulthood, one's development of intimate relationships becomes more common; subsequently, so does one's risk for intimate partner victimization. Second, the importance of certain risk factors are likely to change over time resulting in typological instability (e.g., as one becomes older, the influence of peers changes; Monahan, Steinberg, & Cauffman, 2009).

A note on organization. Only one combined method section is presented for Study 1A and Study 1B given the similarities in measures, participants, and procedures. However, the results are presented separately as follows: Study 1A will present results from the initial typology generated with baseline data and Study 1B will present results for the typologies generated from the follow-up data used to test the stability of class profiles over time. The discussion section will then integrate what was learned from both Study 1A and Study 1B.

Study 1 Methods

This study used archival data provided by the Pathways to Desistance project, a longitudinal study of adolescent offenders[3] designed to examine persistence and desistance from criminal behaviour over time (Mulvey, 2012). A detailed description of the complete study methodology is provided by Schubert and colleagues (2004). It is

[3] Despite being a high-risk sample, approximately 90% of the sample reduced their offending over the study period, and only 10% continued to offend at a high level (Monahan, Steinberg, Cauffman, & Mulvey, 2009).

important to note that for Study 1A, only baseline data was utilized (i.e., data from the initial interviews carried out with youth at the start of the study). However, to examine the stability of latent profiles over time (Study 1B), three waves of data were selected on the basis of: a) the availability of each measure, and b) the ability to compare profiles generated within each wave (as youth were interviewed every 6 months in the first 3 years and annually thereafter). On the basis of these criteria, the 12-month (T-12), 24-month (T-24), and 36-month follow-up (T-36) were selected. Any difference in the way each construct was measured across the various time points is described in the measures section, when applicable.

Participants

Data for the present study was from baseline interviews (for Study 1A) carried out between 2000 and 2003 with 1,354 adjudicated adolescent offenders (184 female, 1170 male) recruited from Philadelphia and Phoenix to partake in a prospective, longitudinal study of adolescent offending. For Study 1B, data were utilized from the 12, 24 and 36-month follow-up interviews (i.e., T-12, T-24, T-36), carried out between 2001 and 2006.[4] Importantly, retention rates for the study were exceptionally high with 91% having remained in the study as of the last time point selected for the present study (T-36).

Youth were recruited for the study if they were between the age of 14 and 17 at the time of their index offence, and were found guilty of serious criminal offences (i.e., primarily felonies, in addition to a few misdemeanour property offences, sexual assaults, or weapons offences). Table 2 presents the mean age of male and female youth for each

[4] As slightly different measures were utilized for Study 1A and 1B, direct comparisons among the resultant classes were not possible; however, differences and similarities between the classes in each study were reviewed in the discussion section.

wave of data selected for the present study. As a whole, the sample was primarily African American (41.4%), followed by Hispanic (33.5%), Caucasian (20.2%), and other ethnicities (4.8%).[5]

Table 2

Study 1 Participant Age by Gender, Across Time-Points

	Males' Age			Females' Age		
	n	*M (SD)*	Range	*n*	*M (SD)*	Range
Baseline	1170	16.05 (1.16)	14-19	184	15.99 (1.03)	14-18
T-12	1087	17.06 (1.17)	15-20	175	17.00 (1.06)	15-19
T-24	1061	18.03 (1.06)	16-21	170	17.96 (1.05)	16-20
T-36	1056	19.01 (1.16)	17-22	176	18.98 (1.04)	17-21

Procedure

Subject data (Mulvey, 2012) and collateral data (Mulvey, 2013) from the Pathways to Desistance project are publicly available for download from the National Addiction & HIV Data Archive Program (NAHDAP). However, access to official records data (Mulvey, 2014) was restricted, and therefore required a formal application. This process included the following steps: 1) the completion of a Data Security Plan detailing where the data was to be stored, how it was to be used, who would have access to the data, what programs were installed to ensure the data remained secure (i.e., Cryptainer; Secure Eraser) and subsequently, how and when the data (and all program

[5] The ethnic composition of the sample did not vary significantly by gender, χ^2 (3, N =1354) = 6.55, p = .09.

related files) would be destroyed; 2) approval from Carleton University's ethics board; 3) signatures from University representatives with Institutional Signing authority, and lastly, 4) approval from the NAHDAP. Once these steps were taken, a link to an encrypted folder was emailed to the author (i.e., the primary researcher). Once this file was open on a non-networked computer, within a folder located on an encrypted hard drive, an email with the password to open it was sent. Subsequently, subject data, collateral data, and official records data were merged together in one data set for analysis.

Variable selection. Variables were selected on the basis of three criteria: 1) alliance with the aforementioned theoretical perspectives; 2) psychometric properties of the assessment (e.g., reliability coefficients); availability of the measures at the chosen waves (for research question #2); and 4) practical application (i.e., likelihood that the construct can be reliably measured and targeted in treatment in the real world). Following this selection criteria, three gender-neutral domains (antisocial personality, criminal peers, and criminal attitudes), two gender-responsive domains (victimization and internalizing mental health deficits), and two domains thought to be salient by both perspectives (i.e., theoretically neutral domains—substance abuse, employment/education) were chosen for this study.

Measures

Antisocial personality. Factor 2 of the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) was utilized as a proxy measure for antisocial personality at baseline; the impulsive/irresponsible subscale of the Youth Psychopathic Traits Inventory (YPI; Andershed, Kerr, Stattin, & Levander, 2002) was utilized for waves T-12, T-24, and T-36 to measure this construct.

As a whole, the PCL:YV is a 20-item rater-based instrument designed to assess the construct of psychopathy in adolescents. Each item is scored on a 3-point gradient: 0 (does not match the description of the item), 1 (partially matches the description), and 2 (matches the description of the item). Factor 2 of the PCL:YV measures the behavioural (e.g., impulsivity) and antisocial (e.g., criminal versatility) traits characteristic of psychopathy. Total scores on this subscale can range from 0 to 20 with higher scores indicative of the presence of more antisocial traits. The psychometric properties of this scale at the total score level have been established with studies finding strong internal consistency (Cronbach's α from 0.79 to 0.83) and excellent inter-rater reliability (ICC= 0.80 to 0.93, Cauffman, Kimonis, Dmitrieva, & Monahan, 2009; Forth & Burke, 1998; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002; Vitacco, Neumann, & Caldwell, 2010). Additionally, a recent meta-analytic study has found the PCL:YV is strongly correlated with general (r_w = .24) and violent recidivism (r_w = .25) among adolescent offenders (Edens, Campbell, & Weir, 2007).

The YPI (Andershed et al., 2002) is a self-report measure that assesses psychopathic traits among youthful offenders. The impulsive/irresponsible subscale is comprised of 15 items (e.g., "I have often been late to work or classes in school") that are scored on a 4-point Likert scale ranging from '*does not apply at all*' to '*applies very well*'. The reliability of this subscale ranged from .83 to .85 for the selected time points (T-12, T-24, and T-36). Previous research has also found good test-retest reliability at the total score level (ICC = .74; Skeem & Cauffman, 2003), good convergent validity with other measures of psychopathic traits (r = .53 to .76; Poythress, Dembo, Wareham, &

Greenbaum, 2006) and significant associations with delinquent behaviour (r = .20 to .44; Poythress et al., 2006) among youthful offenders.

Criminal peers. The Peer Delinquent Behaviour items are a subset of those used by the Rochester Youth Study (Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994) to assess the degree of antisocial activity among the adolescent's peers. There are two dimensions to this scale including *Antisocial Behaviour* (e.g., "During the last six months how many of your friends have sold drugs?") and *Antisocial Influence* (e.g., "During the last six months how many of your friends have suggested that you should sell drugs?"). However, these variables were highly correlated (r = .71). Therefore, for the sake of parsimony, only the *Antisocial Behaviour* subscale was selected for inclusion into the LPA, as this variable had modestly stronger reliability (Cronbach's α = .92 vs. .89). This subscale contains 12 items to which participants respond on a 5-point Likert scale ranging from *none of them* (1) to *all of them* (5). The mean of these items is calculated, and therefore total scores range from 1 to 5.

Although validity data for this scale is lacking, a recent study provided evidence for the predictive validity of this tool. Specifically, Monahan and colleagues (2009) found that the peer delinquency measure was predictive of greater self-reported antisocial behaviour in middle to late adolescence (15-20 years of age). Additionally, this subscale had excellent reliability with the Pathways to Desistance sample across all selected waves (Cronbach's α = .88 to .92)

Antisocial attitudes. The Procedural Justice Inventory was adapted by the Pathways working group to measure an adolescent's perception of fairness and equity that is associated with arrest and court processing (Casper, Tyler, & Fisher, 1988; Srole,

1956; Sampson & Bartusch, 1999; Tyler, 1997). Two subscales from this measure were selected to represent antisocial attitudes including the 'legitimacy subscale' and the 'legal cynicism' subscale. The legitimacy subscale is comprised of 11 items (e.g., 'Overall, the police are honest') to which participants responded on a 4-point scale ranging from *strongly disagree* to *strongly agree*. Scores are averaged, with higher scores indicating more positive perceptions of legitimacy of the legal system and its actors. The *legal cynicism subscale* is comprised of 5 items (e.g., "Laws are meant to be broken") to which participants responded on a 4-point scale from *strongly disagree* to *strongly agree*. Scores are averaged with higher scores indicating more cynicism towards to the justice system. Both the legitimacy subscale (Cronbach's $\alpha = .82$ to .86) and the legal cynicism subscale (Cronbach's $\alpha = .64$ to .72) were found to have moderate reliability estimates according to the Pathways to Desistance working group for all of the selected waves. Although measurement validity for this scale is absent in the literature, a comparable modified version of the Procedural Justice Inventory was found to have good convergent validity with the Court Fairness Scale ($r = .70$, $p < .01$; Penner, 2012).

Education/Employment. For Study 1A, a three-point categorical variable was created utilizing collateral data that represented whether, prior to arrest, the participant was a) not enrolled in school or employed (0), b) was either enrolled in school *or* employed (1), and c) was both in school *and* employed at the time of arrest (2). It was presumed that the importance and likelihood of being in school would likely decrease over time, whereas the importance and likelihood of having a job would arguably increase over time (depending upon whether the youth was in early adolescence or late

adolescence). Therefore, as youth ranged from 14 to 19 in the present study, this variable was created in an effort to measure both employment and educational deficits.

For Study 1B, a dichotomous categorical variable was created utilizing collateral data that represented whether in the past year, the participant was a) not enrolled in school or employed (0), or b) either enrolled in school *or* employed (1). It is important to note that because collateral data was used to create this variable (subject data was only available at baseline for employment) and interviews with collateral informants were only carried out annually for the first three years of the study, this measure captures activities during the past year, while the rest of the measures represent activities in the preceding 6 months.

Substance abuse. The Substance Use/Abuse Inventory (Chassin, Rogosch, & Barrera. 1991; DeLucia, Belz, & Chassin, 2001) was modified by the Pathways working group to measure the adolescent's drug and alcohol use over the last 6 months. For the purpose of this study (including both 1A and 1B), two count variables were utilized: 1) the frequency of alcohol use over the last 6 months (i.e., how often the youth had alcohol to drink in the recall period (range from 1 to 9), and 2) the number of different types of drugs used in the last six months (range 0 to 9). As a whole, this scale has been found to be predictive of both self-report offending, and official number of arrests (Mulvey, Schubert, & Chassin, 2010; Schubert, Mulvey, & Glasheen, 2011).

Victimization. As a proxy measure of victimization, the victim subscale was utilized from a modified version of the Exposure to Violence Inventory (ETV; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998), a tool used to assess frequency of exposure to violent events. The ETV victim subscale is comprised of six items and

documents the types of violence the adolescent had ever experienced (for Study 1A) or had experienced in the recall period (for Study 1B). Notably, this measure included primarily non-gendered types of victimization (e.g., "In the past N months, have you ever been chased where you thought you might be seriously hurt?") in addition to one item more representative of a type of victimization common to women and girls (e.g., “In the past N months, have you been raped, had someone attempt to rape you, or been sexually attacked in some other way?”). Higher scores on this subscale are indicative of having been victim to a greater amount of violence.

Selner-O'Hagan et al. (1998) found the original scale to have good internal consistency (Cronbach’s α = .68 to .93), good test-re-test reliability (ICC = .75 to .94), and good construct validity in a community sample of male and female youth, ages 9 to 24. Notably, the modified version of the victim subscale (comprised of 6 items) also had acceptable internal consistency (α = .51 to .54) at the selected time points.

Internalizing mental health disorders. To measure internalizing mental disorders, the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used. The BSI is a 53-item self-report inventory in which participants rate their concern over a number of symptoms in the past week (0 ="not at all" to 4="extremely"). To maintain theoretical alliance with the feminist pathways perspective, only two subscales were selected for the present study including depression and anxiety.

Both the depression (Cronbach’s α = .81 to .82) and anxiety (Cronbach’s α = .75 to .78) subscales were found to be acceptably reliable among the selected time points. Further, as a whole, the BSI has demonstrated good convergent validity with the Minnesota Multiphasic Personality Inventory (Derogatis, 1992).

Covariates and auxiliary variables. Unlike latent class indicators, which are thought to be endogenous to latent classes (i.e., utilized for class formation), covariates are used to predict class membership and therefore are exogenous to the model (Vermunt & Magidson, 2002). Including covariates in the model can improve parameter coverage and classification accuracy (Lubke & Muthén, 2007). Therefore, for the present study, two continuous covariates were utilized: 1) *age*—to control for any differences that would result simply from one's biological age, and 2) *the proportion of time in a community setting*—to control for differential exposure to various need factors, and subsequently opportunities to engage in antisocial behaviour (for Study 1B only). Both of these variables were anticipated to impact classification to a particular group and therefore were controlled for when building the typology, and examined post-analysis to determine their impact on class formation.

Auxiliary variables are not used in the analysis model, but rather are used to test the equality of means (or in the case of a dichotomous variable, equality of proportions) using posterior probability-based multiple imputations (Muthén & Muthén, 1998-2012). For the present analysis, gender was specified as an auxiliary variable to examine if there are classes that were comprised predominantly of males or females. Additionally, for Study 1B, two criminal history variables were also added as auxiliary variables: 1) self-report criminal behaviour (truncated to range from 0 to 5+) which represented the number of self-reported offences committed in the recall period; and 2) cumulative number of official arrests (range from 1 to 22). Criminal history variables were incorporated so that the treatment profiles could be compared on their overall level of risk over time.

Analyses

In this study, data cleaning was carried out in SPSS (v22), and the primary analysis was conducted in MPlus 7.3 (Muthén & Muthén 1998-2012). Latent profile analysis (LPA; Bartholomew, 1987) was used to examine whether meaningful classes of adolescent offenders could be formed on the basis of the selected risk/need factors.[6] In contrast to variable-centered approaches that look at relationships among a number of observed variables (e.g., factor analysis), LPA is a person-centered approach in that it classifies individuals into meaningful groups based upon similar patterns of individual characteristics (Collins & Lanza, 2010). Specifically, subtypes of offenders are delineated based upon similar patterns of responses (or means or thresholds) on a number of indicators (McCutcheon, 1987). Notably, LPA—also referred to as latent class analysis (LCA) when dichotomous observed variables are used—is similar to factor analysis in that they both seek to understand underlying latent variables that are measured by a number of observable traits. However, factor analysis distinguishes individuals on the basis of how they differ *quantitatively* along a spectrum, whereas LPA delineates latent variables, or classes of offenders, based on the *qualitative* differences between them (Ruscio & Ruscio, 2008).

For the present study, the dependent variables selected were on a variety of different scales and included three count variables, one categorical variable, seven continuous variables, and one continuous covariate. Fortunately, Mplus allows users to

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[6] Arguably, cluster analysis is another method often used to form typologies of offenders; however, LPA identifies the best fitting model through an iterative process, and therefore this method has less subjectivity. Additionally, Magidson and Vermunt (2002) argue that relative to K-Means cluster analysis, latent class cluster models also have more flexibility—for example, scaling (i.e., normalizing variables) is necessary in K-means cluster analysis, but not in latent class cluster models.

specify the scale of the dependent variables, which then "determines how the variables are treated in the model and its estimation" (Muthén & Muthén, 2008-2012, p. 541). For example, a Probit regression model was estimated for the employment/education domain as it was an ordered categorical variable.

Parameter restrictions. All means and variances were allowed to vary among classes. However, the anxiety and depression measures were highly correlated to one another (r = .68), and were anticipated to co-vary across classes given the high comorbidity of mental health problems among offender populations (e.g., Abram, Teplin, McClelland, & Dulcan, 2003; Goldstein et al., 2003; Ulzen & Hamilton, 1998). As such, the covariance between these two variables was held equal across classes, though the means were allowed to vary.

Determining model fit. To determine the relative fit of each model with varying number of classes, several criteria were chosen including Akaike's Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the sample-size adjusted Bayesian Information Criterion (ABIC). In terms of the interpretation of these indicators, lower AIC, BIC, and ABIC values reflect better model fit. Additionally, the Entropy value was examined; this is a measure of classification uncertainty (i.e., how clearly distinguishable the classes are based on how distinctly each individual's estimated class probability is) that can range from 0 to 1. Higher entropy values are indicative of better fit. Lastly, the Lo-Mendell-Rubin Test was used to ascertain whether a K class model is a better fit than a K-1 class model. Importantly, the best fitting model was ultimately determined after a consideration of both statistical conclusions and interpretability of the various classes (i.e., theoretical fit).

Upon identifying the best-fitting model, the equality of means were tested across classes to guide interpretation of the various classes. Specifically, the Wald chi-square statistic was calculated from the posterior probability-based multiple imputations to carry out pairwise mean comparisons (Muthén & Muthén, 1998-2012). Confidence intervals for each parameter estimate are also provided to aid in interpretation of mean differences. Note that when these two measures provided different conclusions (e.g., Wald statistic significant, but overlapping Confidence Intervals), results were interpreted with caution.

Study 1A Results

Data Screening

Data were first screened for missing values, the presence of outliers, normality, and coverage. Missing values ranged from 0.1% to 6.8% for the selected measures. A missing value analysis (MVA) was significant (Little's MCAR test = 184.54, $df = 85$, $p < .001$), suggesting that data was not Missing Completely At Random (MCAR). Individual t-tests of mean differences on the remaining dependent variables revealed that there were mean differences between cases with data missing and present on the anxiety and depression measures on six of the nine remaining dependent variables. However, further investigation of the raw data revealed the missing data was most likely Missing at Random (MAR).[7] As such, maximum likelihood estimation with robust standard errors (MLR; the default in Mplus) was utilized as this is thought to be an acceptable imputation method when data is MAR (Allison, 2003). Additionally, the covariance matrix coverage for the variables incorporated in the LPA (ranging from .89 to .99) was well above what

[7] The final analyses were run both with and without casewise deletion for the Anxiety and Depression measures to ensure the best fitting class solution was the same, and data were truly MAR.

has been recommended as the minimum threshold for good coverage (.10; Muthén & Muthén, 1998-2012).

Upon examination of the distributions of each variable, two of the count variables (drug use and victimization) had a large proportion of participants who scored a zero. As such, a zero-inflated Poisson regression was specified for these variables in the model to account for the excess of zeros.[8] All of the continuous variables had acceptable normal distributions, with the exception of the criminal peer measure and the anxiety and depression subscales; these distributions were positively skewed. However, it was expected that the latent class model underlying the data would be a mix of normal distributions from different types of offenders (i.e., what a mixture modelling seeks to explain). As such, the variables were treated as continuous normal. As a further precaution, MLR estimation was used in the present study, as it is robust to non-normality (Muthén & Muthén, 1998-2012).

The primary assumption of latent variable models is local independence. This assumption presumes that the latent variable explains why the observed items are related to one another, and that all variables within each class are therefore unrelated. Note that while the assumption of local independence is required for latent class models with dichotomous variables, this assumption does not need to hold for mixed models with continuous variables (Magidson & Vermunt, 2004). However, absolute measures of fit (e.g., bivariate residuals) can complement relative measures of model fit (e.g., BIC, AIC,

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[8] With a zero-inflated model, two parameter estimates are provided: 1) a count variable that only takes on values for individuals who are able to assume values of zero and above, and 2) an inflation variable that represents a binary latent variable, where a score of one denotes that an individual is unable to assume any value except zero (Muthén & Muthén, 1998-2012).

etc.). Therefore, although they were given less weight than the relative measures of fit, residuals for the continuous variables and bivariate residuals for the categorical variables were examined for the final model to aid in determining the optimal class solution.

Descriptive Statistics

Descriptive statistics for each variable included in the LPA are presented in Table 3.

Table 3

Sample Descriptive Statistics, Split by Gender

	Males				Females			
Continuous Variables	*N*	*M*	*SD*	Range	*N*	*M*	*SD*	Range
Age (covariate)	1170	16.05	1.16	14 to 19	184	15.99	1.03	14 to 18
Criminal Peers	1134	2.35	0.93	1 to 5	182	2.11	0.86	1 to 4.92
Attitudes- Legitimacy	1169	2.28	0.57	1.00 to 3.82	184	2.39	0.60	1.09 to 4.00
Attitudes- Cynicism	1169	2.06	0.61	1.00 to 4.00	184	1.83	0.57	1.00 to 3.04
Antisocial Personality	1123	8.43	3.88	0 to 20	176	7.63	3.73	0 to 17
Mental Health- Anxiety	1087	.44	.61	0 to 3.83	175	.65	.78	0 to 3.50
Mental Health- Depression	1087	.58	.73	0 to 4	175	.72	.80	0 to 3.33
Count Variables	*N*	*M*	*SD*	*Range*	*N*	*M*	*SD*	*Range*
Alcohol Abuse	1165	2.93	2.47	1 to 9	184	2.69	2.24	1 to 9
Drug Abuse	1166	1.15	1.45	0 to 9	184	1.50	1.85	0 to 9
ETV- Victimization	1167	1.64	1.47	0 to 6	184	1.14	1.31	0 to 5
Categorical Variable	N		*n* (%)		N		*n* (%)	
Employment /Education	1031				169			
Unemployed/Not in School			172 (16.7)				42 (24.9)	
Employed OR in School			694 (67.3)				101 (59.8)	
Employed AND in School			165 (16.0)				26 (15.4)	

Model Selection

A 2, 3, and 4-class model were run sequentially to identify the best fitting model (see Table 4). Overall, consideration of both the fit indices and interpretation of the various classes suggest that a 3-class solution fits the data best.

Table 4

Criteria for Assessing Fit for Different Number of Classes

	2-Class	3-Class	4-Class
AIC	35094.39	34648.25	34344.31
BIC	35268.08	34887.95	34651.74
Sample Size Adjusted BIC	35161.52	34741.82	34464.33
Entropy	.77	.84	.76
Lo-Mendell-Rubin (LMR) Test	1871.62	467.16	326.46
LMR *p*-value	$p < .001$	$p < .01$	$p = .07$

Note. AIC = Akaike's Information Criterion (AIC); BIC = Bayesian Information Criterion (BIC); ABIC = the sample-size adjusted Bayesian Information Criterion.

In addition to using entropy to examine the quality of the latent class membership classification, the posterior class membership probabilities were also examined (see Table 5). The probability of correct classification for the three classes ranged from .91 to .94. According to Nagin (2005), class classification is thought to be acceptable when the probability of class membership assignment is equal to or greater than .70. Using this standard, it can be argued that the quality of the classification was more than acceptable.

Table 5

Average Posterior Class Membership Probabilities

	Latent Class		
Most Likely Class Membership	1	2	3
1	0.94	0.01	0.05
2	0.03	0.93	0.05
3	0.08	0.02	0.91

Upon examination of the estimated means (for continuous variables and count variables) and thresholds (for categorical variables that were converted into probabilities for ease of interpretation) [9] for the various classes (see Table 6), a *minimal-needs* class (*n* = 748), a *complex-comprehensive-needs* class (*n* = 82), and a *comprehensive-needs* class (*n* =524) were identified and labelled.

[9] Mplus allows users to specify the scale of the dependent variables, which subsequently determines how the variables are treated in the model and its estimation. As a result, the parameter estimates produced for the final model are in various formats (i.e., log odds ratios, odds, means, and probabilities), depending on the type of regression model estimated (Poisson and zero-inflated Poisson regression, standard linear regression, and Probit regression). Results were converted to means and probabilities wherever possible to aid in interpretation.

Table 6

Model Parameters for Resultant 3-Class Model

	Minimal-Needs (C1) *n* = 748		Complex-Comprehensive-Needs (C2) *n* = 82		Comprehensive Needs (C3) *n* = 524	
Continuous/Count Variables	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Criminal Peers	1.80	(1.70, 1.91)	3.01[1]	(2.74, 3.27)	2.95[1]	(2.87, 3.04)
Attitudes- Legitimacy	2.39[23]	(2.34, 2.44)	2.15	(2.02, 2.28)	2.19	(2.14, 2.24)
Attitudes- Cynicism	1.89	(1.84, 1.94)	2.05	(1.88, 2.22)	2.22[1]	(2.16, 2.28)
Antisocial Personality	6.71	(6.30, 7.11)	9.54[1]	(8.62, 10.46)	10.50[1]	(10.13, 10.86)
Mental Health- Anxiety	0.25	(0.22, 0.29)	2.26[13]	(1.92, 2.59)	0.45[1]	(0.39, 0.50)
Mental Health- Depression	0.34	(0.29, 0.39)	1.93[13]	(1.47. 2.38)	0.71[1]	(0.63, 0.79)
Alcohol Abuse	1.59	(1.49, 1.70)	2.97[1]	(2.26, 3.91)	4.75[12]	(4.28, 5.27)
Drug Abuse (> 0)[a]	0.52	(0.46, 0.58)	1.54[1]	(1.01, 2.34)	2.23[1]	(1.99, 2.51)
ETV- Victimization (> 0)[a]	1.00	(0.78, 1.28)	2.42[1]	(2.11, 2.83)	2.57[1]	(2.43, 2.70)
Categorical Variables	Thresholds[b] (95% CI)		Thresholds (95% CI)		Thresholds (95% CI)	
Employment /Education ($1)	-1.82[3] (-2.13, -1.51)		-1.31 (-1.94, -0.67)		-1.21 (-1.45, 0.98)	
Employment /Education ($2)	1.83[3] (1.53, 2.14)		1.32 (0.71, 1.92)		1.50 (1.24, 1.76)	
	Probability		Probability		Probability	
Unemployed/Not in School	0.14		0.22		0.23	
Employed OR in School	0.72[3]		0.58		0.59	

Employed AND in School	0.14	0.21	0.18

Note. Numbers in superscripts indicate which parameter estimates are significantly different from one another as determined by a Wald test (e.g., the mean number of criminal peers for Class 2 is significantly higher than the mean number of criminal peers for Class 1). [a] This represents the count for individuals who are able to assume values of zero or above; the inflation variable, representing the odd of being unable to assume any value except zero, is not presented here as it is held constant among classes; [b] Thresholds (e.g., $1) are in a logit scale, and can be interpreted as an intercept in the overall model; these have been converted into probabilities to aid in interpretation; The Wald test of parameter constraints was carried out on the estimated *threshold* parameters; hence both thresholds and probabilities are presented.

Class Descriptions

Minimal-needs class. The *minimal-needs* class was typified by low needs across all domains. Using a series of Wald tests to examine the equality of parameter estimates (see Table 7), this class had fewer needs on all gender-neutral (criminal peers, antisocial attitudes [legitimacy] and antisocial personality), gender-responsive (victimization, mental health), and theoretically neutral domains (substance abuse and employment/education) compared to the *comprehensive-needs* class. The *minimal-needs* class also had fewer needs in all areas compared to the *complex-comprehensive-needs* class, with the exception of two domains: both classes scored low on the measure of legal cynicism, and although the probability of being employed or in school was higher for the *minimal-needs* class (p = .72) compared to the *complex-comprehensive-needs* class (p = .58), this difference was not statistically significant.

Complex-comprehensive-needs class. The *complex-comprehensive-needs* class was characterized by needs in all three gender-neutral domains (antisocial peers, criminal attitudes, antisocial personality), both gender-responsive domains (victimization, mental health), and both theoretically neutral domains (drug/alcohol abuse, employment/education). This class was labelled as such because, in addition to having wide-ranging needs, this was the only class to evidence significant deficits in the mental health domain (i.e., depression and anxiety), arguably making the treatment of this population more complex.

Compared to the *minimal-needs* class, the *complex-comprehensive-needs* class scored higher in all domains, aside from the two exceptions mentioned above (i.e., no differences were seen in the legal cynicism or employment/education domains). Fewer

differences were seen between the *complex-comprehensive-needs* class and the *comprehensive-needs* class, however. Compared to the *comprehensive-needs* class, the *complex-comprehensive-needs* class had fewer alcohol abuse needs; specifically, the mean number of drinks consumed in the recall period was significantly lower for the *complex-comprehensive-needs* class than the *comprehensive-needs* class. Additional differences were seen in the mental health domain; the *complex-comprehensive-needs* class reported significantly more anxiety and depression symptoms than the *comprehensive-needs* class.

Comprehensive-needs class. As with the *complex-comprehensive-needs* class, the *comprehensive-needs* class also scored high across the board in gender-neutral needs, gender-responsive needs, and theoretically neutral domains, with the exception of internalizing mental health deficits. In contrast to differences seen between the *minimal-needs* class and the other two classes, fewer distinctions were seen between the *complex-comprehensive-needs* class and the *comprehensive-needs* class. However, as discussed above, these two classes did differ significantly in the domains of mental health and alcohol abuse, with those belonging to the *comprehensive-needs* class having more significant alcohol abuse needs, and fewer mental health needs relative to the *complex-comprehensive-needs* class.

Table 7

Wald Tests of Parameter Constraints

	Minimal-Needs vs. Complex-Comprehensive-Needs		Minimal-Needs vs. Comprehensive Needs		Complex-Comprehensive-Needs vs. Comprehensive-Needs	
	χ^2	*p*	χ^2	*p*	χ^2	*p*
Criminal Peers	65.18	.001	303.34	.001	0.13	*ns*
Attitudes- Legitimacy	10.86	.001	23.42	.001	0.26	*ns*
Attitudes- Cynicism	3.27	*ns*	71.40	.001	3.06	*ns*
Antisocial Personality	30.48	.001	234.62	.001	3.49	*ns*
Mental Health- Anxiety	151.04	.001	40.15	.001	127.39	.001
Mental Health- Depression	46.81	.001	71.26	.001	25.57	.001
Alcohol Abuse	18.54	.001	377.43	.001	8.70	.003
Drug Abuse (>0)[a]	25.00	.001	425.40	.001	2.70	*ns*
ETV- Victimization (>0)[a]	40.40	.001	64.25	.001	0.36	*ns*
Employment /Education ($1)[b]	2.18	*ns*	11.78	.001	0.08	*ns*
Employment /Education ($2)[b]	2.41	*ns*	3.23	*ns*	0.29	*ns*

Note. *ns* = non-significant. [a] Only the parameters for the zero-inflated models representing the count variables are presented here for ease of interpretation and to reduce redundancy. [b] This parameter represents a threshold ($1) due to this variable's categorical nature.

Covariate and Auxiliary Variable Analysis

Age differences in classification. Age was included as a covariate in the development of the typology as it was anticipated that it could improve classification accuracy (Lubke & Muthén, 2007). Within Mplus mixture modelling, logistic regression is used to examine the impact of covariates on the formation of the classes. The logistic regression coefficients provided in the output are log-odds, which can be interpreted as

the log ratio of two probabilities (Muthén & Muthén, 1998-2012). Overall, there were significant differences in age among the various classes (see Table 8). Specifically, results suggest that the only significant difference in age among classes is between the *minimal-needs* class (C1) and the *comprehensive-needs class* (C3), with those in the latter being moderately older. Specifically, comparing C3 to C1, the log odds increase .30 for a unit increase in age.

Table 8

Categorical Latent Variable Regression of Class on Age

Reference: C1		*Log Odds* (*SE*)	*p*
	C2 ON age	0.13 (0.13)	0.34
	C3 ON age	0.30 (0.06)	0.00**
Reference: C2			
	C1 ON age	-0.13 (0.13)	0.34
	C3 ON age	0.17 (0.13)	0.20

Note. C1 = *minimal-needs class*; C2 = *complex-comprehensive-needs class*; C3 = *comprehensive-needs class*. ** $p < .001$

As odds ratios can be challenging to interpret, an examination of mean differences illustrates how large these differences actually are (on the basis of most likely latent class membership). Compared to the *minimal-needs* class ($M = 15.88$, $SD = 1.18$), the *comprehensive-needs* class ($M = 16.28$, $SD = 1.03$) was significantly older. However, there was no significant difference in age between the *minimal-needs* class ($M = 15.88$, $SD = 1.18$) and the *complex-comprehensive-needs* class ($M = 16.06$, $SD = 1.15$), or

between the *complex-comprehensive-needs* class (M = 16.06, SD = 1.15) and the *comprehensive-needs* class (M= 16.28, SD = 1.03).

Classification by gender. Gender differences in class assignment were examined using posterior probability based multiple imputations. An omnibus chi-square revealed that there were significant between-class differences in the proportion of males and females among the various classes, χ^2 (2) = 9.80, $p < .01$. Upon closer examination it was discovered that the distribution of females to males in the *complex-comprehensive-needs* class was significantly different from the gender distribution in the *minimal-needs* class, χ^2 (1) = 4.96, $p < .05$. Additionally, the proportion of females in the *comprehensive-needs* class was significantly different from the proportion of females in the *complex-comprehensive-needs* class, χ^2 (1) = 8.41, $p < .01$.

More importantly, there were also significant within-class differences (based on most-likely class membership) in the gender composition of each class, χ^2 (2) = 17.20, $p < .01$. Specifically, there was a larger proportion of females (12%) in the *complex-comprehensive-needs* class compared to males (5%). Further, there was a larger proportion of males (40%) in the *comprehensive-need* class compared to females (30%).

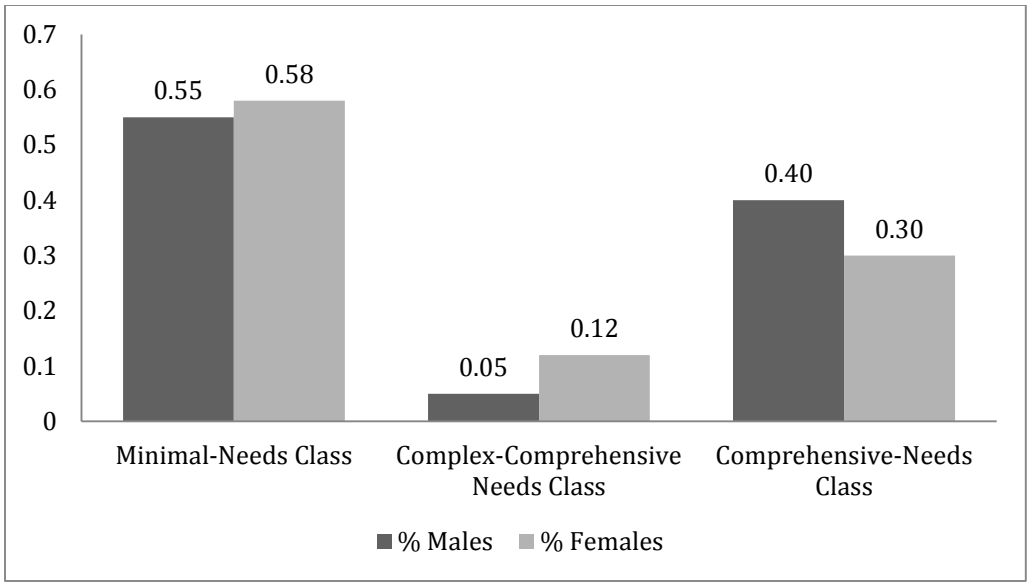

Figure 1. Gender composition of final class solution.

Study 1B Results

Data Screening

Prior to running analysis, data were first screened for missing values, the presence of outliers, normality, and coverage. Missing values for the selected measures[10] ranged from 6.9% to 27.3% at T-12, 9.1% to 35.9% at T-24, and from 9.0% to 36.8% at T-36. A missing value analysis (MVA) was significant for T-12 (Little's MCAR test = 86.85, df = 17, $p < .001$), T-24 (Little's MCAR test = 126.28, df = 49, $p < .001$), and T-36 (Little's MCAR test = 1004.82, df = 68, $p < .001$) suggesting that data was not Missing Completely At Random (MCAR). Separate variance t-tests revealed that the data was most likely Missing at Random (MAR), as missingness was in fact related to other

[10] Covariates were not included in the MVA as only those with data present for these covariates were ultimately included in the LPA (i.e., MLR does not estimate missing values for covariates in LPA).

variables within the dataset.[11] As such, maximum likelihood estimation with robust standard errors (MLR; the default in Mplus) was utilized as this is thought to be an acceptable imputation method when data is MAR (Allison, 2003).[12] To examine coverage, the covariance matrixes for the variables incorporated in the LPAs were examined. Covariance coverage ranged from .68 to 1.00 among all three waves of data and was therefore well above the minimum threshold for good coverage (.10; Muthén & Muthén, 1998-2012).

The distributions of each variable were then examined for normality and outliers. Two of the count variables (drug use and victimization) had a large proportion of participants who scored a zero. As such, a zero-inflated Poisson regression was specified for these variables in the model to account for the excess of zeros. Additionally, a Poisson regression was specified for the alcohol abuse subscale, as visual inspection its histogram revealed that this count variable approximated a Poisson distribution. Several of the continuous variables also had distributions that were positively skewed including the antisocial peer index, the depression subscale and the anxiety subscale. However, it was expected that the latent class model underlying the data would be a mix of normal distributions from different types of offenders. As this is what mixture modelling seeks to explain, the variables were treated as continuous normal; however, extreme outliers were brought within a more acceptable range. For example, the self-report number of offences

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[11] Importantly, it can only be presumed that the missingness is in fact MAR; however, as a precaution, analysis was run with both those missing data and those without, and the only change to the solution was the proportion of individuals within each class, not the interpretation of each class. As such, results using imputed data are presented.
[12] MLR estimates a likelihood function for each individual on the basis of variables present so that all the available data are used.

variable (used as an auxiliary variable in the present study) ranged from 0 to 2062 at T-12, 0 to 3986 at T-24, and 0 to 3013 at T-36, with 45% to 56% of individuals self-reporting having committed no offences in the recall period; therefore, this variable was truncated to range from 0 to 5+. As a further precaution, MLR estimation was used in the present study, as it is robust to non-normality (Muthén & Muthén, 1998-2012). Notably, a Probit regression model was estimated for the employment/education domain as it was an ordered categorical variable.

One of the main assumptions of latent variable models is local independence. However, as mentioned previously, this assumption is not as vital to mixed models with continuous variables (Magidson & Vermunt, 2004). As such, although absolute measures of fit were considered (e.g., residuals for the continuous variables, and bivariate residuals for the categorical variables) relative measures of fit were given more weight in determining the optimal class solution.

Descriptive Statistics

Table 9 presents the descriptive statistics for each wave of data for the complete sample.

Table 9

Sample Statistics for 12-, 24-, 36-month Follow-up

Variable	12 Months				24 Months				36 Months			
Continuous & Count	*N*	Mean	SD	Range	*N*	Mean	SD	Range	*N*	Mean	SD	Range
Criminal Peers	1244	1.83	.84	1-5	1215	1.72	.80	1-5	1197	1.61	0.73	1-5
Attitudes- Legitimacy	1260	2.33	.58	1-4	1230	2.33	.36	1-4	1232	2.34	0.62	1-4
Attitudes- Cynicism	1260	2.03	.62	1-4	1230	2.04	.63	1-4	1232	2.01	0.63	1-4
Antisocial Personality	1260	34.73	8.37	15-60	1225	34.54	8.32	15-60	1230	33.37	8.53	15-60
Mental Health- Anxiety	984	0.37	.55	0-4	868	0.36	0.54	0-4	856	0.32	0.51	0-3
Mental Health- Depression	984	0.45	.66	0-4	868	0.42	0.63	0-4	856	0.40	0.62	0-4
Alcohol Abuse	1260	2.32	2.05	1-9	1229	2.61	2.24	1-9	1231	2.81	2.34	1-9
Drug Abuse	1260	0.60	1.14	0-9	1229	0.59	1.07	0-9	1231	0.56	0.99	0-9
ETV- Victimization	1260	0.22	0.60	0-5	1229	0.16	0.52	0-4	1232	0.13	0.46	0-4
Categorical	*N*	%			*N*	%			*N*	%		
Employment/Education	1099				1072				1104			
Not Employed/in School		10.6				15.3				22.5		
Employed OR in School		89.4				84.7				84.7		
Covariates/Auxiliary Vars.	*N*	Mean	SD	Range	*N*	Mean	SD	Range	*N*	Mean	SD	Range
Age	1262	17.05	1.15	15-20	1231	18.02	1.14	16-21	1232	19.01	1.15	17-22
Time on Streets [a]	1261	0.43	0.43	0-1	1231	0.32	0.42	0-1	1231	0.29	0.41	0-1

Self-Report Offending [b]	1260	1.81	2.16	0-5	1230	1.62	2.12	0-5	1231	1.38	2.03	0-5
Official Criminal history	1354	3.56	2.52	1-16	1354	4.07	2.98	1-22	1354	4.59	3.34	1-22

Note. Mean values for the estimated model were identical (within .01) to all sample statistics; [a] Time on the Streets represents the proportion of time spent in settings with no community access; [b] Self-report offending was truncated to 1 through 5+, to remove extreme outliers.

Model Selection

For each wave of data, a 2, 3, and 4-class model were run sequentially to identify the best fitting model (see Table 10). Overall, consideration of both the fit indices and interpretation of the various classes suggest that a 3-class solution fits the data best at T-12 and T-24, and that a 4-class solution fit best at T-36.

Table 10

Relative Fit Statistics for 2-, 3-, and 4-class Models

T-12	AIC	BIC	SBIC	Entropy	LMR	*p*
2 class	27955.21	28119.68	28018.04	0.81	1438.64	<.001
3 class	27564.06	27795.34	27652.40	0.84	412.71	<.01
4 class	27433.44	27726.40	27545.34	0.83	335.94	.31
T-24	**AIC**	**BIC**	**SBIC**	**Entropy**	**LMR**	***p***
2 class	27271.82	27466.30	27434.99	0.76	1251.70	<.001
3 class	26902.49	27132.69	26989.75	0.81	390.59	<.01
4 class	26717.48	27014.19	26829.95	0.84	208.75	.45
T-36[a]	**AIC**	**BIC**	**SBIC**	**Entropy**	**LMR**	***p***
2 class	27353.97	27517.67	27416.03	0.75	1248.31	<.001
3 class	26855.03	27085.23	26842.29	0.81	519.33	<.001
4 class	26523.35	26820.06	26635.82	0.83	353.85	<.05

Note. AIC = Akaike's Information Criterion; BIC = Bayesian Information Criterion; ABIC = the sample-size adjusted Bayesian Information Criterion. [a] The best log likelihood value was not replicated for a 5-class solution at T-36. Therefore, the 4-class solution was ultimately chosen as a) the 5-class solution may not be trustworthy due to local maxima, and b) the addition of a 5th class would have not added to the overall fit, as the LMR test for the 4-class solution was approaching significance (p = .03).

The quality of the latent class membership classification was further examined using the posterior class membership probabilities (see Table 11). The probability of correct classification for the three classes ranged from .88 to .97 across each time point (i.e., T-12, T-24, and T-36). Class classification is thought to be acceptable when the probability of class membership assignment is equal to or greater than .70 (Nagin, 2005). Using this standard, it can be argued that the quality of the classification was acceptable for profile solutions at each time point.

Table 11

Average Posterior Class Membership Probabilities

		Latent Class			
Most Likely Class Membership		1	2	3	
	1	0.94	0.05	0.01	
T-12	2	0.07	0.91	0.02	
	3	0.03	0.05	0.92	
Most Likely Class Membership		1	2	3	
	1	0.90	0.08	0.02	
T-24	2	0.05	0.93	0.02	
	3	0.05	0.05	0.90	
Most Likely Class Membership		1	2	3	4
	1	0.93	0.00	0.05	0.01
T-36	2	0.00	0.97	0.01	0.01
	3	0.07	0.01	0.88	0.04
	4	0.03	0.01	0.07	0.89

Class Descriptions

T-12 latent class model. Upon examination of the estimated means (for continuous variables and count variables) and thresholds (for categorical variables that were converted probabilities for ease of interpretation) for the various classes (see Table 12), a *minimal-needs* class (n = 821), a *complex-comprehensive-needs* class (n = 98), and a *comprehensive-needs* class (n =342) were identified and labelled.

Table 12

Model Parameters for Resultant 3-Class Model- 12 Month Follow-up

	Minimal-Needs (1) *n* =821		Complex-Comprehensive-Needs (2) *n* =98		Comprehensive-Needs (3) *n* =342	
Continuous/Count Variables	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Criminal Peers	1.50	(1.43, 1.58)	2.21[1]	(1.90, 2.52)	2.45[1]	(2.28, 2.62)
Attitudes- Legitimacy	2.41[23]	(2.36, 2.46)	2.17	(2.00, 2.34)	2.19	(2.12, 2.25)
Attitudes- Cynicism	1.90	(1.85, 1.94)	2.18[1]	(2.00, 2.37)	2.27[1]	(2.20, 2.34)
Antisocial Personality	32.01	(31.16, 32.85)	39.98[1]	(37.32, 42.64)	39.32[1]	(38.12, 40.52)
Mental Health- Anxiety	0.23	(0.20, 0.26)	1.27[13]	(0.86, 1.67)	0.37[1]	(0.32, 0.43)
Mental Health- Depression	0.26	(0.22, 0.30)	2.09[13]	(1.74, 2.45)	0.33[1]	(0.27, 0.39)
Alcohol Abuse	1.38	(1.31, 1.46)	2.21[1]	(1.80, 2.73)	4.49[12]	(4.11, 4.89)
Drug Abuse (> 0) [a]	0.18	(0.14, 0.24)	1.10[1]	(0.65, 1.84)	1.58[1]	(1.35, 1.84)
ETV- Victimization (> 0) [a]	0.06	(0.04, 0.11)	0.94[1]	(0.54, 1.65)	1.03[1]	(0.84, 1.25)
Categorical Variable	Threshold[b] (95% CI)		Threshold (95% CI)		Threshold (95% CI)	
Employment /Education ($1)[b]	-2.24	(-2.51, -1.98)	-2.24	(-3.52, -0.96)	-1.89	(-2.27, -1.51)
	Probability		Probability		Probability	
Unemployed/Not in School	0.09		0.10		0.13	
Employed OR in School	0.90		0.90		0.87	

Note. Numbers in superscripts indicate which parameter estimates are significantly different from one another as determined by a Wald test (e.g., the mean number of criminal peers for Class 2 is significantly higher than the mean number of criminal peers for Class

1). [a] This represents the count for individuals who are able to assume values of zero or above; the inflation variable, representing the odd of being unable to assume any value except zero, is not presented here as it is held constant among classes; [b] Thresholds are in a logit scale, and can be interpreted as an intercept in the overall model; these have been converted into probabilities to aid in interpretation. The Wald test of parameter constraints was carried out on the estimated *threshold* parameters; hence both thresholds and probabilities are presented.

The *minimal-needs class* was the largest of the three classes (*n* = 821; 65%) and was characterized by low needs on all domains. Specifically, using a series of Wald tests to examine the equality of parameter estimates (see Table 13) members of this class had fewer needs on all gender-neutral (criminal peers, antisocial attitudes [legitimacy] and antisocial personality), gender-responsive (victimization, mental health), and theoretically neutral domains (substance abuse) compared to both the *complex-comprehensive-needs* class and the *comprehensive-needs* class. Interestingly, the probability of either being employed or attending school in the previous year was relatively high across all classes (.87 to .90), and therefore did little in distinguishing classes at this time-point.

The *complex-comprehensive-needs* (*n* = 98; 8%) class was typified by high needs across all domains. This class was labelled as such because, in addition to having wide-ranging needs, this was the only class to evidence significant deficits in the mental health domain (i.e., depression and anxiety), making the treatment of this population arguably more complex.

The *comprehensive-needs* (*n* = 342; 27%) class also scored high across all gender-neutral, gender-responsive, and theoretically neutral domains; however, as mentioned above, this class scored significantly lower on measures of anxiety and depression. Notably, this class also scored significantly higher on alcohol use compared to both other classes.

Table 13

Wald Tests of Parameter Constraints- 12 Month Follow-up

	C1 vs. C2		C1 vs. C3		C2 vs. C3	
	χ^2	*p*	χ^2	*p*	χ^2	*P*
Criminal Peers	33.28	.001	117.13	.001	2.53	*ns*
Attitudes- Legitimacy	11.86	.001	24.92	.001	0.07	*ns*
Attitudes- Cynicism	15.05	.001	68.14	.001	1.16	*ns*
Antisocial Personality	56.08	.001	152.81	.001	0.31	*ns*
Mental Health- Anxiety	43.52	.001	19.88	.001	32.79	.001
Mental Health- Depression	203.33	.001	4.05	.044	201.12	.001
Alcohol Abuse	18.28	.001	425.51	.001	35.90	.001
Drug Abuse (>0)[a]	57.23	.001	308.78	.001	2.05	*ns*
ETV- Victimization (>0)[a]	56.01	.001	95.55	.001	0.09	*ns*
Employment /Education ($1)[b]	0.00	*ns*	2.08	*ns*	0.38	*ns*

Note. C1 = Minimal needs class; C2 = Complex-comprehensive-needs class; C3 = Comprehensive-needs class; C4 = Minimal needs, substance-using class. *ns* = non-significant; [a] Only the parameters for the zero-inflated models representing the count variables are presented here for ease of interpretation and to reduce redundancy. [b] This parameter represents a threshold ($1) due to this variable's categorical nature.

T-24 latent class model. A 3-class solution also fit the data best at T-24. Once again, through examination of means, thresholds, and probabilities, a *minimal needs class* (*n* = 748), *complex-comprehensive-needs class* (*n* = 113), and a *comprehensive-needs class* (*n* = 370) were identified (see Table 14). However, it is important to note that the profiles, although similar, were not identical to those at T-12.

Table 14

Model Parameters for Resultant 3-Class Model- 24 Month Follow-up

	Minimal-Needs (1)		Complex-Comprehensive-Needs (2)		Comprehensive-Needs (3)	
Continuous/Count Variables	*n* = 748		*n* = 113		*n* = 370	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Criminal Peers	1.43	(1.38, 1.48)	2.18[1]	(1.93, 2.44)	2.14[1]	(2.03, 2.26)
Attitudes- Legitimacy	2.41[23]	(2.36, 2.46)	2.07	(1.96, 2.18)	2.26[2]	(2.20, 2.33)
Attitudes- Cynicism	1.91	(1.86, 1.96)	2.28[1]	(2.13, 2.42)	2.18[1]	(2.12, 2.26)
Antisocial Personality	32.04	(31.37, 32.70)	40.01[13]	(38.27, 41.75)	37.66[1]	(36.71, 38.61)
Mental Health- Anxiety	0.24	(0.19, 0.28)	0.99[13]	(0.76, 1.22)	0.36[1]	(0.30, 0.42)
Mental Health- Depression	0.22	(0.18, 0.27)	1.83[13]	(1.61, 2.05)	0.29[1]	(0.24, 0.34)
Alcohol Abuse	1.44	(1.34, 1.54)	2.38[1]	(1.95, 2.90)	5.00[12]	(4.68, 5.30)
Drug Abuse [a]	0.13	(0.10, 0.17)	0.95[1]	(0.69, 1.30)	1.36[12]	(1.19, 1.56)
ETV- Victimization [a]	0.11	(0.06, 0.21)	0.69[1]	(0.34, 1.38)	0.98[1]	(0.77, 1.25)
Categorical Variable	Thresholds[b] (95% CI)		Thresholds (95% CI)		Thresholds (95% CI)	
Employment /Education ($1)[b]	-1.87 (-2.12, -1.63)[2]		-0.81 (-1.29, -0.33)		-1.81 (-2.17, -1.45)[2]	
	Probability		Probability		Probability	
Unemployed/Not in School	0.13		0.31		0.14	
Employed OR in School	0.87		0.69		0.86	

Note. Numbers in superscripts indicate which parameter estimates are significantly different from one another as determined by a Wald test (e.g., the mean number of criminal peers for Class 2 is significantly higher than the mean number of criminal

peers for Class 1); [a] This represents the count variable for individuals who are able to assume values of zero or above; the inflation variable, representing the odd of being unable to assume any value except zero, is not presented here as it is held equal across classes by default; [b] Thresholds are in a logit scale, and can be interpreted as an intercept in the overall model; these have been converted into probabilities to aid in interpretation. The Wald test of parameter constraints was carried out on the estimated *threshold* parameters; hence both thresholds and probabilities are presented.

As with the T-12 results, a *minimal-needs* class was the largest group to emerge at T-24 (*n* = 748; 61%). Upon examination of the equality of parameter estimates (see Table 6) members of this class had fewer needs on all gender-neutral (criminal peers, antisocial attitudes [legitimacy and cynicism] and antisocial personality), gender-responsive (victimization, mental health), and theoretically neutral domains (substance abuse) compared to both the *complex-comprehensive-needs* class and the *comprehensive-needs* class.

The *complex-comprehensive-needs* class (*n* = 113; 9%) had comparable needs to the *comprehensive-needs* class, but scored significantly higher on measures of anxiety/depression, and significantly lower on measures of alcohol use and drug use. Interestingly, this class also scored significantly higher than both other classes on the proxy measure of antisocial personality. Additionally, this class was also less likely to be employed or in school in the prior year compared to both other classes.

The *comprehensive-needs* class was the second-largest class identified (*n* = 370; 30%) and represented a group of individuals who scored high across all domains and significantly higher in all domains relative to the *minimal-needs* class. Additionally, as with the T-12 solution, this class scored significantly lower on measures of anxiety and depression relative to the *complex-comprehensive-needs* class and significantly higher on alcohol abuse. However, unlike the T-12 solution, a number of other differences also emerged. Specifically, this class also had more positive perceptions of legitimacy of the legal system and its actors, scored lower on the proxy measure of antisocial personality, used a wider variety of drugs in the recall period, and were more likely to be employed or be in school in the previous year compared to the *complex-comprehensive-needs* class.

Notably, although unable to speak to the practical significance of this difference, it is clear that the overall profile of the *comprehensive-needs* class has shifted over time. Arguably, it could be that individuals classified in the *comprehensive-needs* class at T-12 subsequently developed internalizing mental health deficits, and therefore shifted into the *complex-comprehensive-needs* class.

Table 15

Wald Tests of Parameter Constraints- 24 Month Follow-up

	C1 vs. C2		C1 vs. C3		C2 vs. C3	
	χ^2	*p*	χ^2	*P*	χ^2	*p*
Criminal Peers	118.19	.001	445.05	.000	32.73	*ns*
Attitudes- Legitimacy	28.73	.001	1.36	.001	7.66	.010
Attitudes- Cynicism	20.47	.001	34.98	.001	1.07	*ns*
Antisocial Personality	74.25	.001	87.48	.001	5.06	.020
Mental Health- Anxiety	40.24	.001	10.90	.001	27.67	.001
Mental Health- Depression	243.60	.001	4.35	.040	201.17	.001
Alcohol Use	20.49	.001	847.70	.001	46.63	.001
Drug Use [a]	84.71	.001	274.18	.001	4.05	.040
ETV- Victimization [a]	19.45	.001	49.28	.001	1.04	*ns*
Employment /Education ($1)[b]	14.20	.001	0.07	*ns*	9.82	.002

Note. C1 = *Minimal-needs* class; C2 = *Complex-comprehensive-needs* class; C3 = *Comprehensive-needs* class; C4 = *Minimal-needs, substance-using* class. *ns* = non-significant; [a] Only the parameters for the zero-inflated models representing the count variables are presented here for ease of interpretation and to reduce redundancy. [b] This parameter represents a threshold ($1) due to this variable's categorical nature.

T-36 latent class model. Unlike the previous two waves of data, a 4-class solution best fit the data at T-36. Through examination of the estimated means, thresholds, and probabilities for the various classes (see Table 7), a *minimal-needs* class (n = 684), *complex-comprehensive-needs* class (n = 38), and *comprehensive-needs* class (n =201) were identified and appeared relatively similar to the classes identified in T-12 and T-24. However, an additional class emerged that was characterized primarily by alcohol use with few other risk factors, and therefore was labelled a *minimal-needs, substance-using class* (n = 308) (See Table 16).

Table 16

Model Parameters for Resultant 4-Class Model- 36 Month Follow-up

	Minimal- Needs (1) *n* = 684		Complex-Comprehensive-Needs (2) *n* = 38		Comprehensive-Needs (3) *n* = 201		Minimal Needs-Substance-Using (4) *n* = 308	
Continuous/Count	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Criminal Peers	1.23	(1.19, 1.27)	1.91[4]	(1.60, 2.23)	2.88[124]	(2.74, 3.03)	1.56[1]	(1.48, 1.64)
Attitudes- Legitimacy	2.37[3]	(2.32, 2.43)	2.42[3]	(2.25, 2.59)	2.09	(2.01, 2.16)	2.43[3]	(2.35, 2.52)
Attitudes- Cynicism	1.91	(1.85, 1.96)	2.26[1]	(2.00, 2.52)	2.27[14]	(2.18, 2.37)	2.01	(1.92, 2.09)
Antisocial Personality	30.89	(30.18, 31.61)	40.31[14]	(37.66, 42.96)	38.81[14]	(37.41, 40.21)	34.14[1]	(33.09, 35.19)
Mental Health- Anxiety	0.19	(0.16, 0.23)	2.10[134]	(1.77, 2.42)	0.35[14]	(0.28, 0.42)	0.23	(0.17, 0.30)
Mental Health- Depression	0.32	(0.26, 0.37)	1.60[134]	(1.13, 2.06)	0.58[14]	(0.46, 0.70)	0.26	(0.17, 0.35)
Alcohol Use [a]	1.34	(1.28, 1.40)	3.13[1]	(2.27, 4.31)	3.81[1]	(3.29, 4.41)	5.21[123]	(4.91, 5.48)
Drug Use [a]	0.16	(0.13, 0.22)	1.16[1]	(0.70, 1.91)	1.32[14]	(1.09, 1.60)	0.84[1]	(0.70, 1.00)
ETV- Victimization	0.08	(0.04, 0.17)	1.28[14]	(0.83, 2.00)	1.02[14]	(0.76, 1.36)	0.39[1]	(0.20, 0.76)
Categorical Variables	Threshold[b] (95% CI)		Threshold (95% CI)		Threshold (95% CI)		Threshold (95% CI)	
Employment /Education ($1)[b]	-1.21 (-1.42, -1.01) [34]		-0.83 (-1.74, 0.08)		-0.61 (-0.96, -0.26)		-1.98 (-2.44, -1.53)[23]	
	Probability		Probability		Probability		Probability	
Unemployed/Not in School	0.23		0.30		0.35		0.12	

Employed OR in School	0.77	0.70	0.65	0.88

Note. Numbers in superscripts indicate which parameter estimates are significantly different from one another as determined by a Wald test (e.g., the mean number of criminal peers for Class 2 is significantly higher than the mean number of criminal peers for Class 1). a This represents the count for individuals who are able to assume values of zero or above; the inflation variable, representing the odd of being unable to assume any value except zero, is not presented here as it is held constant among classes; b Thresholds are in a logit scale, and can be interpreted as an intercept in the overall model; these have been converted into probabilities to aid in interpretation. The Wald test of parameter constraints was carried out on the estimated *threshold* parameters; hence both thresholds and probabilities are presented.

A *minimal-needs* class, characterized by low-needs in all domains was once again the largest class identified at T-36 (n = 684; 56%). Using a series of Wald tests to examine the equality of parameter estimates (see Table 17), members of this class had fewer needs on all domains compared to the *comprehensive-needs* class. Similarly, the *minimal-needs* class scored lower on all domains compared to *the complex-comprehensive-needs* class, with the exception of the employment/education domain and legal legitimacy domains (both classes scored comparably low). Fewer differences were seen between the *minimal-needs* class and the *minimal-needs substance-using* class; these two classes had comparable need ratings in the two criminal attitude domains (legitimacy and cynicism), and both scored low on measures of anxiety and depression. However, the *minimal-needs substance-using* class had moderately higher needs in the domains of criminal peers, antisocial personality, drug abuse, victimization, and employment, and substantially higher alcohol use relative to the *minimal-needs* class. This class also had the second highest probability of being in school or being employed (p = .77), second only to the *minimal-needs substance-using* class (p = .88).

The *complex-comprehensive-needs* class made up the smallest class (n = 38; 3%), was characterized by high needs across all domains, and was once again the only class to be identified with significantly higher internalizing mental health needs (i.e., anxiety/depression) relative to the other three classes. Interestingly, this class also scored the highest on victimization compared to all three other classes, though this difference was not significantly different from the *comprehensive-needs* class. This class was also significantly less likely to be employed or in school compared to the *minimal-need substance-using* class (p = .70 vs. p = .88). Further, compared to the *comprehensive-*

needs class, this class had fewer criminal peers and scored higher on the measure of legal legitimacy (i.e., they had better perceptions of the legal legitimacy compared to the *comprehensive-needs* class).

The *comprehensive-needs* class (n = 201; 16.3%) was comprised of youth who had high needs in all domains, with the exception of mental health. Relative to the *minimal-needs* class and *the minimal-needs substance-using* class, this class had higher needs in all domains; however, the *minimal-needs substance-using* class, not surprisingly, had higher needs in alcohol abuse compared to this class (M = 5.21 vs. M = 3.81). There were also a few differences between this class and the *complex-comprehensive-needs* class. Specifically, as mentioned previously, the *comprehensive-needs* class had fewer needs in the mental health domain (anxiety and depression), and significantly higher needs in the criminal attitudes (legitimacy, not cynicism) and antisocial associates domains.

The fourth class, labeled a *minimal-needs substance using class*, represented the second-largest class (n = 308; 25%) at this time point and was comprised of individuals who had minimal needs in most domains, but exceptionally high needs in the alcohol abuse domain and moderate needs in the domain of antisocial personality (i.e., higher than the *minimal-needs* class, but lower than either of the *comprehensive-need* class). As previously mentioned, this class had comparable needs to the *complex-comprehensive-needs* class in the criminal attitudes (both classes scored low) and drug use—*the substance-using minimal-needs* class reported using fewer drugs than the *complex-comprehensive-needs* class (M = .84 vs. M = 1.16), however, this difference was not

significant. Notably, this class had the highest probability of being in school or employed (p = .88).

Table 17

Wald Tests of Parameter Constraints- 36 Month Follow-up

	C1 vs. C2		C1 vs. C3		C1 vs. C4		C2 vs. C3		C2 vs. C4		C3 vs. C4	
	χ^2	*p*	χ^2	*p*	χ^2	*p*	χ^2	*p*	χ^2	*p*	χ^2	*p*
Criminal Peers	460.74	.001	558.70	.001	51.20	.001	31.94	.001	4.63	.030	470.80	.001
Attitudes- Legitimacy	0.26	*ns*	32.99	.001	1.33	*ns*	11.77	.001	0.03	*ns*	37.19	.001
Attitudes- Cynicism	6.93	.009	45.17	.001	3.33	*ns*	0.10	*ns*	3.21	*ns*	15.92	.001
Antisocial Personality	45.74	.001	101.70	.001	21.26	.001	0.95	*ns*	17.85	.001	26.86	.001
Mental Health- Anxiety	133.33	.001	15.60	.001	1.30	*ns*	110.77	.001	150.22	.001	5.61	.020
Mental Health- Depression	27.81	.001	14.43	.001	1.53	ns	17.10	.001	27.48	.001	17.97	.001
Alcohol Abuse	26.06	.001	167.07	.001	1747.57	.003	1.17	*ns*	9.22	.002	13.31	.001
Drug Abuse [a]	42.23	.001	151.31	.001	79.80	.001	0.21	*ns*	1.33	*ns*	10.00	.002
ETV- Victimization [a]	45.02	.001	48.86	.001	13.41	.001	0.83	*ns*	10.05	.002	8.75	.003
Employment /Education [b]	0.63	*ns*	8.22	.004	8.23	.004	0.19	*ns*	4.72	.030	20.34	.001

Note. C1= *Minimal-needs class*, C2=*Complex-comprehensive-needs* class, C3 = *Comprehensive-needs* class, and C4 = *Minimal-needs substance-using* class. *ns* = non-significant; [a] Only the parameters for the zero-inflated models representing the count variables are presented here for ease of interpretation and to reduce redundancy. [b] This parameter represents a threshold ($1) due to this variable's categorical nature.

Covariate and Auxiliary Variable Analyses

Age differences in classification. Age was included as a covariate in the development of the typology as it was anticipated that it could improve classification accuracy (Lubke & Muthén, 2007), and it has been shown in previous studies to be related to class formation (e.g., Dembo et al., 2008). Within Mplus, logistic regression is used to examine the impact of covariates on the formation of the classes. The logistic regression coefficients provided in the output are log-odds, which can be interpreted as the log ratio of two probabilities (Muthén & Muthén, 1998-2012). Overall, there were marginal, but significant differences in age among the various classes at T-12 and T-36, but no differences in age were seen at T-24 among the various classes (see Table 18).

At T-12, results suggest that the only significant difference in age among classes is between the *minimal-needs* class (C1) and the *comprehensive-needs class* (C3), with those in the latter being moderately older. Specifically, comparing C3 to C1, the log odds increase .13 for a unit increase in age. At T-36, there were marginal differences between the *minimal-needs* class (C1) and the *minimal-needs substance-using class* (C4) class, with those in the latter being moderately older, on average. Specifically, comparing C4 to C1 the logs odds increase .24 for a unit increase in age.

Table 18

Categorical Latent Variable Regression of Class on Age

Follow-up	Reference Class		*Log Odds* (*SE*)	*p*
T-12	C1			
		C2 ON age	0.07 (0.11)	0.54
		C3 ON age	0.13 (0.06)	0.04*
	C3			
		C1 ON age	-0.13 (0.06)	0.04*
		C2 ON age	-0.06 (0.12)	0.60
T-24	C1			
		C2 on age	0.18 (0.10)	0.08
		C3 on age	0.13 (0.07)	0.06
	C3			
		C1 ON age	-0.13 (0.07)	0.06
		C2 ON age	0.05 (0.11)	0.64
T-36	C1			
		C2 ON age	0.04 (0.15)	0.76
		C3 ON age	0.06 (0.07)	0.47
		C4 ON age	0.24 (0.08)	0.00**
	C2			
		C1 ON age	-0.04 (0.15)	0.76
		C3 ON age	0.01 (0.16)	0.93
		C4 ON age	0.20 (0.15)	0.20
	C4			
		C1 ON age	-0.24 (0.08)	0.00**
		C2 ON age	-0.20 (0.15)	0.20
		C3 ON age	-0.19 (0.10)	0.06

Note. C1 = *Minimal-needs* class; C2 = *Complex-comprehensive-needs* class; C3 = *Comprehensive-needs* class; C4 = *Minimal-needs, substance-using* class.

* $p < .05$, ** $p < .01$

To facilitate interpretation, an examination of mean differences, on the basis of most likely latent class membership, is presented below to illustrate how negligible these differences actually are (See Table 19). As can be seen, the *minimal-needs* class was significantly younger than the *comprehensive-needs* class at T-12 (16.99 vs. 17.16) and significantly younger than the *minimal-needs substance-using* class at T-36 (18.93 vs. 19.21).

Table 19

Average Age within Each Class

	C1	C2	C3	C4
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
T-12 *	16.99 (1.19)	17.10 (1.11)	17.16 (1.07)	--
T-24	17.97 (1.18)	18.14 (1.16)	18.09 (1.05)	--
T-36 *	18.93 (1.19)	18.97 (0.99)	19.00 (1.12)	19.21 (1.06)

Note. C1 = *Minimal-needs* class, C2=*Complex-comprehensive-needs* class, C3= *Comprehensive-needs* class, C4 = M*inimal-needs, substance-using* class. *Significant differences among classes.

Gender differences in classification. Gender differences in class assignment were examined using posterior probability based multiple imputations. An omnibus chi-square revealed that there were no significant between-class differences in the proportion of males and females among the various classes at either T-12 (χ^2 (2) = 2.44, $p > .05$) or T-24 (χ^2 (2) = 1.76, $p > .05$). However, there were significant gender differences in the proportion of males and females assigned to the various classes at T-36 (χ^2 (3) = 17.67, $p < .001$). Specifically, upon closer examination, it was discovered that there were

significant differences in the proportion of males and females in the *comprehensive-needs class*, compared to the *minimal-needs substance-using* class, χ^2 (1) = 12.60, $p < .001$, and the *complex-comprehensive-needs* class, χ^2 (1) = 6.42, $p < .05$.

More importantly, there were also significant within-class differences (based on most-likely class membership) in the gender composition of each class at T-36, χ^2 (3) = 17.72, $p < .001$. Specifically, at this time point, there was a slightly larger proportion of females (6%) in the *complex-comprehensive-needs* class compared to males (3%), a larger proportion of males (18%) in the *comprehensive-need* class compared to females (7%), and a larger proportion of females (24%) in the *minimal-needs substance-using* class compared to males (32%).

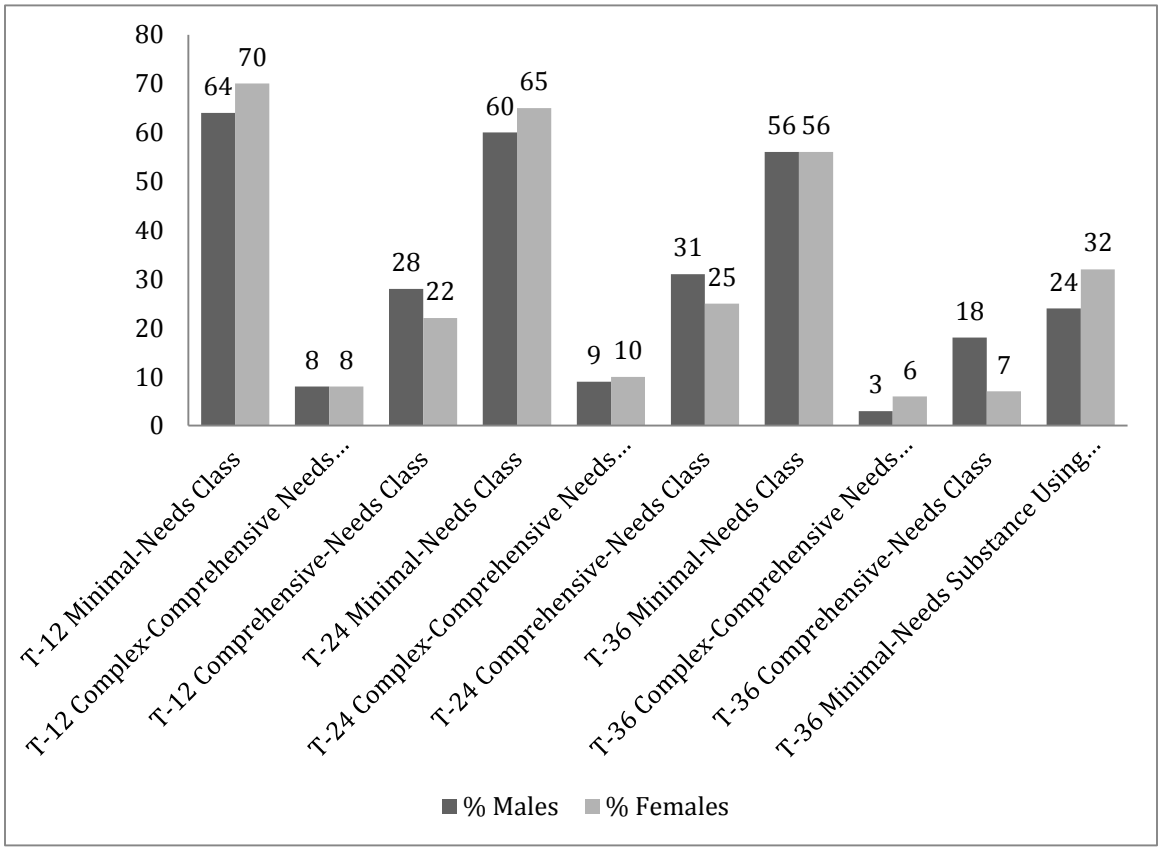

Figure 2. Gender composition of final class solution.

Differences in risk. Although the primary purpose of this study was to examine how treatment needs cluster together and how stable the comorbidity of these factors were over time, an ancillary goal was to examine how the profiles that emerged were related to one's level of risk. As such, criminal history (measured through self-report and official criminal records) was examined for each class solution (see Table 20).

Table 20

Criminal History by Class

	Self-Report Number of Offences			
	C1	C2	C3	C4
	M (*SE*)	*M* (*SE*)	*M* (*SE*)	*M* (*SE*)
T-12	1.00 (0.06)	2.84 (0.24)	3.34 (0.12)	--
T-24	0.79 (0.06)	2.65 (0.22)	2.88 (0.13)	--
T-36	0.57 (0.06)	2.97 (0.47)	2.84 (0.55)	1.62 (0.13)
	Official Number of Arrests (Cumulative)			
	C1	C2	C3	C4
	M (*SE*)	*M* (*SE*)	*M* (*SE*)	*M* (*SE*)
T-12	3.37 (0.08)	3.61 (0.27)	3.85 (0.15)	--
T-24	3.94 (0.12)	4.31 (0.29)	4.04 (0.16)	--
T-36	4.44 (0.14)	4.82 (0.53)	5.56 (0.26)	4.11 (0.19)

Note. C1= *Minimal-Needs* class, C2 =complex-comprehensive-needs class, C3= *Comprehensive-Needs* Class, and C4 = *Minimal-Needs, Substance-Using* class.

T-12. There were significant differences among the various classes on self-report offending at T-12 (χ^2 [2] = 210.24, $p < .001$). Specifically, the number of self-reported

offences committed by the *minimal-needs class* was significantly lower compared to both the *complex-comprehensive-needs* class (χ^2 [1] = 55.81, $p < .001$), and the *comprehensive-needs* class (χ^2 [1] = 279.58, $p < .001$). There were also marginal, but significant differences among the various classes at T-12 in the official number of arrests (χ^2 [2] = 6.27, $p < .05$). Specifically, the *minimal-needs* class had a fewer number of official arrests compared to the *comprehensive-needs* class (χ^2 [1] = 7.34, $p < .01$). There were no other significant differences in official number of arrests among the remaining classes.

T-24. Upon examination of the number of self-report offences within the recall period, there were significant differences among the various classes at T-24 (χ^2 [2] = 268.55, $p > .001$). Specifically, the *minimal-needs* class self-reported significantly fewer offences compared to both the *complex-comprehensive-needs* class (χ^2 [1] = 66.66, $p < .001$), and the *comprehensive-needs* class (χ^2 [1] = 209.44, $p < .001$). Interestingly, there were no significant differences among the various classes on cumulative official number of arrests, (χ^2 [2] = 1.63, $p > .05$).

T-36. As with both T-12 and T-24, there were significant differences among classes in self-report offending at T-36 (χ^2 [3] = 56.85, $p < .001$). Specifically, there were significant differences between the *minimal-needs* class ($M = 0.57$) and the *minimal-needs substance using* class ($M = 1.62$; χ^2 [1] = 50.74, $p < .001$), the c*omplex-comprehensive-needs* class ($M = 2.97$; χ^2 [1] = 25.81, $p < .001$), and the *comprehensive-needs* class ($M = 2.84$; χ^2 [1] = 16.76, $p < .001$). The *minimal-needs substance-using* class also self-reported significantly fewer offences compared to the *complex-*

comprehensive-needs class (χ^2 [1] = 7.71, $p < .01$), and the co*mprehensive-needs* class (χ^2 (1) = 4.59, $p < .05$).

At this time-point there were also significant differences found between classes on the cumulative official number of arrests, (χ^2 [3] = 22.00, $p < .001$). Specifically, there were significant differences between the *comprehensive-needs* class (M = 5.56) and both the *minimal-needs* class (M = 4.44; χ^2 [1] = 13.89, $p < .001$) and the *minimal-needs substance-using* class (M = 4.11; χ^2 [1] = 19.16, $p < .001$).

Study 1 Discussion

This study adds to the limited research that has sought to better understand the heterogeneity of adolescent offenders. Unlike previous taxonomic work that has generated typologies within a theoretical silo (Onifade et al., 2010; Simourd et al., 1994), this study took a gender-informed approach and drew from two competing, but complementary theories: a mainstream correctional perspective (i.e., PIC-R; Andrews & Bonta, 2010) and the contemporary feminist pathways perspective. The integration of these theories allowed not only for a test of whether traditional types of offenders exist in the data, but also to examine if the results mirrored any of the offender types proposed by feminist pathways proponents. Further, unlike previous studies that have limited their samples to solely males (e.g., Simourd et al., 1994) or females (e.g., Brennan et al., 2012; Marquart et al., 2001; Simpson et al., 2008), this study utilized a mixed-gender sample to be able to speak to whether or not there are truly gender differences in the types of offenders that emerged. Lastly, although previous studies have generated their typologies using retrospective and/or cross-sectional data, the present study examined the stability of the typology over time using multi-wave data.

Emergent Types of Adolescent Offenders

The results of a series of latent profile analyses (LPA) suggest that youthful offenders can be classified into three distinct types of offenders, on the basis of treatment needs proposed as salient by both gender-neutral and gender-responsive perspectives. Specifically, although there were minor differences across the various time points (to be discussed further below), the following classes emerged at each time point: 1) a *minimal-needs* class scoring low across all domains; a *complex-comprehensive-needs* class scoring high across all domains, including co-morbid internalizing mental health deficits (i.e., anxiety and depression); and 3) a *comprehensive-needs* class with high-need in all domains with the exception of mental health deficits. Interestingly, a fourth class of offenders also emerged at the 36-month follow-up—namely one characterized by high rates of substance use and moderate needs in the domain of antisocial personality, but low-needs in all other domains (i.e., *minimal-needs substance-using* class).

On the basis of prior research, it was hypothesized that four classes would emerge: 1) an *overall low-need class*; 2) a *victimized/internalizing class* with evidence of victimization, deficits in mental health, and serious substance abuse; 3) a *normal functioning/drug dependent class* who have significant substance use problems, but few other risk factors, and 4) *a traditional antisocial class* that possess the *Big Four* risk factors (i.e., criminal history/dynamic criminal involvement, antisocial peers, criminal attitudes, antisocial personality; Andrews & Bonta, 2010).

Two classes emerged that were consistent with our hypothesis: a class characterized with low-needs across all domains (i.e., *minimal-needs* class), and a class with significant substance use problems, but with little other treatment needs (i.e.,

minimal-needs substance-using class). However, contrary to the hypothesis, a pure victimized/internalizing class—one characterized primarily by victimization, substance use, and internalizing mental health deficits- did not emerge. Although the *complex-comprehensive-needs* class was characterized by these factors, this class also evidenced a number of traditional risk/needs. Additionally, although it was hypothesized that a *traditional antisocial class* would emerge characterized primarily by the *Big Four* (i.e., criminal history/dynamic criminal involvement, antisocial peers, criminal attitudes, antisocial personality; Andrews & Bonta, 2010), the *comprehensive-needs* identified was not defined exclusively by these gender-neutral risk factors, but rather, also had the highest rate of victimization of all the resultant classes.

Importantly, as the victimization measure utilized in the present study failed to account for cumulative historical trauma or childhood victimization—types of victimization which may be more salient in the lives of females—this measure may be more relevant for males than for females. As such, conclusions drawn from these results are tentative and need replication. However, keeping this caveat in mind, none of the classes identified at any time point were characterized predominantly by either gender-responsive or gender-neutral risk factors, suggesting that males and females may be more similar than different in their treatment profiles.

Examining Profile Stability

A second goal of this study was to test the stability of this typology over time, both in terms of the number of classes that emerged, and the profiles of the resultant classes. It was hypothesized that the diversity in subtypes of offenders would likely widen over time, as a result of a) having the opportunity for more life experiences and b)

a change in the importance of certain risk factors (e.g., as one becomes older, the influence of peers changes; Monahan et al., 2009).

Differences in the number of classes over time. In line with the presented hypothesis, results of a series of LPA's suggest that the heterogeneity of offenders increases over time. Specifically, a 3-class solution best fit the data at T-12 and T24; however, a 4-class solution emerged at T-36. Although the profiles were not identical across each time point, three similar profiles emerged at each wave: *a minimal-needs* class, typified by low needs across most domains compared to the other classes, and two classes who scored high on most domains but differed primarily on measures of depression and anxiety and alcohol use, labelled a *comprehensive-needs* class, and a *complex-comprehensive-needs* class. Importantly, a fourth class emerged at T-36 that represented a class of youth characterized primarily by alcohol use, and a moderate antisocial personality (i.e., higher than the minimal-needs class, but lower than the other two classes).

Differences in the defining features of each class over time. Overall, the defining features of the *minimal-needs* class changed very little over time; this class scored consistently lower in all domains relative to all other classes across all time points, However, there were differences in the relative importance of the employment/education domain between classes over time (to be discussed below).

More sizable differences were seen in the defining features of the two comprehensive-need classes over the various time points. Specifically, at T-12 the *complex-comprehensive-needs* class and the *comprehensive-needs* class had comparable needs in all domains, with the exception of internalizing mental health deficits (the

complex-comprehensive-needs class scored higher) and alcohol use (the *comprehensive-needs* class scored higher). However, at the 24 and 36-month follow-ups, the *complex-comprehensive-needs* class not only had higher needs in depression and anxiety, but also scored moderately higher in antisocial personality (M = 40.01, vs. M = 37.66) and scored lower on the measure of legal legitimacy (M = 2.07 vs. M = 2.26). An additional difference at T-36 was seen in the criminal peer domain; the *comprehensive-needs* class had more criminal peers compared to all other classes, including the *complex-comprehensive-needs* class despite having a comparable number of criminal friends at the 12 and 24-month follow-up.

Overall, these slight differences could be due to youth transitioning from one class to another over time. For example, it is possible that a youth classified as having comprehensive-needs at T-12 subsequently developed depression and anxiety, thereby placing them in the *complex-comprehensive-needs* class at T-24. As a result of this transition, it seems logical that the means on other domains for each of these two classes would change, as would one's overall interpretation of each class. Alternatively, it could simply be the result of measurement error, or possibly improvement of measuring a particular construct over time.

Importantly, a fourth class emerged at T-36 that represented a class of youth characterized primarily by alcohol use and a moderate antisocial personality (i.e., higher than the minimal-needs class). It was initially surprising to see an elevated score on antisocial personality domain, given the relatively low needs in all other domains (with the exception of alcohol use). However, the proxy measure of antisocial personality used for Study 1B was the impulsive/irresponsible subscale of the Youth Psychopathic Traits

Inventory (YPI; Andershed et al., 2002). As substance use and impulsivity often co-occur in adolescent populations (e.g., Robbins & Bryan, 2004), the comorbidity of these factors in a generally low-need class is not entirely unexpected.

Change in the importance of distinguishing class characteristics. Interestingly, the importance of certain domains in distinguishing among classes also changed over time. For example, the employment/education domain did little in distinguishing classes at baseline or T-12; however, this domain became more of a distinguishing characteristic among classes in later waves. Specifically, while there were no differences among classes in this domain the 12-month follow-up (i.e., all classes had an equal probability of being employed or being in school), the probability of being employed or in school at T-24 was significantly higher for the *minimal-needs class* than for the *complex-comprehensive-needs* class and was comparable to the *comprehensive-needs* class. At T-36, the probability of being employed or in school was significantly higher for the *minimal-need substance-using class* (p = .88) compared to both the comprehensive-need classes (p = .65 to .70). The *minimal-needs* class also had a higher probability of being employed or being in school compared to the *comprehensive-needs* class (significant difference) and the *complex-comprehensive-needs* class (non-significant difference) at the 36 month-follow-up.

What these results might suggest is that education (i.e., attending school vs. not attending school) may not differentiate youth who are low-need from those with a more comprehensive treatment profile; however, being employed (vs. unemployed) may play a larger role in distinguishing between those who desist or persist later in adolescence. This finding is in line with research that suggests that the importance of risk factor changes as

one transcends from adolescence (van der Put et al., 2012). Additionally, this is in line with literature on desistance that suggests that gainful employment may be a key factor in one's exit out of crime (for review, see Maruna, 1999).

Differences over time in the proportion of youth within each class. One would expect that as an individual moves from adolescence to early adulthood, receives treatment, and begins the process of desistance, they would be more likely to fall into the *minimal-needs* class. However, this study failed to support this contention; the proportion of offenders identified as having low needs in all domains decreased over time, with 64% of the males and 70% of the females classified as having low-needs at the 12-month follow-up (T-12) and only 56% of females and 56% of males being classified as low-need at the 36-month follow-up (T-36). Although only speculative, it appears as though the proportion of youth who may have fallen into the *minimal-needs* class in earlier waves, may have moved into the class characterized primarily by substance abuse. Importantly, both the *minimal-needs* class and the m*inimal-needs substance-using* class were relatively low risk (i.e., both classes scoring lower on measures of criminal history compared to both comprehensive-needs classes) suggesting that both classes are making the transition out of a criminal lifestyle. The identification of a class characterized predominantly by alcohol use at a later time point is not entirely unexpected as the prevalence of alcohol and other drug use increases as one transitions from early to late adolescence, and generally peaks in early adulthood (Griffon & Botvin, 2010; Young et al., 2002).

Perhaps not as surprising, the proportion of youth classified as having comprehensive-needs also declined over time. Specifically, the *complex-comprehensive*

needs class comprised roughly 8% of the population at T-12, but only 3% at T-36. Similarly, the proportion of youth assigned to the *comprehensive-needs* class declined from 27% at T-12 to 16% at T-36. Importantly, this study was unable to speak to the effects of treatment on change in class membership; future research may wish to explore the impact of correctional interventions on change in class membership over time. Notwithstanding this limitation, these results are in line with what one might expect in a population of adolescent offenders; specifically, according to Moffitt's (1993) typological work, only a small percentage of youth persist in a criminal lifestyle (i.e., Life-Course Persistent offenders).

Alliance with Existing Taxonomies

As with previous taxonomies of adolescent offenders (Brennan, 2008; Onifade et al., 2010; Simourd et al., 1994), the largest class in the present study was comprised of those with low-needs across all domains. The proportion of youth classified as low needs ranged from 55% to 70% across all time points in the study.

The *comprehensive-needs* class was the second largest class of offenders in the present study at baseline, with approximately 40% of the males and 30% of the females falling into this class. However, as mentioned previously, the proportion of youth classified as having high needs in all domains (with the exception of internalizing mental health deficits) decreased over time with only 18% of the males and 7% of the females classified as having comprehensive-needs at the final wave of this study (T-36). Relative to previous offender classifications, this group of offenders most closely resembled the generalized high risk/need group identified by Simourd et al. (1994), the comprehensive-needs group identified by Onifade and colleagues (2010), and conceivably Moffitt's

(1993) life course persistent offender, though the chosen analyses for the present study precludes the examination of offending trajectories. Specifically, Moffitt's typology of offenders suggests that the LCP offender represents only a small proportion of adolescent offenders, and that the majority of youth—referred to as Adolescent Limited offenders-will desist in late adolescence.

The *complex-comprehensive-needs* class identified in this sample was the smallest of all the classes across all time points, representing only 6% to 9% of the participants across the various waves. This class most closely resembles what some have argued to be a gendered pathway to crime (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008). Specifically, this group was epitomized by the comorbid occurrence of drug and alcohol abuse, victimization and internalizing mental health deficits. Salisbury and Van Voorhis (2009) identified two groups of women offenders that closely map on to this *complex-comprehensive-needs* class. Specifically, both their *childhood victimization model* and *relational model* reflected groups of women who were victimized (either in childhood or in the context of intimate relationships in adulthood), and had both substance use and mental health difficulties (i.e., anxiety/depression). Further, Jones et al. (2014) also identified a group of girls in their sample who had suffered abuse and had mental health issues (in addition to being economically marginalized—a variable not examined in the present study). Importantly, unlike these previous studies, the *complex-comprehensive-needs* class also presented a number of traditional risk factors for crime, including criminal peers, criminal attitudes, and antisocial personality. These results were a little unexpected, as previous quantitative research has found evidence for an exclusive gendered-pathway—namely,

one that is characterized primarily by factors deemed important by the feminist pathways paradigm (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008). One possible explanation for this divergent finding is that a number of these studies (e.g., Simpson et al., 2008) did not include the full spectrum of risk factors deemed salient by gender-neutral proponents. Arguably, the exclusion of key traditional gender-neutral risk factors would limit their ability to identify classes of girls and women who follow more mainstream pathways into crime (i.e., one characterized primarily by the Central 8; Andrews & Bonta, 2010).

The *minimal-need substance-using* class that emerged exclusively at the 36-month follow-up most closely resembles Daly's (1992) *drug-connected women*, and Brennan and colleagues (2012) *normal-functioning drug-dependent* types. Interestingly, a class characterized predominantly by substance use has not previously been found in typologies generated on samples of adolescents. One possible explanation for this finding is that most studies that have generated a typology have done so with cross-sectional data at a time when one's needs would likely have been high (i.e., at or around the time of committing an offence, in the case of offender samples). However, as youth age, their need profiles evolve; as such, an examination of typological stability is essential to guide treatment efforts. Importantly, although this class had exceptionally high-rates of alcohol use and moderate needs in the antisocial personality domain, this class had comparable rates of offending at the 36-month follow-up compared to the minimal-needs class suggesting they are in fact low-risk. As such, it is possible that this class represents a group of youth simply experimenting with substances having reached late adolescence (i.e., a time when substance use peaks; Griffon & Botvin, 2010; Young et al., 2002).

Gender Differences (and Similarities) in Class Assignment

The feminist pathways perspective argues that female's pathways into crime are qualitatively different from their male counterparts (e.g., Arnold, 1990; Daly, 1992; 1994; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Dehart, 2008; Gilfus, 1992; Jones et al., 2014; Richie, 1996; Salisbury & Van Voorhis, 2009). Indeed, gendered subtypes of offenders have consistently emerged in previous taxonomic work on female offenders (Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al. 2014; Salisbury & Van Voorhis, 2009; Simpson et al., 2008). However, a large proportion of this evidence has stemmed from studies that have failed to include a male comparison group, thereby precluding the ability to claim that these gendered pathways are truly unique for females. Addressing this limitation, the present study incorporated a male comparison group and found that there is substantial overlap among males and females in their pathways to crime (i.e., the way in which risk factors cluster together).

A mentioned previously, the largest class was the *minimal-needs* class; indeed, the majority of both the male and female subsample fell into this class across all waves of the study. At baseline, there were two noteworthy gender differences in classification between the remaining two classes. Foremost, there were a larger proportion of males in the *comprehensive-needs* class relative to females. This is not entirely unexpected, as on the whole, males tend to possess more risk factors than their female counterparts (e.g., Rowe, Vazsonyi, & Flannery, 1995). Second, the proportion of females was significantly higher within the *complex-comprehensive-needs* class compared to the proportion of males. What this may suggest is that although there are males who have comorbid mental health deficits, substance abuse, and victimization experiences (in addition to a number of

traditional risk factors for crime), this amalgamation of treatment needs is more common among females.

In the subsequent time points, gender differences in class assignment were not as apparent. Specifically, there were no differences at either the 12-month or 24-month follow-up. However, at the 36-month follow-up there was a larger proportion of females in the *minimal-needs substance-using* class and the *complex-comprehensive-needs* class and a larger proportion of males in the *comprehensive-needs* class.

The finding that males made up a larger proportion of the *comprehensive-needs* class is in line with research that suggests males are higher risk than females and therefore have higher rates of serious delinquency (Farrington & Painter, 2002; Piquero, Farrington, & Blumstein, 2003; Rowe et al., 1995). However, what was surprising was that the proportion of females assigned to this class at earlier time points was comparable to that of males and that gender differences were only prominent in the 36-month follow-up. What this might suggest is that there are more similarities in the treatment profiles of high-risk youth in mid-adolescence; however, as youth reach late adolescence (average age at T-36 was 19 for the *comprehensive-needs* class), the profiles of males and females may begin to diverge. Specifically, at later time points a small proportion of females remained classified in the *complex-comprehensive-needs* (6%) or *comprehensive-needs* class (7%); however, the remainder were classified in one of the two low-need classes (88%). These results are in line with research that has found that a) females on the whole are generally lower risk compared to males (Rowe et al., 1995), and b) males are more likely to be classified as life-course persistent offenders (Moffitt & Caspi, 2001; Moffitt,

2006), thereby explaining why there was a larger proportion of males in the comprehensive-needs class (18%) in the last wave of the present study (T-36).

In sum, although marginal gender differences emerged at the 36-month follow-up, these results are in conflict with previous research that has found a gendered pathway *exclusively* for females within a mixed-gender sample. Specifically, Jones and colleagues' (2014) had a subset of girls in their sample who had a history of abuse, running away, poverty, and mental health deficits—factors that typify what feminist scholars consider to be a gendered pathway into crime (Daly, 1992; Salisbury & Van Voorhis, 2009). However, this study carried out their thematic analysis on females and males separately, therefore being unable to speak to whether there were males who fell into predominantly female theme, or visa versa. Brennan and colleagues (2008) also examined a mixed gender sample; however, they failed to disaggregate their results by gender and as such, they too were unable to speak to overlap in classification between males and females. All in all, as this is one of the first quantitative studies to examine how risk/need factors cluster together using a combined sample of males and females—and in combination for the analyses- this finding needs replication.

What about Age?

Although similarities were found between the types of offenders that emerged in this study and those found in the literature, the impact of age on class assignment was not consistent with previous research. Specifically, a study on youthful offenders placed in a diversion program ($N = 137$) found younger youth to have more problems at baseline than older youth (Dembo et al., 2008). However, the current study found that youth in the *comprehensive-needs* class were significantly older than those in the *minimal-needs* class

at T-12. Intuitively, this makes sense, as those older in age will have likely been embedded in a criminal lifestyle longer than younger youth, and therefore will have a more comprehensive treatment profile. As such, this difference could be the result of sampling variability; Dembo and colleagues' study involved a sample of presumably low-risk youth (i.e., participating in a juvenile diversion program), while participants in the present study were high-risk youth who had been formally adjudicated.

The present study also found that those in the *minimal-needs substance-using* class were significantly older than the *minimal-needs* class at T-36. As previously discussed, substance use peaks in late adolescence, and therefore being moderately older than the other classes appears to fit this profile. All in all, as few studies have explicitly examined differences in age among resultant risk/need typologies, future research is needed to elaborate on this finding.

Class Differences in Risk

Although only an ancillary goal of the present study, differences in overall risk – as measured by cumulative number of official arrests and self-report offending—were also examined across the resultant profiles. On the whole, results were as expected—those with more identified needs also self-reported a higher number of offences. Specifically, those in the *complex-comprehensive-needs* class and the *comprehensive-needs* class self-reported more criminal acts, and although not significant, also had a higher cumulative number of official arrests compared to the minimal-needs class and the *minimal-needs substance-using* class (at the 36-month follow-up).

Interestingly, self-report offending distinguished classes better than aggregate number of official arrests. This is not surprising, as youth generally don't get caught for

every offence they commit. Further, official records data does not account for police discretion, a victim's decision to report a crime, less serious crimes that less likely to be detected, and differences in legal definitions across various jurisdictions (Piquero, Schubert, & Brame, 2014). As such, self-report measures often encapsulate a wider range of offences than official records data, thereby providing more variability among the resultant classes.

Limitations and Directions for Future Research

This study had a number of limitations that are worth noting. Most importantly, the measures selected to represent each domain were limited to those available in the data; as such, several measures may not be theoretically aligned with the ideal conceptualization of each domain. For example, the proxy measure of victimization utilized in the present study (i.e., victim subscale of the Exposure to Violence Scale; Selner-O'Hagan et al., 1998) is a tool that includes a wide range of victimization experiences. However, the majority of the questions inquire about non-gendered based victim experiences (e.g., "In the last N months, have you been shot at?") and therefore may be a better measure of the types of victimization more typically experienced by males. It may not truly capture the essence of gendered victimization, particularly historical victimization experiences that may have served as a catalyst for a girl's entry into crime or the cumulative effects of traumatic events over the lifetime. As such, future research looking to test the feminist pathways paradigm may wish to replicate these results using a measure that encapsulates victimization experiences that are particularly salient for females.

This study was limited in scope to risk factors that could be targeted in treatment; however, a number of factors may mitigate the effects of these risk factors on future re-offending (e.g., positive peer relations, school achievement, effective use of leisure time; Hoge, Andrews, & Leschied, 2006). As such, future research may want to explore how the addition of protective factors may add to the delineation of subtypes of offenders.

Another limitation of this study was that the age-graded nature of typologies was not fully examined. Although age was treated as a covariate in the present study, and therefore age did not directly impact class formation, future research may want to disaggregate the data to be able to test how profiles change across one's biological age (e.g., 14-, 15-, 16-year olds).

It is also unclear as to how the uneven distribution of males and females in the present data may have impacted these results. It is plausible that the large proportion of males may have been driving the formation of the classes, thereby potentially masking any subtle gender differences that might exist. As such, sample size permitting, future research may wish to explore how typologies would vary if one were to analyze males and females separately (vs. in a combined sample as in the present study).

Lastly, this study was only able to speak to the *relative* importance of treatment needs over time (compared to other classes). The absolute importance of these factors in terms of determining what is a low, moderate, or high need could not be determined on the basis of the variables selected for this study or the chosen analysis.

Summary

Evidence suggests there are different types of female offenders (e.g., Brennan et al., 2012; Holfreter & Morash, 2003; Jones et al., 2014; Salisbury & Van Voorhis, 2009;

Simpson et al., 2008), that gender-neutral risk assessment tools may work differentially for these various subtypes of offenders (Reisig et al., 2006) and that gender-responsive programming may only be effective for certain types of offenders who present gendered risk/need factors (i.e., trauma & mental health; Day et al., 2015). However, the majority of this work stems from studies comprised entirely of males; as such, it is unclear from the literature if there are subtypes of male offenders who look similar to females in terms of their treatment needs. The development of a gender-informed typology of offenders (i.e., one that is informed by both gender-responsive and gender-neutral perspectives, and incorporates males and females to be able to speak to differences as well as similarities in profiles) as the present study sought to do, is critical step in effective service delivery for male and female youthful offenders.

Results of the present study suggest that youth can be reliably classified on the basis of gender-neutral and gender-responsive treatment needs, and that the heterogeneity of these types of offenders increases over time. Additionally, there is substantial overlap in the theoretical orientation that defines the treatment needs of adolescent offenders. Therefore, this study echoes the recommendations others have made as to the importance of theoretical integration (e.g., Brennan et al., 2012; Jones et al., 2014) when attempting to understand the variability in offender populations. Overall, while this study is a first step to identifying an underlying taxonomic structure within a population of adolescent offenders, these results need replication, preferably using a mixed-gender sample, and drawing from multiple theoretical perspectives.

CHAPTER 3

Study 2: Examining Gender-Informed Pathways to Crime with Multi-wave Data.

Study Rationale

Across a number of gendered pathways (i.e., street women, battered women, harmed and harming women; Daly, 1992), abuse or victimization is thought to play a primary role in female offending behaviour and to be the catalyst for subsequent criminal behaviour. As suggested in early qualitative work, it is important to note that not all criminally involved women have been victimized (Daly, 1992), and not all victimized girls/women go on to commit crime. Nevertheless, there has been a significant amount of research that has found a high prevalence of trauma and victimization among samples of female adolescent delinquents and adult female offenders.

Prevalence of Victimization and Trauma

Among female juvenile offenders, prevalence rates of victimization and trauma range from 22% to 70% (Belknap & Holsinger, 2006; Cauffman, et al., 1998; Chesney-Lind & Shelden, 2004; Gaarder & Belknap, 2002; Smith & Thornberry, 1995). Among adult female offenders, although there is some variability among studies, these rates remain alarmingly high with estimates of abuse ranging from 18.3% to 94% (Browne, Miller, & Maguin, 1999; Marquart et al., 2001; McClellan et al., 1997).

A number of studies have also documented gender differences in the prevalence of trauma. Specifically, studies that have found that among youthful offenders victimization reported by girls exceeds that reported by boys (Belknap & Holsinger, 2006; Cauffman et al., 1998; Chamberlain & Moore, 2002; Dembo et al., 1993). For example, Cauffman et al. found that 65.3% of the juvenile offenders in their sample had

displayed symptoms of PTSD over the course of their lives, compared to 32.3% of an equivalent male juvenile offender population. Additionally, Belknap and Holsinger's (2006) study of incarcerated youth (281 boys, and 163 girls) found that relative to boys, girls reported significantly greater amounts of all types of abuse (i.e., physical, verbal, sexual), irrespective of whether a family member, significant other, or stranger had carried out the abuse.

Notably, the risk of victimization within relationships is higher for females compared to males in both childhood and in adulthood. Messina and colleagues (as cited in Covington, 2002) found that women who had participated in a treatment program while in prison were two times more likely to report child abuse and eight times more likely to report abuse as an adult, relative to the men in the sample. Other studies have found that women are approximately three to four times more likely than men to have been physically or sexually abused prior to incarceration (Harlow, 1999; Snell & Morton, 1994).

Importantly, a review of the literature reveals that this gender difference is complex. The prevalence of trauma or victimization among justice-involved youth varies as a function of the type of trauma, how trauma is defined, and the population being studied (Kerig & Becker, 2012). Kerig and Becker's (2012) review of the literature (k = 14) found that prevalence rates of PTSD among studies of juvenile delinquents ranged from 5% to 52% for girls and from 2.2% to 32% for boys. Notably, in 8 of the 11 studies that directly compared males and females, girls were significantly more likely to experience more PTSD symptoms or to be diagnosed with PTSD than boys.

In a similar vein, Maschi, Stimmel, Morgen, Gibson, and O'Mary (2012) reviewed the literature on the relationship between trauma and posttraumatic stress disorder (PTSD) and delinquency. The review incorporated studies that examined both PTSD and trauma in tandem, and limited the review to samples of incarcerated youth, and those that were published in the previous 20 years (1990 to 2010). Notably, as with Kerig and Becker's review (2012), definitions of trauma varied tremendously across studies and included witnessing violence (e.g., exposure to violence in the community), direct victimization (i.e., sexual, physical, and/or emotional assault/abuse, domestic violence), neglect, and life event stressors (e.g., family dysfunction, parental substance abuse). Importantly, of the five studies reviewed that incorporated both males and females in their sample, four found higher rates of trauma and PTSD for female juvenile delinquents compared to males.

Linking Victimization/Trauma to Offending

Irrespective of gender differences in the prevalence of trauma and victimization, the link between trauma/victimization and delinquency has been found with both female (e.g., Gilfus, 1992; Messina, Burdon, Hagopian, & Prendergast, 2006) and male samples (Falshaw, Browne, & Hollin, 1996; Lemmon, 1999; Maschi, 2006). However, some argue that the link between victimization and delinquency varies as a function of gender. For example, it has been suggested that males are more likely to respond with externalizing behaviours (e.g., aggression; Turner, Finkelhor, & Ormrod, 2006). Whereas females are more likely to develop internalizing problems that manifest in an array of mental health problems, such as anxiety, depression, or PTSD (Cauffman et al., 1998; Turner, et al., 2006). Further, the relationship between past abuse and substance use (a

potential mediation variable in the relationship between victimization and offending) has been found to be stronger for incarcerated women, than incarcerated men (McClellan et al., 1997).

Grella and colleagues' (2005) study included women ($N = 440$) receiving substance abuse treatment who had recently been released on parole. Using a structural equation modeling (SEM) approach, significant relationships between early victimization (i.e., sexual abuse, physical abuse, and family violence), adolescent substance abuse, adolescent conduct problems, psychological distress, and criminal behaviour were found. Notably, this study was based upon the retrospective accounts of abuse and adolescent delinquency. As such, the temporal ordering of these variables could not be discerned. Further, this study excluded males thereby limiting the ability to imply gender-saliency (i.e., important for females, but not for males).

Using cross-sectional data, McClellan and colleagues (1997) examined the differences found in substance use, depression, and childhood and adult victimization among male ($n = 500$) and female ($n = 1030$) adult inmates. Overall, this study revealed several compelling differences that substantiate female salient pathways to crime. Specifically, it was found that women had higher rates of child and adult victimization, depression, and overall illicit drug use. Additionally, although simply correlational, the relationship between victimization and drug use was stronger for females ($r = .30$) than for males ($r = .18$). Overall, as the data was cross-sectional and retrospective in nature, whether these gender-informed factors were causally related to their criminal behaviour could not be discerned. Nonetheless, these results do suggest that women's pathways from early victimization to criminal behaviour may be qualitatively distinct from men's.

King et al. (2011) examined the prevalence of childhood maltreatment and its relationship with current psychiatric disorders among 1735 detained youths (1095 males, 640 females). In line with previous prevalence research, it was found that females had higher rates than males of physical abuse (75% vs. 66%) and sexual abuse (40% vs. 10%). Further, upon examination of DSM diagnoses of psychiatric disorder, it was found that females who experienced various types of abuse were 2.6 to 10.7 times more likely than females with no maltreatment to have been diagnosed with a psychiatric disorder. Importantly, this relationship was not exclusive to females. With the exception of anxiety disorders, maltreatment was also associated with every disorder for males. Interestingly, of those with a history of violent abuse, females displayed more anxiety and affective disorders in comparison to males who were more likely to be diagnosed with attention-deficit hyperactivity and substance use disorders.

Overall, King and colleagues' (2011) study lends support to the feminist pathways model, as it demonstrates the high co-occurrence of abuse, maltreatment and substance use among female adolescent offenders. However, this study also highlights how responses to particular types of trauma may be moderated by gender. Specifically, research has found that females are more likely to experience internalizing disorders (e.g., mental health), whereas males are more likely to respond with externalizing behaviours (Cauffman et al., 1998; Turner et al., 2006). Notably, as with most feminist pathways literature, this study relied on the retrospective account of victimization using cross-sectional data. As such, given the amount of time that may have passed between the trauma and the time of recall, it is questionable as to whether the relationship between

childhood maltreatment and psychiatric disorders is direct, or if are there other mediating variables accounting for this relationship.

All in all, this body of work suggests that victimization and trauma are prevalent among offender populations, and that the consequences of trauma—which are hypothesized to vary by gender- may help explain why some females (and males) become involved in criminal acts. This contention is in line with the feminist pathways perspective that has found that a number of pathways women take to the criminal justice system are propelled by trauma or victimization.

Trauma Pathway

Based on early qualitative research on women and girls (Arnold, 1990; Daly, 1992; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Dehart, 2008; Gilfus, 1992; Richie, 1996), feminist pathways proponents argue that female offending behaviour is often catalyzed by victimization and/or trauma, and further exacerbated by mental health difficulties, substance use, and economic marginalization. This pathway, sometimes referred to as the trauma pathway, has garnered support in both adult and juvenile offender samples, using both qualitative (e.g., Daly, 1992; Gilfus, 1992) and quantitative (e.g., Jones et al., 2014; Salisbury & Van Voorhis, 2009) cross-sectional data. However, to date, feminist pathways researchers have yet to conduct research in which causation could be inferred among these variables (i.e., victimization, substance abuse, internalizing mental health deficits and delinquency).

Correctional interventions informed by mainstream correctional perspectives, such as RNR, are designed to target risk factors believed to be a) changeable/treatable, and b) linked to reducing one's risk to reoffend (i.e., criminogenic needs). Historically,

studies that have examined dynamic variables relied on one-time evaluations of risk (i.e., single-wave design) to assess the predictive validity of these constructs. However, according to change theorists, a risk factor can only truly be considered as such if a) it is correlated to the outcome of interest, b) it is measured prior to the outcome of interest, c) it is truly dynamic (i.e., changes are to be expected), and d) when change in the risk factor occurs, changes in the outcome of interest are also evident (Kraemer et al., 1997). However, few studies have examined *changes* in dynamic variables, accomplished either through treatment or simply the passage of time, to subsequent reductions in recidivism (Douglas & Skeem, 2005).

As feminist pathways proponents argue that correctional interventions should target gender-responsive risk factors (e.g., victimization, substance abuse, and mental health; Covington & Bloom, 2006), demonstrating how change in these variables is related to subsequent delinquency with multi-wave data could serve to reinforce the importance of developing gender-responsive correctional treatment initiatives. As such, the purpose of this study is to apply Kraemer et al.'s (1997) criteria for testing the dynamic nature of a variable (i.e., it is correlated to the outcome of interest, measured prior to the outcome of interest, is truly dynamic, and when change in the risk factor occurs, changes in the outcome of interest are also evident) to examine the longitudinal relationship between victimization, internalizing mental health deficits, substance abuse, and delinquency. Specifically, this study used utilized a sophisticated statistical technique to test whether changes in substance abuse and internalizing mental health deficits mediated the relationship between victimization and offending.

Research Questions and Hypotheses

The research questions that guided this study and the hypotheses stemming from them are as follows:

1) Is there a relationship between victimization and delinquency? In line with feminist pathways literature (e.g., childhood victimization pathway), and research that has supported the relationship between victimization and delinquency among males (e.g., Falshaw et al., 1996; Lemmon, 1999) and females (e.g., Gilfus, 1992; Messina et al., 2006), it is hypothesized that there will be a significant direct relationship between victimization and delinquency.

2) ***Is the relationship between victimization and delinquency mediated by substance use and/or internalizing mental health deficits?*** In line with the feminist pathways model, and the premise that substance use and the development of internalizing mental health disorders are typical responses to trauma (Covington, 1998), it is hypothesized that the relationship between victimization and delinquency will be mediated by substance use and internalizing mental health deficits.[13]

3) Is the indirect effect of victimization on delinquency through changes in substance abuse and internalizing mental health deficits (examined separately) moderated by gender? As previous research suggests that the etiology of female substance use is qualitatively different for females compared to males (e.g., Cauffman, Lexcen, Goldwebet, Shulman, & Grisso, 2007), and in light of taxonomic research that has found victimization and substance use to co-occur among samples of women

[13] Importantly, although the pathways perspective suggests that substance abuse and mental health are often co-occurring disorders, the chosen analyses are not suited to examine an interaction of mediators. As such, as a first step, these models will be tested separately.

(Salisbury & Van Voorhis, 2009) and girls (Cuevas, Finkelhor, Turner, & Ormrod , 2007; King et al., 2011), it is hypothesized that the indirect effect of victimization through substance abuse will be moderated by gender.

Further, given the research that has found more substantial mental health needs among female offenders (e.g., Cauffman et al., 2007; Teplin et al., 2002), and research that suggests that males are more likely to respond with externalizing behaviours and females are more likely to internalize their response to trauma (Cauffman et al., 1998; Turner et al., 2006), it is hypothesized that this indirect relationship of victimization to offending through internalizing mental health deficits will be stronger for females than for males.

4) Do these direct, indirect, and conditional indirect effects hold across time? Given the dearth of research that has examined feminist pathways-informed variables with longitudinal data, whether this dynamic relationship holds across time will primarily be exploratory in nature. However, in light of the typological research that has found significant histories of abuse, substance abuse, and mental health disorders in samples of both girls (e.g., Chesney-Lind & Rodriguez, 1998) and women (e.g., Salisbury & Van Voorhis, 2009), it is hypothesized that these effects will hold across time.

Study 2 Methods

This study used archival data provided by the Pathways to Desistance project, a longitudinal study of juvenile offenders designed to examine persistence and desistance from criminal behaviour over time (see Mulvey, 2012). A detailed description of the study methodology is provided by Schubert and colleagues (2004). However, for the

present study, only select waves of data were utilized including T-6 through T-36; as such, the following description pertains to these data.

Participants

Data for the present analysis was from follow-up interviews carried out between 2000 and 2003, with 1,354 adjudicated adolescent offenders (184 female, 1170 male) recruited from Philadelphia and Phoenix to partake in a prospective, longitudinal study of juvenile offending. Youth had to have been between the age of 14 and 17 at the time of their index offence, and have been found guilty of serious criminal offences (i.e., primarily felonies, in addition to a few misdemeanour property offences, sexual assaults, or weapons offences) to be included in the study.

As a whole, the sample was primarily African American (41.4%), followed by Hispanic (33.5%), Caucasian (20.2%), and other ethnicities (4.8%).[14] Table 21 displays the average age, by gender, for each of the time points used in the present study.

Table 21

Mean Age by Gender over Selected Time Points

	Males' Age		Females' Age	
Time Point	*n*	*M* (*SD*)	*n*	*M* (*SD*)
T-6	1094	16.57 (1.58)	171	16.47 (1.10)
T-12	1087	17.05 (1.17)	175	17.00 (1.06)
T-18	1058	17.52 (1.15)	171	17.47 (1.12)
T-24	1061	18.03 (1.16)	170	17.96 (1.05)
T-30	1061	18.50 (1.16)	173	18.45 (1.09)
T-36	1056	19.02 (1.16)	176	18.98 (1.04)

[14] The ethnic composition of the sample did not vary significantly by gender, χ^2 (3) = 6.55, p = .09.

Measures

Victimization. As a proxy measure of victimization, the victim subscale was utilized from a modified version of the Exposure to Violence Inventory (ETV; Selner-O'Hagan et al., 1998), a tool used to assess the frequency of exposure to violent events. The ETV victim subscale is comprised of six items and documents the types of violence the adolescent had experienced in the recall period. Notably, this measure included primarily non-gendered types of victimization (e.g., "In the past N months, have you ever been chased where you thought you might be seriously hurt?"), however, also included one item more representative of the types of victimization common to women and girls (e.g., “In the past N months, have you been raped, had someone attempt to rape you, or been sexually attacked in some other way?”). Higher scores on this subscale are indicative of having been victim to a greater amount of violence.

The original scale has been found to have acceptable internal consistency (Cronbach’s α = .68 to .93) and good test-re-test reliability (interclass correlations = .75 to .94) in a community sample of male and female youth, ages 9 to 24 (Selner-O'Hagan et al., 1998). Notably, the modified version of the victim subscale (comprised of 6 items) also had acceptable internal consistency (α = .51 to .54) at the selected time points, in light of the limited number of item comprising this scale (i.e., having a small number of items impacts reliability estimates).

Substance abuse. The Substance Use/Abuse Inventory (Chassin et al., 1991; DeLucia et al., 2001) was modified by the Pathways working group to measure the adolescent’s drug and alcohol use over the last 6 months. Four variables were chosen to develop a substance use latent construct, including the following: 1) the frequency of

alcohol use over the last 6 months (i.e., how often the youth had alcohol to drink in the recall period). This subscale was scored on a Likert scale ranging from 0 (*not at all*) to 8 (*everyday*); 2) the number of alcoholic drinks usually consumed (range from 0 to 40); 3) the number of times the youth drank 5 or more drinks within the recall period. This subscale was also scored on a Likert scale ranging from 0 (*not at all*) to 8 (*everyday*); and lastly, 4) and the number of different types of drugs used in the last 6 months (range = 0 to 9). As a whole, this scale has been found to be predictive of both self-report offending, and official number of arrests (Mulvey et al., 2010; Schubert et al., 2011).

Internalizing mental health disorders. The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used to measure two internalizing mental disorders. As a whole, the BSI is a 53-item self-report inventory in which participants rate their concern over a number of symptoms in the past week (0 = *not at all* to 4= *extremely*). However, for the present study, only three subscales were selected to represent an internalizing mental health deficit construct: depression (e.g., "feeling no interest in things"), anxiety (e.g., "feeling tense or keyed up") and psychoticism (e.g., "the idea that something is wrong with your mind"). The depression (Cronbach's α = .79 to .82), anxiety (Cronbach's α = .75 to .77), and psychoticism (Cronbach's α = .60 to .69), subscales were found to be acceptably reliable among the selected time points. Further, as a whole, the BSI has demonstrated good convergent validity with the Minnesota Multiphasic Personality Inventory (Derogatis, 1992). Importantly, these items were examined within an exploratory factor analysis (EFA) to ensure that they were in fact measuring the same latent construct; results of the EFA are presented below.

Self-report criminal behaviour. Self-report criminal involvement was used to assess criminal history within each recall period.[15] The measure was adapted from Huizinga, Esbersen, and Weihar's (1991) self-report offending tool and is comprised of 24 items that inquire about the youth's involvement in a variety of criminal activities. The *frequency score* subscale utilized for the present study was simply the sum of frequencies reported for the 24 criminal acts (i.e., the total number of criminal acts committed, irrespective of the type).

The psychometric properties of this modified scale have not yet been reported.[16] Notably, using internal consistency to assess reliability is not appropriate as there is not an expectation that responses will be highly correlated (Thornberry & Krohn, 2000). However, for self-report offending measures more generally, test-retest reliability has been found to be strong (r = .85 to .99), and the predictive validity of these measures has been established (for review, see Thornberry & Krohn, 2000).

Time on the street. To control for differential exposure to various need factors, and subsequently opportunities to engage in antisocial behaviour, the proportion of time

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[15] Notably, official record data could also have been used in these models; however, these data are "limited in their inability to: (1) measure all crime that is committed; (2) control for police, prosecutorial, and judicial discretion; (3) control for victim decisions to report crimes; (4) include all crime types; and (5) systematically deal with variability in legal definitions" (Piquero et al., 2014, p. 527). Additionally, the correlation between self-report data and official records data from the Pathways sample was found to be strong and relatively stable over time (Piquero et al.), and correlated for both males (Spearman's rho = 0.23) and females (Spearman's rho = 0.22; Brame, Fagan, Piquero, Schubert, & Steinberg, 2004). As such, self-report data were utilized for the present study.

[16] A number of the measures selected for this study were modified by the Pathways working group; as such, several of them had limited psychometric data available. As data at the individual item-level are not publicly accessible, reliability coefficients for each scale at each time-point were retrieved from the Pathways to Desistance website.

in a community setting within the recall period (range 0 to 1) was utilized as a covariate within each model tested.

Analyses Plan

In this study, data cleaning was carried out in SPSS (v22), and the primary analysis was conducted in MPlus 7.3 (Muthén & Muthén 1998-2012). A three-step process was used for the present study. First, a series of exploratory factor analyses (EFA) were carried out to ensure that the hypothesized latent constructs were adequately measured by the proposed dependent variables. Second, exploratory structural equation modelling (ESEM) was utilized to examine factorial invariance over time, to ensure that any change that occurred between time points could be attributed to change within the person, and not simply measurement error. Lastly, latent difference score (LDS) modeling, a specialized type of structural equation modeling (SEM) was used to examine the hypothesized direct effects, indirect effects, and conditional indirect effects (when applicable) over the selected time points.

Measurement model. Structural equation modeling allows one to examine the structural relationship among a number of constructs including latent constructs (when adequate measures are available for a given construct) and observed variables, when multiple measures of a construct are unavailable. The present study utilized two observed variables for the independent variable (i.e., victimization) and dependent variable (i.e., self-report offending); however, two latent constructs (i.e., internalizing mental health and substance abuse) were hypothesized to act as mediating variables in this relationship.

By using a latent variable approach, some of the common pitfalls associated with other types of change score models can be avoided (e.g., regression towards the mean,

reliability of the change score, increased estimates of variance; McArdle, 2001). Specifically, as multiple indicators at each time point assess each latent construct, the variance in each latent construct is error free; as a result, the change in variance is also measured without error (McArdle, 2001). However, using multiple indicators to measure change in manifest variables over time requires a consideration of adequate measurement invariance.

Simply put, a measure is thought to be invariant across time when the way in which a latent construct is measured is equivalent over time (Vandenberg & Lance, 2000). There are a number of ways to test for measurement invariance, ranging from factorial invariance—where the same factor structures are consistent across groups or time—to metric invariance—which demonstrates that a one unit change at one time is equal to a one unit change at another time period. If measurement invariance is not established, then the change in latent scores may not reflect true change in the construct, but rather measurement error (Asparouhov & Muthén, 2009). As such, evidence for causality would be weakened.

Testing for measurement invariance. Exploratory structural equation modelling (ESEM; Asparouhov & Muthén, 2009; Marsh et al., 2009, 2010) integrates features of EFA, Confirmatory Factor Analysis (CFA), and SEM and was used to explore the invariance of the two latent constructs over time. Configural invariance was first examined to confirm that the basic model structure was invariant over time. Subsequently, scalar invariance was examined as this is a requirement when one is interested in comparing mean scores (Milfont & Fischer, 2010; Vandenberg & Lance,

2000); establishing scalar invariance would demonstrate that the meaning of the construct, and the levels of its underlying items is equal across time points.

It should be noted that should scalar measurement invariance not hold, partial measurement invariance can be established by freeing parameters; however, this would ultimately impact the interpretation and conclusions drawn from the study. Varying factor loadings would mean that the underlying factors are not measuring the same underlying construct (i.e., internalizing mental health deficits or substance abuse), whereas varying item thresholds would suggest that the indicators of a factor are not functioning the same way over time. If factor loadings or item thresholds vary across time, changes over time cannot be attributed to true change in the individual, but rather may be the result of measurement error or a combination of true change and measurement error.

Notably, although these two parameters (i.e., factor loadings and item thresholds) can be examined separately when using continuous variables, categorical variables require both thresholds and factor loadings to be either fixed (or freed) in tandem (Muthén & Muthén, 2008-2012). To establish measurement invariance, a model in which the parameters are fixed (i.e., a model where thresholds and/or means are constrained to be equal over time) was compared to a model in which parameters are free to vary over time (i.e., a baseline model with no constraints) (see Table 22).

Table 22

Models to be tested to Ascertain Measurement Invariance of Substance Use and Internalizing Mental Health Latent Factors

Invariance Type	Definition
A. Configural Invariance	No equality constraints for parameters. Used as baseline model to compare more restrictive models: thresholds and factor loadings are allowed to vary across time points.
B. Scalar Invariance	Loadings and item threshold are invariant: both thresholds and factor loadings are constrained to be equal across time-points.

Assessing model fit. To evaluate the fit of the measurement models, including both the initial EFA's and the subsequent ESEM's, four indicators were used: 1) the Comparative Fit Index (CFI), 2) the Root Mean Square Error of Approximation (RMSEA), and 3) Tucker-Lewis Index (TLI), and 4) the Chi-Square Difference Test. The CFI is equal to the discrepancy function adjusted for sample size. CFI ranges from 0 to 1 with a larger value indicating better model fit. The TLI is another fit index that compares a hypothesized model to the observed data; TLI and CFI values greater than .90 indicate acceptable model fit, whereas values greater than .95 indicate good model fit (Hu & Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA) is related to residuals in the model; values range from 0 to 1 with a smaller RMSEA value indicating better model fit. Acceptable model fit is indicated by an RMSEA value of 0.08 or less (Hu & Bentler, 1999). Lastly, the chi-square difference test was calculated; specifically,

the DIFFTEST option in Mplus was used to obtain the correct Chi-Square difference test when WLSMV estimators are used (Muthén & Muthén, 2008-2012). A chi-square value close to zero indicates little difference between the expected and observed covariance matrices.

Structural model: Latent difference score SEM. Latent Differences Score (LDS) modelling within a structural equation modelling framework, was selected to test the moderated-mediation models proposed. Notably, while traditional mediation models are testing inter-individual differences, more recent mediation models, such as LDS modeling allows one to include intra-individual variation as a part of a mediation process (Selig & Preacher, 2009). Specifically, in LDS models, "change, represented by the difference between adjacent observations, is represented in the model as a distinct latent construct" (Selig & Preacher, 2009, p. 156). Importantly, modelling change as a latent construct is thought to minimize compounding measurement error that results from simply using change scores (McArdle, 2009).

Latent difference scores do not directly compute a difference score prior to analysis but rather use a structural model with strategically fixed parameters to model the difference score as a latent variable (McArdle, 2009). Multiple indicators of a latent construct are used to model the relation between each indicator and the latent construct by first introducing third latent score (Δf) representing the latent change between the two factor scores ($f1$ and $f2$). Subsequently, two of the coefficients are fixed to 1 so that the second latent factor ($f2$) is defined as the sum of $f1$ and Δf (McArdle, 2009).

Although a number of other options are available for examining mediation using longitudinal data, the LDS model was best suited to address the research questions and to

model the type of change expected (see Appendix A for a brief overview of analytical options considered).

Assessing model fit. As the distributions of both the independent and dependent observed variables departed from normality, bootstrapped confidence intervals were generated using sampling with replacement for each parameter estimate. Notably, Mplus does not produce bootstrapped fit statistics (i.e., RMSEA, CFI, etc.). As such, 1) the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and Tucker-Lewis Index (TLI) were first generated to assess overall model fit; however, bootstrapped estimates were generated for final parameter estimates. The models that were tested are presented in Table 23.

Table 23

Mediation Models to be Tested

Model 1A and 1B		
IV	Mediator	Dependent Variable
Victimization T6	Internalizing Mental Disorders Δ T6-T12	Delinquency T18
Victimization T24	Internalizing Mental Disorders Δ T24-T30	Delinquency T36
Model 2A and 2B		
Victimization T6	Substance Use Δ T6-T12	Delinquency T18
Victimization T24	Substance Use Δ T24-T30	Delinquency T36

Note. Δ = latent change in the variable between the two time points listed. Should significant mediation effects be substantiated, conditional indirect effects will be examined (i.e., with gender as a moderating variable).

Study 2 Results

Data Screening

Prior to running analyses, data were first screened for missing values, the presence of outliers, normality, linearity, and multicollinearity. The proportion of missing data ranged from 6.9% to 36.8%[17]. A Missing Values analysis was run and Little's MCAR test was significant, χ^2 (2617) =3690.42, $p < .001$. Examination of separate variance t-tests revealed that a number of them were significant at the $p < .001$ level, suggesting that the data were not Missing Completely at Random (MCAR). Closer examination revealed that there were significant differences on the internalizing mental health variables, with those missing data on the anxiety, depression and psychoticism scales (at nearly all time points) scoring significantly lower on measures of self-report offending, victimization, and other mental health variables relative to those with data present. However, further investigation of the raw data revealed the missing data were most likely Missing at Random (MAR).[18] As such, weighted least squares with mean and variance adjusted (WLSMV) was used to estimate missing values.

The distributions of each variable were then examined for normality and univariate outliers. All three internalizing mental health variables (depression, anxiety and psychoticism) were zero-inflated and therefore, significantly skewed. This variable was categorized (0, 1, 2) to address skew and visual inspection of these transformations revealed that these new distributions approximated normal. The distribution for the

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[17] The large proportion of missing data was the result of "invalid tests" for the BSI data (i.e., internalizing mental health variables); as such, values were imputed given they were presumed to be MAR.

[18] The final analyses were run both with and without casewise deletion for the Internalizing Mental Health measures to ensure the parameter estimates were not significantly different, and data were truly MAR.

"number of drinks typically consumed in one sitting" (DRINK2) had a number of extreme outliers, and was positively skewed. As such, this variable was truncated to range from 0 to 9. Further, this variable, in addition to the other three remaining substance use measures (DRINK1, DRINK3, and DRUGS) were treated as ordered categorical variables in the model as this is recommended to avoid biased estimates (Muthén, 1983). Notably, bootstrapping was used the present study, which also minimizes the effect of non-normal variables on the parameter estimates (Bollen & Stine, 1993; Finney & DiStefano, 2006).

Mahalanobis distance was used to screen for multivariate outliers for variables within both the Model A (i.e., internalizing mental health; χ^2 [8] = 20.09, $p < .001$) and Model B (i.e., substance abuse; χ^2 [9] = 21.66, $p < .001$). The number of multivariate outliers ranged from 13 (0.01%) to 168 (12.4%), with more multivariate outliers identified in the later time points (i.e., Models including T-24 to T-36). This is not entirely surprising, as the proportion of high-risk youth would decrease over time, whereby the number of low-risk youth would increase over time (resulting in a lower average score on measures over time), which would subsequently lead to a larger number of outlying cases. In light of this, and upon ascertaining that there was no significant jump in values, all cases were retained for analysis.

Descriptive Statistics

Descriptive statistics for the various measures are provided for males (see Table 24) and females (see Table 25) separately.

Table 24

Descriptive Statistics of Raw Data at Selected Time Points for Males

Model 1A & 2A	T-6			T-12			T-18		
	N	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range
Victimization	1090	0.28 (0.71)	0-4	--	--	--	--	--	--
Drink1	1090	2.25 (2.07)	1-9	1086	2.35 (2.06)	1-9	--	--	--
Drink2	1089	1.92 (3.02)	0-9	1082	2.09 (3.08)	0-9	--	--	--
Drink3	1089	1.86 (1.83)	1-9	1086	1.90 (1.82)	1-9	--	--	--
Drugs	1090	0.63 (1.20)	0-9	1086	0.59 (1.11)	0-9	--	--	--
Depression	918	0.75 (0.66)	0-2	846	0.72 (0.68)	0-2	--	--	--
Anxiety	918	0.68 (0.62)	0-2	846	0.68 (0.65)	0-2	--	--	--
Psychoticism	918	1.22 (1.11)	0-2	846	0.67 (0.67)	0-2	--	--	--
Time on Streets	--	--	--	--	--	--	1058	0.36 (0.42)	0-1
SRO	--	--	--	--	--	--	1056	1.82 (2.16)	0-5
Model 1B & 2B	T-24			T-30			T-36		
	N	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range
Victimization	1059	0.17 (0.54)	0-4	--	--	--	--	--	--
Drink1	1059	2.66 (2.29)	1-9	1060	2.64 (2.27)	1-9	--	--	--
Drink2	1056	2.23 (3.03)	0-9	1060	2.14 (2.99)	0-9	--	--	--
Drink3	1057	2.09 (2.01)	1-9	1058	2.04 (1.99)	1-9	--	--	--
Drugs	1059	0.60 (1.09)	0-9	1060	0.55 (1.01)	0-9	--	--	--
Depression	738	0.65 (0.68)	0-2	726	0.65 (0.68)	0-2	--	--	--
Anxiety	738	0.64 (0.63)	0-2	726	0.60 (0.62)	0-2	--	--	--
Psychoticism	738	0.60 (0.65)	0-2	726	0.61 (0.67)	0-2	--	--	--
Time on Streets	--	--	--	--	--	--	1055	0.33 (0.42)	0-1
SRO	--	--	--	--	--	--	1055	1.46 (2.08)	0-5

Table 25

Descriptive Statistics of Raw Data at Selected Time Points for Females

Model 1A & 2A	T-6			T-12			T-18		
	N	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range
Victimization	171	0.19 (0.53)	0-3	--	--	--	--	--	--
Drink1	171	2.03 (1.71)	1-8	174	2.14 (1.95)	1-9	--	--	--
Drink2	171	1.45 (2.28)	0-9	173	1.32 (2.28)	0-9	--	--	--
Drink3	171	1.47 (1.24)	1-7	174	1.55 (1.56)	1-9	--	--	--
Drugs	171	0.71 (1.23)	0-7	174	0.62 (1.27)	0-9	--	--	--
Depression	146	1.33 (1.16)	0-2	138	0.83 (0.70)	0-2	--	--	--
Anxiety	146	1.32 (1.09)	0-2	138	0.76 (0.66)	0-2	--	--	--
Psychoticism	146	1.27 (1.14)	0-2	138	0.69 (0.66)	0-2	--	--	--
Time on Streets	--	--	--	--	--	--	171	0.16 (0.33)	0-1
SRO	--	--	--	--	--	--	171	0.94 (1.70)	0-5
Model 1B & 2B	T-24			T-30			T-36		
	N	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range	*N*	*M* (*SD*)	Range
Victimization	170	0.08 (0.33)	0-2	--	--	--	--	--	--
Drink1	170	2.34 (1.94)	1-9	173	2.50 (2.00)	1-8	--	--	--
Drink2	170	1.58 (2.32)	0-9	173	1.57 (2.14)	0-9	--	--	--
Drink3	170	1.50 (1.35)	1-9	173	1.55 (1.31)	1-8	--	--	--
Drugs	170	0.48 (0.91)	0-5	173	0.53 (0.98)	0-7	--	--	--
Depression	130	0.65 (0.74)	0-2	130	0.68 (0.68)	0-2	--	--	--
Anxiety	130	0.64 (0.69)	0-2	130	0.67 (0.65)	0-2	--	--	--
Psychoticism	130	0.59 (0.60)	0-2	130	0.58 (0.62)	0-2	--	--	--
Time on Streets	--	--	--	--	--	--	176	0.03 (0.14)	0-1
SRO	--	--	--	--	--	--	176	0.90 (1.70)	0-5

Measurement Model

A series of exploratory factor analyses were conducted to ascertain that the number of factors and indicators of each factor were the same across the four time-points. It was anticipated that two latent constructs (i.e., internalizing mental health deficits and substance abuse) would be measured by the seven observed variables (see Table 26). Three items were hypothesized to load onto the internalizing mental health latent factor, and four items were hypothesized to load onto the substance abuse latent factor.

Table 26

Indicator Variable/Item Description

Construct	Variable Label	Subscale Description
Internalizing MH (F1)	DEP	Average depression symptoms in recall period
	ANX	Average anxiety symptoms in the recall period
	PSYC	Average psychoticism symptoms in the recall period
Substance Abuse (F2)	DRINK1	How often had alcohol to drink in the recall period?
	DRINK2	Number of alcoholic drinks usually consumed.
	DRINK3	How often had 5+ drinks at once in recall period?
	DRUGS	Number of types of drugs used in recall period

To ensure factorability, the correlation matrix of the observed variables (see Table 27) was examined to ensure the correlations among the variables were within an acceptable range (i.e., +/- .30 to +/- .90; Tabachnick & Fidell, 2007). Notably, as several of the variables were skewed, and were subsequently treated as ordered categorical variables to account for non-normality, polychoric correlations were examined as they are

more appropriate than Pearson's *r* for distributions of this nature (Flora & Curran, 2004; Holgado-Tello, Chacón-Moscoso, Barbero-Garcia, & Vila-Abad, 2010).

Table 27

Polychoric Correlations among Observed Variables

T-6 (*N*=1261)	a	b	c	d	e	f
Drink1 (a)	--	--	--	--	--	--
Drink2 (b)	.89	--	--	--	--	--
Drink3 (c)	.94	.91	--	--	--	--
Drugs (d)	.63	.64	.62	--	--	--
Depression (e)	-.00	-.00	.05	.15	--	--
Anxiety (f)	.04	.01	.05	.19	.58	--
Psychoticism (g)	.05	.04	.08	.19	.70	.57
T-12 (*N* = 1260)						
Drink1 (a)	--	--	--	--	--	--
Drink2 (b)	.88	--	--	--	--	--
Drink3 (c)	.93	.90	--	--	--	--
Drugs (d)	.64	.66	.61	--	--	--
Depression (e)	.03	.04	.09	.15	--	--
Anxiety (f)	.11	.13	.18	.14	.61	--
Psychoticism (g)	.09	.09	.15	.16	.77	.59
T-24 (*N* = 1229)						
Drink1 (a)	--	--	--	--	--	--
Drink2 (b)	.85	--	--	--	--	--
Drink3 (c)	.91	.88	--	--	--	--
Drugs (d)	.58	.61	.57	--	--	--
Depression (e)	.03	.05	.02	.16	--	--
Anxiety (f)	.12	.11	.12	.21	.66	--
Psychoticism (g)	.06	.05	-.00	.16	.76	.55
T-30 (*N* = 1233)						
Drink1 (a)	--	--	--	--	--	--
Drink2 (b)	.86	--	--	--	--	--
Drink3 (c)	.91	.90	--	--	--	--
Drugs (d)	.56	.57	.51	--	--	--
Depression (e)	-.01	-.03	-.01	.17	--	--
Anxiety (f)	.12	.13	.10	.19	.62	--
Psychoticism (g)	-.00	.05	.05	.13	.75	.60

Correlations between Drink3 and both other alcohol use indicators (i.e., Drink1 and Drink2) were quite high across all time points, suggesting problems with multicollinearity. As such, Drink3 was removed from the analysis.

Factors were extracted using the Weighted Least Square (WLSMV) method (suitable for ordinal data, Muthén & Muthén, 1998-2012; Schmitt, 2011). Additionally, as it was expected that the two latent constructs (i.e., internalizing mental health and substance abuse) would be correlated with one another, factors were rotated using an oblique rotation method (Geomin), rather than an orthogonal rotation method (Costello & Osborne, 2005). As ordinal variables were utilized, the correlations matrices of polychoric correlations were factor analyzed (vs. Pearson's correlations), as these are more robust correlation estimators for ordinal data (Flora & Curran, 2004; Holgado-Tello et al. 2010). Table 28 presents the fit statistics and Table 29 presents the rotated factor loadings for each EFA. Overall, a two-factor model was supported across all time points.

Table 28

Model Fit Statistics for EFA's

		X^2 (*df*)	CFI	TLI	RMSEA (95% CI)
T-6					
	1-factor	1222.99 (9), $p < .001$	0.85	0.76	0.32 (0.31, 0.34)
	2-factor	4.44 (4), $p > .05$	1.00	1.00	0.00 (0.00, 0.04)
T-12					
	1-factor	1136.65 (9), $p < .001$	0.87	0.78	0.32 (0.30, 0.33)
	2-factor	3.96 (4), $p > .05$	1.00	1.00	0.00 (0.00, 0.04)
T-24					
	1-factor	1038.66 (9), $p < .001$	0.85	0.75	0.31 (0.29, 0.32)
	2-factor	30.39 (4), $p > .05$	1.00	1.00	0.00 (0.00, 0.04)
T-30					
	1-factor	1068.46 (9), p < .001	0.86	0.76	0.31 (0.29, 0.33)
	2-factor	3.42 (4), p > .05	1.00	1.00	0.00 (0.00, 0.04)

Table 29

Geomin Rotated Loadings and Standard Errors from Two Factor Model EFAs

	T-6		T-12		T-24		T-30	
	F1	F2	F1	F2	F1	F2	F1	F2
Drink1	**0.94 (0.01)**	0.00 (0.00)	**0.93 (0.01)**	-0.01 (0.01)	**0.90 (0.02)**	-0.00 (0.01)	**0.92 (0.02)**	-0.00 (0.01)
Drink2	**0.95 (0.01)**	-0.01 (0.01)	**0.95 (0.01)**	-0.01 (0.01)	**0.94 0.01)**	-0.00 (0.01)	**0.94 (0.01)**	-0.00 (0.01)
Drugs	**0.66 (0.02)**	0.21 (0.03)	**0.68 (0.02)**	0.11 (0.03)	**0.64 (0.02)**	0.16 (0.04)	**0.61 (0.03)**	0.17 (0.04)
Depression	-0.05 (0.04)	**0.84 (0.03)**	-0.05 (0.04)	**0.90 (0.02)**	-0.02 (0.04)	**0.95 (0.03)**	-0.00 (0.03)	**0.88 (0.02)**
Anxiety	0.00 (0.01)	**0.69 (0.03)**	0.05 (0.04)	**0.68 (0.03)**	0.09 (0.04)	**0.69 (0.03)**	0.13 (0.04)	**0.70 (0.03)**
Psychoticism	0.01 (0.03)	**0.83 (0.03)**	0.01 (0.02)	**0.86 (0.02)**	0.01 (0.01)	**0.80 (0.03)**	0.00 (0.01)	**0.85 (0.03)**

Having identified the same two-factor structure at each time point, the next step was to ensure that these constructs being measured were invariant over time (i.e., that a one unit change in a latent construct at one time point equals a one unit change in the construct at subsequent time points).

Invariance Testing

A series of nested exploratory equation models (ESEM) were run to examine the invariance of the substance abuse and internalizing mental health latent variables over the selected time-points**.** If the model that allows the parameters (i.e., factor loadings and thresholds) to vary provided better fit (or no worse fit) to the data than the model that constrains the parameters to be equal over time, then it can be concluded that the parameters are non-invariant and indeed vary across time-points (Morin, Marsh, & Nagengast, 2013). Importantly, to account for using the same measures over time, correlated errors of indicators (i.e., shared measurement variance) were included in the model.

Internalizing mental health latent variable. As can be seen in Table 30, the baseline model with no equality constraints (i.e., factor loading and thresholds free to vary) was a very good fit to the data. The invariant model (i.e., holding the factor loadings and thresholds equal) was also an excellent fit to the data, with no change in the relative fit indices, and a non-significant chi-square difference test. As such, scalar invariance of the internalizing mental health variable was supported. Specifically, it can be concluded that a one-unit change in internalizing mental health deficits at one time is equivalent to a one-unit change at subsequent time points. In other words, the measures are assessing the same construct across time.

Substance abuse latent variable. The baseline model with no equality constraints for the substance abuse latent variable was also a good fit the data (See Table 30). After constraining parameters and factor loadings to be equal over time (i.e., invariant model), the change in fit indices was minimal ($CFI_{change} = .001$, $TLI_{change} = .003$), and a chi-square difference test suggest that this nested model was also a good fit to the data ($p > .01$). As such, scalar invariance of the substance abuse latent variable was supported. Specifically, it can be concluded that a one-unit change in substance abuse at one time is equivalent to a one-unit change at subsequent time points (i.e., the measures are assessing the same construct across time).

Table 30

Model Fit Indices and Nested Model Comparisons for Testing Invariance of Latent Constructs

Internalizing MH	CFI	TLI	RMSEA (95% CI)	χ^2 Difference Test
A. Factorial [a]	1.00	1.00	0.00 (0.00, 0.02)	
B. Scalar [b]	1.00	1.00	0.00 (0.00, 0.02)	(A v. B) 20.65 (21), $p = 0.48$
Substance Abuse	**CFI**	**TLI**	**RMSEA (95% CI)**	**χ^2 Difference Test**
A. Factorial [a]	1.00	1.00	0.04 (0.03, 0.05)	
B. Scalar [b]	1.00	1.00	0.03 (0.02, 0.03)	(A v. B) 90.62 (67) $p = 0.03$

Note. MH = mental health; [a] Thresholds and factor loadings free to vary. [b] Both thresholds and factor loadings constrained to be equal across time points, residual variance and factors mean fixed at one for one time point only.

Structural Models

Model 1: Victimization to offending through internalizing mental health deficits. Figure 3 displays the structural model testing the indirect relationship of victimization to self-

report offending through changes in internalizing mental health. Parameters estimated in the model are regression coefficients for paths between variables; parameter held equal (to generate the latent difference score) are fixed at a constant (1). Model 1A tested a) the direct relationship between victimization and self-report offending from T-12 to T-36, b) the indirect relationship of victimization (T-12) to self-report offending (T-36) through changes in internalizing mental health deficits (change from T-12 to T-24). Model 1B examined these same effects over the T-24 to T-36 time points.

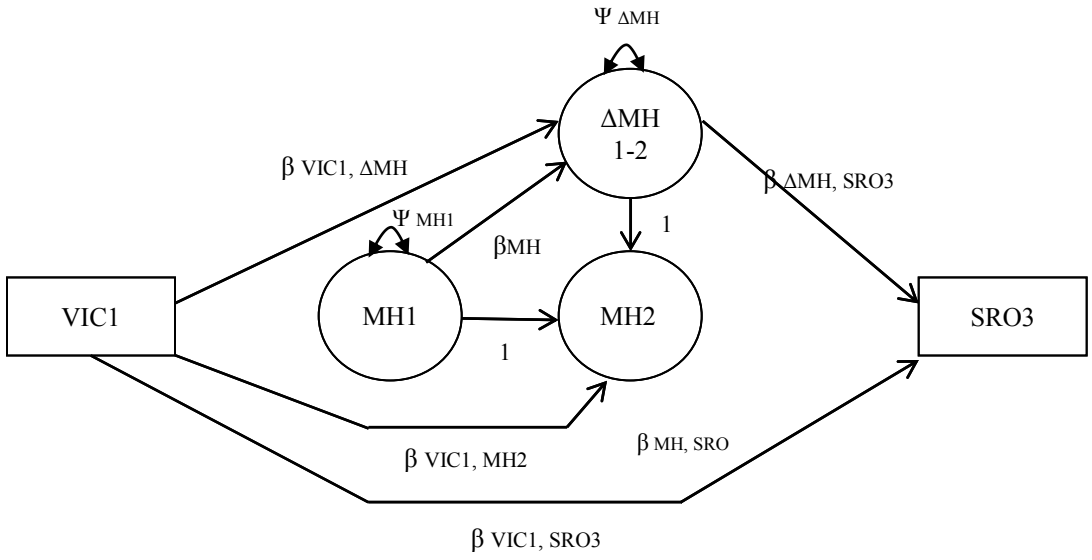

Figure 3. Structural mediation model 1. VIC = victimization, MH = Internalizing mental health deficits, SRO = self-report offending, Δ= change.

Overall, both model 1A and 1B had acceptable fit (see Table 31). Bootstrapped confidence intervals (95% CI's based on 500 draws) for each parameter were generated. The estimated means for the latent and observed variables for structural mediation model 1A and

1B are presented in Table 32. As can be seen, due in part to low base rates, very little change was evident in the latent construct across either time point.

Table 31

Model Fit Indices for Model 1A and 1B

	RMSEA	CFI	TLI
Model 1A	0.07 (0.06, 0.08)	0.95	0.92
Model 1B	0.06 (0.05, 0.07)	0.96	0.94

Note. Model 1A= T6 to T18; Model 1B = T24 to T36.

Table 32

Estimated Means for Latent and Observed Variables for Structural Model 1A and 1B

Model 1A	Estimated Mean	Model 1B	Estimated Mean
VIC_{T-6}	0.123	VIC_{T-24}	0.119
MH_{T-6}	0.000	MH_{T-24}	0.000
MH_{T-12}	-0.001	MH_{T-30}	0.061
$\Delta MH_{T-6 \text{ to } T-12}$	-0.001	$\Delta MH_{T-24 \text{ to } T-30}$	0.061
SRO_{T-18}	1.660	SRO_{T-36}	1.369

Note. VIC = victimization; MH = internalizing mental health deficits; ΔMH = change in internalizing mental health deficits; SRO= self-reported offending; Time on the street (at the final time-point of each model) and self-reported offending (at the time-point preceding the final time-point) were controlled for in the model.

Results for the structural mediation model 1A and 1B are presented in Table 33. Confidence intervals (95% CI's based on 500 bootstrapped draws) for the direct effect of victimization on self-report offending, while controlling for time on the street and self-report

offending at the time-point preceding the dependent variable, suggest that this direct effect was significant at both time points (Model 1A: T6→T18 and Model 1B: T24→T36). However, confidence intervals for the indirect effect of victimization on self-report offending through internalizing mental health deficits contained zero; as such this indirect effect was not supported by these data. In light of the non-significant indirect effect of victimization through mental health to self-report offending, conditional indirect effects (by gender) were not examined.

Table 33

Direct and Indirect Effects of Victimization through Mental Health to Self-Report Offending

Direct Effect	Parameter	Estimate (95% CI)
$Vic_{T6} \rightarrow SRO_{T18}$	$\beta_{Vic, SRO}$	0.33 (0.15, 0.48)
$Vic_{T24} \rightarrow SRO_{T36}$	$\beta_{Vic, SRO}$	0.43 (0.16, 0.67)
Indirect Effect	**Parameter**	**Estimate (95% CI)**
$Vic_{T6} \rightarrow \Delta MH_{T6\text{-}T12} \rightarrow SRO_{T18}$	$\beta_{Vic, MH} \times \beta_{\Delta MH, SRO}$	0.01 (-0.01, 0.03)
$Vic_{T24} \rightarrow \Delta MH_{T24\text{-}T30} \rightarrow SRO_{T36}$	$\beta_{Vic, MH} \times \beta_{\Delta MH, SRO}$	-0.04 (-0.11, -0.00)

Note. Vic = victimization; MH = internalizing mental health deficits; ΔMH = change in internalizing mental health deficits; SRO= self-reported offending

Model 2: Victimization to offending through substance abuse. Figure 4 displays the structural model testing the indirect relationship of victimization to self-report offending, through changes in substance abuse. Model 2A tested a) the direct relationship between victimization and self-report offending from T-12 to T-36, and b) the indirect relationship of

victimization (T-12) to self-report offending (T-36) through changes in substance abuse (change from T-12 to T-24). Model 2B examined these same effects over the T-24 to T-36 time points.

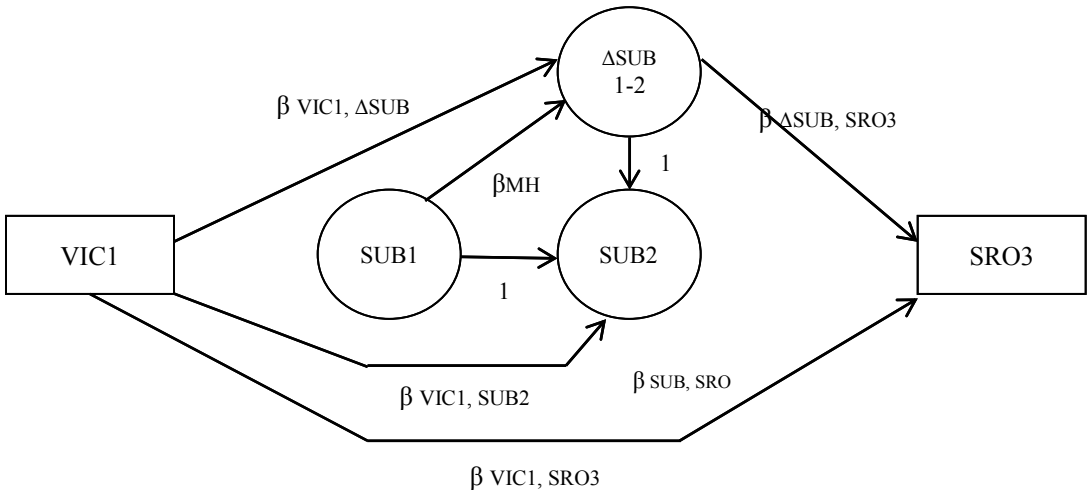

Figure 4. Structural mediation model 2. VIC = victimization, SUB = substance abuse, SRO = self-report offending, Δ= change.

Overall, model 2A and 2B had acceptable fit to the data (see Table 34)[19]. Upon ascertaining acceptable model fit, bootstrapped confidence intervals for each parameter (95% CI's based on 500 bootstrapped draws) were generated. The estimated means for the latent and observed variables for structural mediation model 2A and 2B are presented in Table 35. As with the mental health latent variable, very little change was seen in the substance abuse latent construct over time.

[19] Notably, the RMSEA for model 2B was just below what is thought to be acceptable fit (< .08; Hu & Bentler, 1999); however, as the goal of the present study was to test the stability of this model over time, parameter estimates for the indirect effect were still generated using bootstrapped draws.

Table 34

Model Fit Indices for Model 2A and 2B

	RMSEA	CFI	TLI
Model 2A	0.07 (0.06, 0.08)	0.99	0.98
Model 2B	0.09 (0.08, 0.11)	0.97	0.96

Note. Model 2A= T6 to T18; Model 2B = T24 to T36.

Table 35

Estimated Means for Latent and Observed Variables for Structural Model 2A and 2B

Model 2A	Estimated Mean	Model 2B	Estimated Mean
VIC_{T-6}	0.238	VIC_{T-24}	0.153
SUB_{T-6}	0.000	SUB_{T-24}	0.000
SUB_{T-12}	0.051	SUB_{T-30}	-0.033
$\Delta SUB_{T-6 \text{ to } T-12}$	0.051	$\Delta SUB_{T-24 \text{ to } T-30}$	-0.033
SRO_{T-18}	1.694	SRO_{T-36}	1.205

Note. VIC = victimization; SUB = substance abuse; ΔSUB = change in substance abuse; SRO = self-reported offending; Time on the street (at the final time-point of each model) and self-reported offending (at the time-point preceding the final time-point) were controlled for in the model.

Results for structural models 2A and 2B are presented in Table 36. As with the previous model, results suggest that the direct effect of victimization on self-report offending is significant from T6 to T18 (model 2A) and from T24 to T36 (model 2B). However, as the confidence intervals contained zero, the indirect effect of victimization through changes in substance abuse was not significantly different from zero for either time point. In light of the

non-significant indirect effect of victimization through substance abuse to self-report offending, conditional indirect effects (by gender) were not examined.

Table 36

Direct and Indirect Effects of Victimization through Substance Abuse to Self-Report Offending

Direct Effect	Parameter	Estimate (95% CI)
$Vic_{T6} \rightarrow SRO_{T18}$	$\beta_{Vic, SRO}$	0.36 (0.20, 0.55)*
$Vic_{T24} \rightarrow SRO_{T36}$	$\beta_{Vic, SRO}$	0.43 (0.19, 0.62)*
Indirect Effect	**Parameter**	**Estimate (95% CI)**
$Vic_{T6} \rightarrow \Delta SUB_{T6\text{-}T12} \rightarrow SRO_{T\text{-}18}$	$\beta_{Vic, SUB} \times \beta_{\Delta SUB, SRO}$	-0.02 (-0.06, -0.00)
$Vic_{T24} \rightarrow \Delta SUB_{T24\text{-}T30} \rightarrow SRO_{T36}$	$\beta_{Vic, SUB} \times \beta_{\Delta SUB, SRO}$	0.03 (0.00, 0.09)

Note. Vic = victimization; SUB = substance abuse; ΔSUB = change in substance abuse; SRO= self-reported offending; * Confidence intervals did not include zero, suggesting a significant effect;

Study 2 Discussion

Feminist pathways proponents argue that females are unique from their male counterparts in their pathways to crime. Specifically, they argue that a female is often propelled into crime as a result of having experienced trauma or victimization, that substance use often ensues as means to cope, and that internalizing mental health deficits subsequently culminate (e.g., Chesney-Lind, 1997; Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996). However, to date, feminist pathways researchers have not conducted research in which causation could be inferred (or the temporal ordering confirmed) among the factors hypothesized to explain the relationship between victimization and delinquency. As applied

correctional feminists suggest that interventions need to target gender-responsive risk factors (e.g., victimization, dysfunctional relationships, substance abuse, and mental health; Covington & Bloom, 2006), demonstrating how changes in these variables are related to subsequent offending behaviour would provide a stronger rationale for treating these needs.

As such, the current study used multi-wave data to examine one prominent pathway, conceptualized as the trauma pathway, to test whether a) there was a relationship between victimization and subsequent offending in this sample of adolescent offenders, and b) to examine the extent to which changes in internalizing mental health deficits and substance abuse mediated this relationship. Additionally, as feminist pathways proponents argue that this pathway is unique for females, this study incorporated a male comparison group to attest to whether this mediated relationship is conditional on gender, should a mediated effect exist.

Alliance with Hypotheses

Overall, in line with the first hypothesis, there was a significant direct relationship between victimization and subsequent offending, and further, a significant effect was found at each time point examined in this study using a combined sample of males and females. This finding is consistent with previous research that has found a relationship between prior victimization and/or abuse and offending (e.g., Falshaw et al., 1996; Gilfus, 1992; Lemmon, 1999; Messina et al., 2006).

Contrary to the second hypothesis, however, the relationship between victimization and self-report offending could not be explained by changes in either internalizing mental health deficits or changes in substance abuse. These results are in contrast to feminist pathways research that has detailed the sequence of this pathway from qualitative (e.g., Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996) and quantitative data (e.g., Salisbury & Van

Voorhis, 2009). Notably, this relationship has historically been examined with retrospective or cross-sectional data. While valuable, the feminist pathways model suggests that substance use and the development of internalizing mental health disorders are typical *responses* to trauma (Covington, 1998), suggesting a temporal order to how these factors play out. However, the present study failed to support this relationship with multi-wave data. It is important to note that the measure of victimization utilized in this study was representative of primarily of non-gendered types of violence (e.g., getting shot at) and therefore, may be a better measure of victimization for males than for females; this may, at least in part, explain these null results. As such, these results should be considered tenuous and replication with more gender-informed measures of victimization is warranted.

Two moderated-mediation effects were also hypothesized to exist in the data. Foremost, as previous research suggests that the etiology of female substance use is qualitatively different for females compared to males (e.g., Cauffman et al., 2007), and in light of taxonomic research that has found victimization and substance use to co-occur among samples of women (Salisbury & Van Voorhis, 2009) and girls (Cuevas et al., 2007; King et al., 2011), it was hypothesized that the conditional indirect effect of victimization through substance abuse would be moderated by gender. Further, given the research that has found more substantial mental health needs among female offenders (e.g., Cauffman et al., 2007; Teplin et al., 2002), and females are more likely to internalize their response to trauma (Cauffman et al., 1998; Turner et al., 2006), it was hypothesized that the indirect relationship of victimization to offending through internalizing mental health deficits would be stronger for females than for males. However, the lack of a significant indirect effect, due in part to

minimal change seen in the latent variables over time, precluded an examination of conditional indirect effects.

One final exploratory hypothesis was examined in this study. First, given the limited research that has examined these mediated effects using longitudinal data, the stability of the direct and indirect effects over subsequent time points was examined. Overall, results were generally consistent across both models (i.e., T-6 to T-18, and T-24 to T-36). Specifically, the direct effect of victimization on subsequent offending was significant across both models (internalizing mental health deficits and substance abuse) and both time-points examined. When incorporating change in either of the latent constructs as a mediating variable, the results also remain stable over time; however, none of the indirect effects were significant across either time point.

There are several possible explanations as to why the hypothesized indirect effects were not supported by the data. Arguably, one of the most obvious reasons is simply that very minimal change was seen in either latent variable over the selected time-points. As such, the change seen in this sample may not have been enough to explain the relationship between victimization and subsequent offending. Future research may want to test these hypothesized effects using a longer follow-up, thereby allowing the time for these constructs to demonstrate change. Notably, even with an adequate follow-up period, this study was unable to speak to treatment completion, which may in part, explain the minimal change seen in these variables over time.

Irrespective of a lack of change in the latent variables over time, there are a number of other possible explanations as to why these models were not supported in the data. Speaking first to the internalizing mental health model, it could be that this relationship simply does not

exist. According to gender-neutral scholars, mental health deficits are thought to be responsivity factors—that is, those factors that need to be taken into account when treating an offender but are not factors directly related to one's risk to re-offend (Andrews & Bonta, 2010). As such, it may be that there is no direct relationship between internalizing mental health deficits and offending. However, feminist pathways proponents would argue that treating mental health deficits is only one component of effective treatment for females (Bloom & Covington, 2008) and that substance abuse, trauma, and mental health issues need to be treated in tandem (Covington & Bloom, 2006). In light of this contention, it may be that the comorbidity of these factors is more important for females than the causal sequence in which they play out.

An alternative explanation for this null finding could be that internalizing mental health deficits are not proximate risk factors for crime. Rather, it may be that these factors are important for the onset of offending, but are not as important in the maintenance of offending behaviour, or the process of desistance. Developmental criminologists (i.e., those that take a life course perspective on crime) have emphasized the importance of disentangling predictors for the onset, maintenance and desistance of delinquency (e.g., Farrington & Hawkins, 1991). Research from this body of work suggests that criminal parents, parental conflict, living in a high-crime neighbourhood, impulsivity, and low school attainment are important risk factors for the onset of offending (Farrington & Welsh, 2007). Van der Put and colleagues (2012) found that in adolescence, risk factors in the family domain were most strongly related to offending, whereas in late adolescence the domains of criminal attitudes, relationships, and school domains were more salient predictors. While there is evidence that the relative importance of risk factors changes over time, this body of work suffers from the same

methodological shortcoming as the traditional correctional perspective; specifically, this work has been premised on research carried out with samples comprised of predominantly males and limited by a sole consideration of gender-neutral risk factors (i.e., failing to take a gender-informed approach). As such, whether gender-responsive variables, including internalizing mental health deficits, play a larger role in the initiation or maintenance of offending behaviour, has yet to be discovered using quantitative longitudinal data.

The lack of a significant finding for the substance abuse model was surprising. Both gender-responsive scholars and gender-neutral proponents underscore substance abuse as a key treatment target among both female and male offenders. Further, the gender invariance of this risk factor has been supported by meta-analytic research (Andrews et al., 2011; Green & Campbell, 2006; Hubbard & Pratt, 2002; Simourd & Andrews, 1994). Additionally, recent research by Andrews and colleagues (2011) found that substance use was actually a more valid predictor for females than for males, suggesting that there may be a "Big Five" for females (i.e., criminal history, antisocial personality, criminal peers, antisocial attitudes, and substance abuse). All in all, while these two perspectives do not disagree as to the importance of substance use, the feminist pathways perspective suggests that for females, substance abuse often occurs as a means to cope with trauma or victimization (e.g., Covington, 1998; Covington & Bloom, 2006), whereas for males, substance abuse is more apt to occur as a sensation-seeking behaviour (Greiner, Brown, & Skilling, 2012). Given the low-base rates of victimization among the present sample, and the fact that substance abuse often co-occurs with victimization among women and girls (Cauffman, et al., 1998; Huskey & Tomczak, 2013; Marquet et al., 2001; Ruiz et al., 2012; Salisbury & Van Voorhis, 2009; Turner et al., 2006), this could in part explain why this indirect effect was not supported in these data.

Specifically, it may be that the number of females with co-occurring victimization and substance use was simply too small to provide evidence for this indirect effect.

Notably, the base rate for victimization (as measured by the Exposure to Violence Inventory) was not only low for the sample as a whole, but was also substantially lower for females (M = 0.08 to 1.14) compared to males (M = 0.17 to 1.64) across all time points. Therefore, another explanation for this lack of an indirect effect could simply be that the types of victimization experiences captured by the Exposure to Violence inventory (e.g., physical attacks, being shot at) is not representative of all types of experiences particularly salient for women and girls. Though sexual assault, including rape or attempted rape, was measured by this scale, other types of gender-based trauma may not have been adequately captured (e.g., relational aggression, interpersonal violence, childhood victimization experiences).

Alternatively, it could be that history of trauma in childhood (vs. victimization events in adolescence) plays a more important role in explaining female offending. Indeed, prior research on women offenders has highlighted that victimization often begins in childhood (e.g., Daly's [1992] Street women and Harmed and Harming Women; Salisbury & Van Voorhis's [2009] childhood victimization model), that abuse starts earlier for females, and that the frequency and duration of abuse is higher for girls than for boys (Belknap & Holsinger, 2006). Therefore, there may not be a relatively minimal short-term impact of victimization on subsequent offending; rather, it may be the cumulative effect of trauma over the lifetime. This notion is supported by research that has demonstrated that complex trauma—defined as severe and enduring exposure to traumatic events (e.g., emotional, sexual, and physical abuse, witnessing domestic violence, neglect, etc.; Cook et al., 2005)—is

associated with a wide range of adverse outcomes (e.g., substance use, depression, anxiety, etc.; Ford, Chapman, Connor, & Cruise, 2012).

Limitations and Directions for Future Research

As with all research, this study had a number of limitations worth noting. Foremost, the mean score on both latent variables changed very little over time across all time points examined. Arguably, this could mean that the construct is stable, and therefore change in these variables takes longer than 6 months to transpire (the length of time used in the present study to create the latent change score). Alternately, it could be that more frequent assessments are needed to adequately capture change. In any case, future research should seek to determine how, and when, changes in these variables can be measured within adolescent offender populations.

A second limitation of the present study was that the chosen measures were limited by the archival nature of the data, and as such, gender-responsive variables were not as plentiful as they could have been. For example, the measure of victimization measured a wide range of victimization experiences that were applicable to both males and females. However, a gender-responsive tool would arguably capture victimization experiences more prominent in the lives of girls and women (e.g., childhood sexual abuse, partner violence, interpersonal violence). Additionally, a number of other gender-responsive variables were not considered, despite being deemed important by feminist pathways proponents (e.g., relationship dysfunction, self-efficacy, economic marginalization, parenting-related factors). Therefore, future research that seeks to test this pathway to offending with longitudinal data should seek to incorporate more gender-responsive variables captured by gender-informed measures.

Lastly, this study only examined the mediating variables of substance abuse and internalizing mental health deficits in isolation. However, given the high co-morbidity of substance use and internalizing mental health deficits (Cauffman, et al., 1998; Huskey & Tomczak, 2013; Marquet et al., 2001; Ruiz et al., 2012; Salisbury & Van Voorhis, 2009; Turner et al., 2006), it could be that interaction of these risk factors better explains the relationship between victimization and offending. As such, sample size permitting, future research should examine these factors in a combined model.

Summary

Overall, the findings from this study suggest that the trauma pathway, as put forth by feminist pathways researchers, does not hold up to statistical cross-validation when examined with multi-wave quantitative data. However, in light of the aforementioned limitations (i.e., lack of change in latent constructs, gender-neutral measures), the conclusions drawn from this study are far from concrete. Future research using a larger sample size (to be able to model interactions among gender-responsive variables) and gender-responsive measures that are sensitive enough to capture change is necessary to confirm whether the hypothesized mediated relationships exist among adolescent populations.

CHAPTER 4

General Discussion

Feminist scholars argue that traditional theories of crime provide inadequate explanations of female crime due to their androcentric nature (Belknap, 2001; Belknap & Holsinger, 2008; Chesney-Lind, 1989, 1997; Chesney-Lind & Sheldon, 2003; Giordano, Dienes, & Cernkovich, 2006; Steffensmeier & Allen, 1998). Further, they contend that the criminalization of girls' survival strategies and the role that victimization and trauma play in female delinquency has largely been ignored by these traditional theories (Belknap, 2001; Chesney-Lind, 1989; Chesney-Lind & Pasko, 2013). In response to these criticisms, a number of scholars have sought to better understand how females differ from males in the sequence of events that led them to engage in crime. Specifically, empirical work on the female offender produced by feminist criminologists (e.g., Covington & Bloom, 2006; Daly, 1992), correctional psychologists (e.g., Salisbury & Van Voorhis, 2009), and sociologists (e.g., Richie, 1996) have been integrated resulting in what has become known as the *feminist pathways perspective*.

While this perspective has evolved significantly over the last 20 years, the research supporting it suffers from a number of shared limitations. Foremost, although developmental and life course perspectives of crime emphasize that age matters and that early onset offenders have distinct risk factors relative to those who start offending later in life (e.g., Sampson & Laub, 2003; Moffitt, 1993), most studies that examine feminist pathways variables have used adult samples (i.e., women); as a result, studies on adolescent offenders, informed by this perspective are largely lacking. Second, quantitative research that has tried to tease apart the causal relationships among these variables has used cross-sectional or

single-wave data, often retrospective in nature. As such, evidence in support of the causal relationship (or temporal sequence of events) among feminist informed variables has only been speculative thus far. Third, pathways-informed variables are generally treated as static (e.g., a history of trauma, measured retrospectively). Although applied correctional feminists suggest that interventions need to target gender-responsive risk factors (e.g., victimization, dysfunctional relationships, substance abuse, and mental health; Covington & Bloom, 2006), no studies have examined how changes in these variables are related to changes in offending behaviour or how these factors are interrelated across time. Therefore, the primary purpose of this dissertation was to build on this body of work by addressing many of the limitations prominent across studies. Specifically, this study took a gender-informed approach to advance the feminist pathways paradigm.

Overview of Key Results

In light of the contention that females are unique from males in their pathways to crime (Brennan et al., 2009; Jones et al., 2014; Reisig et al., 2006; Salisbury & Van Voorhis, 2009; Simpson et al., 2008), the first goal of this dissertation was to shed light on whether or not there are truly gender differences in the treatment profiles of adolescent offenders. As such, Study 1 generated a gender-informed typology by a) using a mixed gender sample, b) incorporating factors deemed salient by mainstream correctional researchers (i.e., a gender-neutral perspective) and feminist pathways researchers (i.e., a gender-responsive perspective), and c) analyzing males and females in a combined sample to speak to both differences and similarities in classification.

The results of Study 1 suggest that distinct types of adolescent offenders can be delineated on the basis of gender-neutral and gender-responsive treatment needs. Specifically,

this study found that youth could be reliably classified into three classes of offenders: a *minimal-needs* class, a *complex-comprehensive-needs* class, and a *comprehensive-needs* class. Notably, there were minor differences in the treatment profiles over time and a fourth class emerged in a later wave (i.e., a *minimal-needs substance-using* class); however, the relative needs among these three classes generally remained stable over time. Although it was hypothesized that one class would emerge that was characterized entirely by gender-responsive needs (i.e., victimization, internalizing mental health deficits, and substance abuse), none of the yielded classes fit this gendered profile. It was also hypothesized that a class characterized entirely by traditional risk factors for crime (i.e., the Big Four; Andrews & Bonta, 2010) would emerge; however, this class also failed to appear. Rather, there was substantial overlap in the theoretical orientation of the defining features of these two high-need classes, and more importantly, there was substantial overlap in the proportion of males and females assigned to each class. Although there was a larger proportion of females in a class that most closely resembled a gendered classification (i.e., complex-comprehensive-needs class), no class was comprised exclusively of males or females suggesting that the treatment profiles of females and males may be more similar than different.

This study also found that the heterogeneity of offenders increases over time. Specifically, although three classes of offenders consistently emerged across the first three time-points examined, a fourth class emerged at the last time-point in the study—one characterized by elevated alcohol use and moderate needs in the antisocial personality domain. Importantly, this class had few needs in other domains, and self-reported as having committed relatively few offences; as such, it was possible that this class was simply a

normative adolescent class, whose alcohol use coincided with reaching late adolescence (Griffon & Botvin, 2010; Young et al., 2002).

A second goal of this dissertation was to lend support to the treatability of gender-responsive needs. Historically, feminist pathways proponents have identified viable treatment targets using qualitative research that has detailed the factors that led a woman to commit crime (e.g., Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996), or cross-sectional data analysis that has identified the needs prevalent among women including trauma or victimization (e.g., Belknap & Holsinger, 2006; Cauffman et al., 1998; Dembo et al., 1993), substance abuse, depression, anxiety, and other psychopathologies (Abram et al., 2004; Dixon et al., 2004; Drapalski et al., 2009; Teplin et al., 2002; Ulzen & Hamilton, 1998). Mainstream correctional researchers argue that evidence for dynamic risk factors must be generated with longitudinal data, providing at least partial evidence for causality. Applying this methodological approach, this study examined the prospective relationship between victimization, substance use, internalizing mental health deficits, and self-report offending using multi-wave data. Once again, both males and females were analyzed in combination to speak to the gender-saliency of this relationship (i.e., was it moderated by gender). In line with previous research, Study 2 found that there was a direct relationship between victimization and subsequent offending, and that this relationship held up over time (e.g., Falshaw et al., 1996; Gilfus, 1992; Lemmon, 1999; Messina et al., 2006). However, this study failed to find evidence that changes in substance abuse or internalizing mental health deficits were in fact explaining this relationship. Importantly, this study suffered from a number of methodological challenges; thereby, conclusions drawn from it cannot be concrete. However, as this study offers one of the first attempts at examining a mediation model in this fashion,

and these results could have important implications for theory, research, and correctional practice, future research should replicate these null findings.

Theoretical Implications

As previously mentioned, the feminist pathways paradigm argues that male theories of crime are androcentric in nature, and therefore are inadequate for explaining the etiology of female crime (Belknap, 2001; Belknap & Holsinger, 2008; Chesney-Lind, 1989, 1997; Chesney-Lind & Sheldon, 2003; Giordano et al., 2006; Steffensmeier & Allen, 1998). However, although there are some exceptions, qualitative and quantitative typological research stemming from the feminist pathways paradigm has often failed to incorporate a male comparison group. As such, the argument that females are unique from males and therefore require different treatment targets is to some extent premature. Arguing for the saliency of treatment needs for one gender or the other need to come from studies that are gender-informed—that is, the study needs to be informed by multiple theoretical perspectives, incorporate a male (or female) comparison group, and carry out the analysis with females and males in combination (vs. separately).

The results of Study 1 suggest that females and males are more similar than different in their treatment profiles, and that the risk/need factors most useful for delineating subtypes of offenders are in fact a combination of gender-responsive and gender-neutral measures. What this suggests is that neither a gender-neutral theory nor gender-responsive theory is adequate to explain female offending behaviour; rather, one should draw from both perspectives to gain a complete picture of an adolescent's treatment profile.

The results of Study 2 suggest victimization is directly related to subsequent criminal behaviour, in line with feminist pathways proponents that have theorized that victimization is

often a catalyst for crime, particularly for females (e.g., Chesney-Lind & Sheldon, 1998; Daly, 1992; Dehart, 2008; Gilfus, 1992). Importantly this relationship held for a mixed sample of males and females, suggesting that the integration of gender-responsive risk factors in delineating pathways to offending, using a mixed-gender sample, is critical to allow one to identify groups of males who follow what has traditionally been thought of as a gendered pathway to crime.

All in all, in light of the aforementioned results, this study echoes the recommendations of others as to the importance of theoretical integration when attempting to understand variability in an offender population (e.g., Brennan et al., 2012; Jones et al., 2014).

Practical Implications

Prior typological research has found anywhere from two (e.g., Jones et al., 2014) to eight (Brennan et al., 2012) types of female offenders, or pathways for female offenders. Arguably, as the number of explanatory variables increases, the more complex a typology becomes, as does any practical implications drawn from it. However, this dissertation uncovered four types of offenders with distinct treatment profiles that, in practice, might be targeted in different manners.

Across all time points, a *minimal-needs* class emerged with lower needs on all domains relative to the other classes. Additionally, at the 36-month follow-up a *minimal-need substance-using* class emerged, with significant alcohol use and moderate needs in criminal personality domain. Both of these minimal-needs classes had scored low on self-report measures of criminal behaviour, and as such, would likely be classified as low-risk using a structured assessment tool. In line with the RNR principles, those classified as having

minimal-needs should receive minimal intervention (Andrews & Bonta, 2010) as there is evidence that providing services to low-risk offenders is of no benefit to them and can potentially increase rates of recidivism among them (e.g., Lowenkamp, Latessa, & Holsinger, 2006).

Two comprehensive-needs classes were identified across all waves of the study; these classes had higher rates of self-report offending and official number of arrests relative to the other classes; as such, in line with the risk principle (Andrews & Bonta, 2010), these classes would require more intensive interventions. Importantly, both of these classes had comparable criminal histories, suggesting they were similar in terms of overall risk. However, only one of these comprehensive-needs classes had co-morbid mental health deficits (i.e., the *complex-comprehensive-needs* class). Practically speaking, this class may be more challenging to treat. This is especially true for those with co-morbid mental health deficits and substance abuse treatment needs (Hawkins, 2009), as interventions would likely need to be provided by different service sectors (i.e., mental health professionals vs. program officers or other community treatment providers).

This study found that there was substantial overlap in the gender distribution among the various classes; as such, it can be concluded that there are more similarities than differences in the treatment profiles of male and female adolescent offenders. However, Covington and Bloom (2006) suggest that gender-responsive programming should be comprehensive given the interconnectedness of gender-responsive risk factors. Further, Day and colleagues (2014) found that gender-responsive programming was only effective for offenders that displayed gender-responsive needs, but that this programming was not as effective for boys displaying these same needs (i.e., trauma, depression, anxiety, substance

use, anger/irritability, and somatic complaints). Therefore, although there was substantial overlap in the treatment profiles of adolescents in the present study, the effectiveness of programming for males and females with similar treatment profiles cannot be assumed to be the same. Future research should be carried out on the treatment amenability of various classes of offenders.

The present study also found evidence that the importance of certain risk factors in distinguishing among classes changes over time. Specifically, the employment/education domain did little to distinguish classes at earlier waves of the study, but clearly distinguished low-need and high-need classes at later time points. This finding is congruent with research on desistance that has found gainful employment may be a key factor in one's exit out of crime (for review, see Maruna, 1999).

Other research has also found that the importance of criminogenic needs changes over the course of adolescence (van der Put et al., 2012). Specifically, van der Put and colleagues (2012) found that family risk factors were most important at age 12, whereas criminal attitudes were more strongly associated with recidivism at age 14. In light of these findings, these authors suggest that the needs principle (Andrews & Bonta, 2010) should be altered such that one considers not only the risk factors an adolescent offender presents, but also those that are the best predictors of re-offending at a particular age. If one were to follow this recommendation, results of the present study suggest that targeting employment deficits in later adolescence may be more important than concentrating one's efforts on educational deficits in early adolescence. Importantly, this finding can only be generalized to youth already embedded within the justice system, as low achievement in school has in fact been

found to be a salient risk factor for the onset of criminal behaviour (Farrington & Welsh, 2007).

It should be noted that the measure used for the employment and educational deficits domain was categorical in nature (i.e., employed or in school vs. not employed or in school) and therefore only really skimmed the surface of this properties of this domain. Future research should examine the differential impact of a wider range of employment and education variables (e.g., truancy, achievement, conflict) to better understand of how this domain differentiates classes of youthful offenders.

The results of Study 2 contribute to the ongoing debate within the traditional correctional perspective of crime as to the utility of dynamic re-assessment by examining whether change in gender-responsive risk/need factors can predict subsequent offending. Several scholars have questioned if changes in dynamic risk factors can even be reliably linked to reductions in recidivism (Kroner & Mills, 2013; Serin, Lloyd, Helmus, Derkzen, & Luong, 2013). One reason for this scepticism is that a lot of the support for the utility of dynamic variables has been generated with single-time point designs.

Addressing this limitation, this study used longitudinal data and measured change in two latent constructs (i.e., internalizing mental health and substance abuse) across two time points as a distinct latent construct; modelling change as a latent construct is thought to minimize compounding measurement error when using change scores (McArdle, 2009). Although methodologically strong, this study failed to support the hypothesized mediated relationships. Specifically, although there was a significant effect of victimization on subsequent offending, neither changes in substance use or changes in internalizing mental health deficits were significant mediators of this relationship.

As substance use remains relatively stable throughout adolescence, and generally only begins to decrease in early adulthood (Arnett, 2000), it is possible that change in the latent construct cannot be adequately captured until after this time (i.e., in a youth is in their early 20's). In any case, despite failing to support this relationship, substance abuse is strongly linked to offending for both males (e.g., Mulvey et al., 2010) and females (e.g., Andrews et al., 2011). As such, additional studies, using varying time points to capture change and an older high-risk sample, are needed to examine the role that substance use plays in the relationship between victimization and offending.

Result of this study also suggest that internalizing mental health deficits may not be viable criminogenic treatment targets, as change in this construct failed to predict subsequent offending. However, this does not mean that this factor does not need to be attended to in treatment. Both feminist pathways proponents (e.g., Covington & Bloom, 2006) and the traditional correctional perspective (Andrews & Bonta, 2010) agree that at the very least, mental health issues are responsivity factors (i.e., factors that need to be attended to in order to enhance treatment effectiveness; Bonta & Andrews, 2007; Andrews & Bonta, 2006; 2010). Additionally, as Study 1 revealed a class of offenders characterized as having comprehensive-needs in addition to internalizing mental health deficits, and did not identify a class with minimal-needs and internalizing mental health deficits, it is clear that this is domain is at the very least, more prevalent among high-risk cases and therefore warrants continued theoretical and practical consideration.

Limitations and Directions for Future Research

There are several limitations of this study worthy of discussion. Foremost, with the exception of the employment/education domain in Study 1B (collateral data was used) data

for the present study were based entirely on self-report. Although self-report data has been shown to be valid and reliable for adolescent offender populations (Thornberry & Krohn, 2000), there is the possibility for measurement error, due to socially desirable responding (i.e., the tendency of individuals to want to make themselves look good) or inaccurate recall (e.g., forgetting how many times they had a drink in the recall period), when data is not corroborated by alternate sources.

Second, as the variables selected for the present study were limited to those within the Pathways to Desistance database, this study only examined four gender-responsive or theoretically-neutral domains: victimization, internalizing mental health deficits, substance abuse, and employment or educational deficits. Feminist pathways proponents argue that there are a number of other risk factors for crime that are unique to female offending, including but not limited to relational dysfunction, economic marginalization, child-care problems, and poor self-efficacy (e.g., Arnold, 1990; Chesney-Lind, 1997; Chesney-Lind & Sheldon, 1998; Daly, 1992; Dehart, 2008; Gilfus, 1992; Richie, 1996). As such, future research should include these variables, if available, when examining gender-informed treatment profiles, and when attempting to test female pathways to crime using longitudinal multi-wave data.

Arguably one of the biggest limitations of the present study was the victimization measure utilized. Across both the female and male subsamples, there was an extremely low base rate of victimization captured by the chosen measure (on average, 0.08 to 1.64 victimization experiences in a particular recall period) across all time points across the chosen waves. A gender-informed measure, one that captures victimization experiences salient in the

lives of girls, in addition to those important for males would have allowed for more precise estimates of victimization/trauma.

The present study was also limited in the measurement of change; specifically, the selected time-points were largely predetermined, due to the archival nature of the data, and therefore may have not been spaced appropriately to capture change (i.e., assessments were either too far apart, or too close together). As such future research should explore how quickly (or slowly) internalizing mental health deficits and substance use change over time, and whether this change is in any way linked to subsequent offending.

Summary

Despite the aforementioned limitations, this study offers one of the first attempts at taking a gender-informed approach to understanding gender differences and similarities in the treatment profiles of adolescent offenders. Specifically, by leveraging the feminist pathways perspective with "what works" this study was able to conclude that there may be more similarities than differences among the need profiles of offending youth. Further, by borrowing methods and theory from a mainstream correctional perspective, this study offers a first attempt at linking changes in gender-responsive risk factors to subsequent offending using multi-wave data. Specifically, the relationship between victimization and offending, as mediated by changes in internalizing mental health deficits and substance use, were examined. Although the hypothesized relationships failed to emerge, in part due to measurement challenges, future research should build on the tenets of these models to demonstrate whether the pathways put forth by feminist pathways proponents can be empirically supported with multi-wave, quantitative data.

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Appendix A

Methodological Considerations for Study 2

Multilevel Structural Equation Modeling (MSEM) could also be used to examine moderated mediation with longitudinal data; however, this would involve the incorporation of time-lagged predictors if one wanted to examine how the status of, or changes in one variable (e.g., from T1 to T2) predicted changes in another variable (e.g., from T2 to T3) (K. Preacher, personal communication, Nov. 19, 2012). A cross-lagged panel model is best suited for looking at inter-individual change, and therefore is not suitable if one expects there to be substantial intra-individual change over time in the variables of interest (Selig & Preacher, 2009).

When using a latent growth mediation model, individuals are changing in a systematic way at least one of the variables of interest, and one would be interested in examining the inter-individual variability around that average rate of change (Selig & Preacher, 2009). As it was hypothesized that the variables under consideration would change, but would not change in any particular pattern, this method was deemed unsuitable.

Lastly, although Latent Growth Curve Models (LGCM) can also examine change and individual differences in change over time, if the trajectory of change is hypothesized to change from one interval to the next, LDS modeling is preferred (Selig & Preacher, 2009). LDS modelling also allows for bootstrapping. There are several advantages of this approach (See Preacher & Hayes, 2008), one of which is that it minimizes the effect of non-normal variables on the parameter estimates (Bollen & Stine, 1993; Finney & DiStefano, 2006).