Examining Gender Differences in Typological Membership using Latent Class
Analysis: A Novel Contribution to the Gender-Specificity/Neutrality Debate

by

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Abstract

This study contributed to the gender neutrality/specificity debate by using an innovative quantitative approach (Latent Class Analysis) to assess whether female offenders are different from male offenders. To do so, data from a large sample of adult female ($n = 733$) and adult male ($n = 726$) offenders from Canada's federal correctional system were assessed using 10 feminist-informed dichotomous indicators drawn from two portions of the Offender Intake Assessment Process (the immediate risk concerns assessment and the Dynamic Factors Identification and Analysis; Brown & Motiuk, 2005; Motiuk, 1997). Findings revealed a four-class solution for females with classes similar to proposed feminist pathways theories (e.g., classes characterized by mental health variables, poor coping, and substance abuse) and a two-class solution for males (i.e., one characterized by an absence of the feminist pathways variables and another characterized by gender neutral variables such as substance abuse, and associating with substance abusers). The results offer support for gender-saliency as females and males statistically differed according to the resultant optimal classification solutions.

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Examining Gender Differences in Typological Membership using Latent Class Analysis: A
Novel Contribution to the Gender-Specificity/Neutrality Debate

Introduction

Offence trends typically reveal large gender differences in criminal offending patterns as females tend to commit fewer offences relative to men (referred to as the “gender gap”). For example, in Canada (2005) the ratio of female to male *Criminal Code* offence accusations by police is approximately 1:5 (Kong & AuCoin, 2008). This gender gap is not new and has been the focus of many research studies and has also been demonstrated cross culturally (Moffitt & Caspi, 2001; Steffensmeier & Allan, 1996), and is more pronounced in developed countries (D’Unger, Land, & McCall, 2002).

Furthermore, various studies have illustrated that the gender gap is most apparent when considering aggressive (Ellis, 1988) or violent (Steffensmeier, 1980, 1993, 2001) forms of criminal behaviour. As well, self-report data indicates the gap is also apparent when considering other severe criminal offences such as robbery and major theft (Canter, 1982; Cernkovich & Giordano, 1979). However, from a self-report perspective the disparity diminishes when considering less serious criminal activity as boys report committing only twice as much criminal activity compared to girls. It is also of interest to note that the gap is almost eliminated when least severe crimes (e.g., shoplifting, drug use) are considered among youth (Canter, 1982; Cernkovich & Giordano, 1979; Moffitt & Caspi, 2001).

Thus, for both genders, teenage and young adulthood are times at which these individuals appear to be at the highest risk for criminal behaviour (Piquero, Farrington, & Blumstein, 2003). However, the gender gap tends to be very pronounced when considering almost all offence types within the adult offender population (Kong & AuCoin, 2008).

Although the gender gap varies as a function of methodology (self-report versus official records) offence type (violent offences versus shoplifting), and age, it is apparent there are some fundamental gender differences associated with criminality. The extent of these differences is not well understood and as such a heated gender debate has emerged. The gender debate does not dispute the gender gap as observed in studies examining official records. It does however, focus on the impact of personal histories and motivations for criminal activity and can be cogently summarized as having two primary – interdisciplinary – positions in which one camp places little importance on gender differences while the other highlights them.

Specifically, the “gender-neutral” camp contends that from a risk/needs assessment perspective, gender differences are minor and that risk/needs assessment instruments measuring eight empirically supported dynamic/static risk factors (e.g., antisocial associates, antisocial attitudes, antisocial personality pattern) operate as well with women as they do with men (Andrews & Bonta, 2006; Andrews et al., 1990; Cullen & Gendreau, 2000; Gendreau, 1996; Latessa, Cullen, & Gendreau, 2002). Furthermore, this perspective states that treatment targeting these dynamic factors is equally effective for both males and females (Dowden & Andrews, 1999a; Dowden & Andrews, 1999b; Dowden & Andrews, 2000).

Alternatively, the gender-specific camp (e.g., Belknap & Holsinger, 1998; Belknap & Holsinger, 2006; Chesney-Lind & Pasko, 2004; Reisig, Holtfreter, & Morash, 2006) maintains that according to research, women commit criminal acts for different reasons (motives) and as a result of distinct female-specific experiences (Belknap & Holsinger, 2006; Chesney-Lind & Pasko, 2004; Hannah-Moffat, 2009; Taylor & Blanchette, 2009). As such this camp states that risk assessment instruments and treatment approaches developed from a gender neutral perspective are not applicable to females (Beals, 2004) as they are the product of research

examining male; or predominantly male offenders (Krisberg, 2005) and were designed with males in mind (Salisbury, Van Voorhis, & Spiropolous, 2009).

While the gender-specificity/neutrality debate has been theoretical and focuses on correlates (e.g., Andrews & Dowden, 2006; Lowenkamp, Latessa, & Holsinger, 2006; McClellan, Farabee, & Crouch, 1997; Rettinger & Andrews, 2010; Simourd & Andrews, 1994), predictors (e.g., Bonta, Hanson, & Law, 1998; Dowden & Andrews, 1999; Gendreau, Little, & Goggin, 1996; Hubbard & Pratt, 2002; Wright, Salisbury, & Van Voorhis, 2007), and treatment outcomes (e.g., Andrews, et al., 1999; Dowden & Andrews, 1999b; Dowden & Andrews, 2000; Hipwell & Loeber, 2006), no studies have completed a quantitative clustering approach, with either a single or mixed gender sample to explore for gender differences.

Thus, the purpose of this study is to contribute to the gender-neutrality versus gender-specificity debate using a contemporary quantitative approach to clustering using a mixed gender sample informed by female centered correctional theories. The following review will commence with a general discussion of societal perceptions and empirical evidence of gender differences, along with a review of gender-neutral literature. This will be followed by an in-depth discussion of the gender-specific perspective. Lastly, a brief review of risk assessment, the importance of its accuracy for prediction, risk/need classification, and appropriate treatment will be discussed.

Women and Men: Distinct or Similar?

Individuals and societies often highlight gender differences despite empirical evidence to the contrary. For example, Hyde (2005) conducted a meta-analysis to test the “gender similarities hypothesis” using data from 46 key meta-analyses that examined psychological gender differences within six categories (e.g., cognitive abilities, verbal/non-verbal communication, social/personality variables). Findings revealed that 78% of the effect sizes

were close-to-zero ($d \leq 0.10$) or small ($0.11 < d < 0.35$). As such, Hyde concluded “that males and females are similar on most, but not all psychological variables” (p. 581). While it is important to understand that males and females are psychologically similar, gender differences with respect to differing socialization practices and female experiences unique to those of men are difficult to ignore.

This is particularly relevant to correctional research as gender differences that result from these experiences (e.g., abuse histories, parenting responsibilities) are often not addressed (Chesney-Lind & Pasko, 2004). In fact, gender-specific theorists insist that ignoring gender differences in this regard has resulted in the punishment and re-victimization of women for their survival strategies or unique experiences not typical with male offenders (Belknap, 2001; Covington & Bloom, 1999). Thus, examining gender differences is essential to ensure proper classification and effective treatment.

Women Offenders: Differing Perspectives

Many researchers agree that women are no longer disregarded in the correctional literature (Blanchette & Brown, 2006; Salisbury & Van Voorhis, 2009). Only recently, however, has the female offender population been rightly acknowledged or empirically highlighted. This transition is due in large part to the feminist criminology movement (Chesney-Lind & Pasko, 2004a; Chesney-Lind & Pasko, 2004b). This movement initiated the materialization of two perspectives—gender specific and gender neutral that lack consensus regarding the mechanisms that influence, predict, or cause criminal behaviour in females.

Specifically, the gender-specific perspective maintains that the processes and pathways to female offending behaviour are distinct for males and females (e.g., Belknap & Holsinger, 2006; Chesney-Lind & Pasko, 2004a; Daly, 1994; Salisbury & Van Voorhis, 2009; Steffensmeier &

Allan, 1996) and that male generated assessment tools should be abandoned or extensively modified to incorporate factors specific to female offenders.

In contrast, the gender-neutral perspective holds that the variables that influence, predict, cause, and/or relate to criminal behaviour in males are the same for females (e.g., Andrews & Bonta, 2006; Burgess & Akers, 1966; Dowden & Andrews, 1999; Gottfredson & Hirschi, 1990; Moffitt, 1993; Moffitt, 1994; Simourd & Andrews, 1994; Smith, Cullen, & Latessa, 2009) and that gender-neutral risk assessment tools are equally effective for men and women.

Before an in-depth discussion of these two interdisciplinary perspectives it is worth noting that both perspectives tend to acknowledge the gender differences mentioned previously (associated with the gender gap). Thus, it is not necessarily that gender differences exist, it is the degree and extent to which they exist, and their implications for risk/needs assessment, and or treatment that is debated.

Crime and gender neutrality: Stability across gender. Various biological (e.g., Quinsey, Skilling, Lalumière, & Craig, 2004; Caspi, et al., 2002), control (e.g., Gottfredson & Hirschi, 1990; Hirschi, 2004; Laub & Sampson, 2003; Sampson & Laub, 1993), social learning (e.g., Burgess & Akers, 1966), and life-course (e.g., Farrington, 2005; Moffitt, 1993; Patterson, DeBaryshe, & Ramsey, 1989) theories have been proposed to explain criminality – the vast majority of which posit that the causes of crime do not vary as a function of gender.

These theories however, will not be discussed in depth here. Rather, the primary focus will be placed on an integrative gender-neutral theoretical perspective, referred to as the Personal, Interpersonal, and Community-Reinforcement (PIC-R; Andrews, 1982a) theory. This theory finds its origins in a multifaceted General Personality and Social Psychology (GPSP)

framework (e.g., Ajzen & Fishbein, 1980, 2005; Bandura, 1989, 2001; Digman, 1990; Dollard, Doob, Miller, Mowrer, & Sears, 1939; Mischel, 1968, 2004).

Personal Interpersonal Community -Reinforcement (PIC-R) and Risk, Need, Responsivity (RNR). Very briefly, the PIC-R approach summarizes criminal behaviour as the product of rewards versus costs, pro-criminal (versus pro-social) modeling, antisocial beliefs, poor attachments at home, school, and or work, as well as temptations or situational influences within the immediate environment. This gender-neutral perspective serves as the operational framework for the three principles of effective correctional treatment. Specifically, the RNR model, (Andrews & Bonta, 2006; Andrews, Bonta, & Hoge, 1990; Andrews, Bonta, & Wormith, 2006) operates as both a method of prediction for criminal behaviour as well as a classification system for treatment purposes.

The risk principle. The risk principle is comprised of two elements: a) criminal behaviour can be predicted and b) the intensity of the treatment provided should be determined as a function of each offender's level of risk to re-offend. Specifically, high risk offenders should receive more intensive treatment and low risk offenders should receive very little if any treatment (Andrews & Bonta, 2006; Andrews, Bonta, & Hoge, 1990; Lowenkamp & Latessa, 2004).

Meta-analytical work examining correctional treatment supports the risk principle suggesting that services to low-risk offenders have little (or negative) effect, while services delivered to high-risk offenders yield moderate correlations with reduced recidivism (Andrews & Dowden, 2006; Lowenkamp, Latessa, & Holsinger, 2006). These findings illustrate the importance of effective risk assessment prior to the preparation of an offender's correctional programming. Thus, it is here that the second principle, the need principle, comes into play.

The Need Principle. An offender's level of risk is determined by assessing 'dynamic' risk factors or criminogenic needs. These needs are labelled "criminogenic" due to their strong empirical relation to criminal behaviour. Furthermore, they are considered "dynamic" in nature as they are amenable to change (Andrews & Bonta, 2006). It is this amenability that makes these factors very powerful correctional treatment targets.

According to this principle there are eight static/dynamic risk/need factors and Andrews and Bonta (2006) refer to the most powerful within the category as the *Big Four* (i.e., antisocial personality pattern, antisocial attitudes, antisocial associates, history of antisocial behaviour). The Big Four along with the remaining four (i.e., negative family/marital relationships, low satisfaction or performance at school/work, low involvement in leisure or recreational activities, substance abuse) comprise the *Central Eight* risk/need factors.

Moreover, empirical tests support the need principle. For example, in an extensive meta-analysis Dowden (1998) examined treatment programs that addressed more promising treatment targets (criminogenic needs) and compared them to programs treating less promising needs. Findings suggest that programs addressing a larger number of more promising targets yield the largest reductions in recidivism (mean effect size = .19) compared to programs treating less promising targets (mean effect size = -.01). These findings support previous work by Andrews and his colleagues (Andrews et al., 1990) and have also been illustrated within violent (Dowden & Andrews, 2000) and female (Dowden & Andrews, 1999a) offender populations (to be discussed in more depth below).

The Responsivity Principle. The final component of the RNR model, the responsivity principle, addresses the method of delivery of the treatment program(s). Specifically, this principle seeks to ensure that treatment is delivered in a manner that is suitable to the ability and

learning style of each offender, primarily using cognitive behavioural techniques. It is important to note that other factors such as gender, ethnicity, and motivation to change are taken into consideration within the responsivity component of the RNR model.

Thus, these researchers do not place primary importance on gender although they do consider gender for treatment delivery (and not risk assessment) purposes. This is one of the primary contentions of gender-specific proponents as it is their position that gender must be considered prior to treatment (responsivity). Specifically, a consideration of gender after classification is said to contribute to misclassification in risk assessment, and therefore, delivery of inappropriate (for example, a low risk offender may receive needlessly intensive) treatment (Reisig, Holtfreter, & Morash, 2006).

Empirical research in this area (typically referred to as the “what works” literature) spanning over two decades supports the RNR model, including the Central Eight predictors of criminal behaviour. This support has been illustrated among a variety of samples including violent offenders (Dowden & Andrews, 2000), young offenders (Dowden & Andrews, 1999b) and female offenders (Dowden & Andrews, 1999a, Rettinger & Andrews, 2010).

Specifically, Dowden and Andrews (1999a) conducted a meta-analysis of 26 studies that assessed effective correctional treatment for female offenders. Findings indicated that mean effect size for studies employing human service (.18) interventions (those that follow the RNR model) rather than criminal sanctioning (.01) with female offenders was associated with significantly larger mean reduction in recidivism ($\eta = .31$).

In fact, a consideration of studies examining females only indicated an increase in mean effect sizes from inappropriate (.02), weak service (.03), promising service (.17), to the most promising service (.36). Weak service can be equated to criminal sanctions while the most

promising service is defined as those programs that incorporated all three principles within the RNR model. Furthermore, recidivism rates for the treatment group were 43% and 57% for the control group.

These effect sizes and rates of recidivism are similar (or better) to those illustrated in studies examining males for example, work by Andrews, Dowden, and Gendreau (1999) revealed rates of recidivism of 44% for treated offenders and 56% for the comparison group. Furthermore, mean effect sizes are similar from inappropriate (-.02), weak service (.02), promising service (.18), and finally, the most promising service (.26). These findings illustrate that these principles are gender neutral as they appear to operate just as well with females as they do with males.

Although relatively sparse compared to research examining males, empirical evidence suggests that criminal history, antisocial attitudes, antisocial personality, antisocial associates, education/employment, and leisure/recreation (Brown & Motiuk, 2005; Dowden & Andrews, 1999a; Rettinger & Andrews, 2010; Simourd & Andrews, 1994; Van Voorhis et al., 2010) predict and/or correlate with recidivism in female offenders. However, there are some gender differences in the strength of the predictive accuracy of certain risk factors.

Regardless of empirical support for the Central Eight within female offender populations, feminist scholars argue that the Central Eight alone are not appropriate for use with female offenders (Beals, 2004) as they emerged from research using primarily male populations (Krisberg, 2005; Salisbury, Van Voorhis, & Spiropolous, 2009). These scholars state that pathways variables (e.g., history of victimization, poor self esteem, mental health, and poverty) separate female from male offenders and therefore, cannot be neglected as they are necessary for effective classification and rehabilitation.

Although variables such as victimization, depression, and poor self-esteem are not ignored in the “what works” literature, they are regarded as minor risk factors or non-criminogenic needs. Non-criminogenic needs are dynamic factors (e.g., anxiety and self-esteem) with weak empirical relations to recidivism. Curiously, studies conducted by the opposing camps suggest that these variables either do (Van Voorhis, Wright, Salisbury, & Bauman, 2010) or do not (Rettinger & Andrews, 2010) contribute incrementally to the prediction of criminal behaviour.

Incremental Validity: A similar approach with conflicting findings. For example, Rettinger and Andrews (2010) conducted a study designed to examine the predictive performance of gender-neutral and gender-specific variables on a large sample ($n = 411$) of provincially sentenced (custodial and community) adult women in Ontario, Canada with a 57 month follow-up period (recidivism was measured using official reports).

To examine this, both the Level of Service/ Case Management Inventory (LS/CMI; Andrews et al., 2004) and the Level of Service Inventory (LSI-R; Andrews & Bonta, 1995) were used to generate general risk/need scores and to obtain information pertaining each offenders’ personal and social history (for the gender-specific variables). The LSI-R is a 54-item survey that includes 10 sub-scales. Each item is scored in a dichotomous manner (risk present, or not) and scores are summed for a total risk score. The LS/CMI is the successor to the LSI-R and measures risk/need using eight risk/need scales.

Similar to the LSI-R the LS/CMI is summed to obtain a final risk/need score. Scores ranging from 0 to 4 represent very low risk, 5 to 10 represent low risk, 11 to 19 represent moderate risk, 20 to 29 is high risk, and finally, 30 and above represent “very high risk” offenders. Archival interview data was used to obtain information pertaining to demographics,

social history, and need information associated with female specific variables. Variables mentioned frequently in literature as being relevant for female criminality were used as gender-specific measures.

Results indicated that LS/CMI predicted general ($r = .63$) and violent ($r = .45$) recidivism, and new convictions ($r = .54$). Furthermore, each of the central eight risk/need factors were associated with general and violent recidivism, and new convictions (the lowest correlation occurs between family/marital domain and new convictions ($r = .11$)). A consideration of gender-specific variables revealed that sexual ($r = .11$) and emotional ($r = .11$) abuse as a child revealed low correlations with violent reoffending. All abuse indicators were summed to create one indicator and the result was a mild relation to violent recidivism however, this did not remain when analyses controlled for the general risk/need score as measured by the LS/CMI (in the regression model). Furthermore, self-abuse (as measured by suicide and self-injury) were related to violent recidivism, however, self-abusive behaviour did not add incrementally to the predictive validity of the LS/CMI.

Mental health concerns (e.g., depression, phobias, eating disorders, anxiety, nervousness, sleeping difficulties) were not related to recidivism however, emotional interference and active psychosis were linked to both general ($r = .12$) as well as violent ($r = .13$) recidivism. Neither parenting responsibilities nor financial difficulties emerged as predictors of recidivism, however, reliance on welfare emerged as a predictor of general recidivism ($r = .14$). Lastly, certain variables associated with financial or employment difficulties revealed mild correlations with recidivism however, none of these items contributed incrementally to the validity of the LS/CMI.

In sum, this study supports the gender-neutral theory as the central eight risk/need factors emerged as important and relevant when predicting criminal behaviour with provincially

sentenced female offenders. It is of interest to note however, that perhaps these findings would differ in a federal sample of women. For example, certain female specific variables (e.g., suicide, self-injury) were related to violent recidivism and since serious violent offenders are more likely to be housed in federal facilities this variable may add incrementally in federal samples.

Given the predictive capacity of this research design these findings warrant consideration in the gender-neutrality versus gender-specificity debate however, there remain a few limitations worth noting. The authors' suggest that the magnitude of the effect of the gender-specific variables may have been reduced given the interview nature of the data. Specifically, the authors' speculate that the abuse measures may not have accurately captured the variety and multidimensional nature of abuse that could be associated with future criminality. Furthermore, many of the offenders in the current study may not have reported the depth of their abuse or personal histories due to social desirable responding.

In contrast to the Rettinger and Andrews (2010) study, research conducted by Van Voorhis et al. (2010) revealed that some of the factors not included in the Central Eight (e.g., parental responsibilities, anger/hostility, abuse, and self-efficacy) were predictive among probationers, prisoners, and/or released females. Specifically, their study set out to examine the incremental validity of a "gender-responsive trailer" for female offenders (probation, pre-release, and prison) designed for use in accompaniment with male-generated "gender-neutral" instruments such as the LSI-R.

Two trailers were tested in their study. The first trailer (supplement 1) is a paper-pencil measure of self-esteem, self-efficacy, victimization (adult), child abuse, parental stress, and relationship dysfunction. The second, referred to as supplement 2 measures the same dimensions

as supplement 1 and also includes measures of depression, psychosis, mental health history, family support, family conflict, relationship support, housing safety, anger/hostility, and educational strengths (acceptable alphas were reported for both supplemental scales).

Participants included female offenders from a variety of settings (probation, prison, pre-release) from various institutions in Colorado, Minnesota, Missouri, and Maui. Follow-up periods ranged from 17 months to 2 years for the various samples. It should be noted that recidivism was measured only after release from the institution in the previously discussed Rettinger and Andrews (2010) study however, in the Van Voorhis et al. (2010) study recidivism included serious institutional misconducts (for prisoners/pre-release), and various community outcome variables (probationers) obtain from arrest data.

For probationers, analyses revealed that the sum of all gender responsive scales (supplements 1 and 2) were predictive among the combination of all samples involved in the study (prison, probation, and pre-release). Not surprisingly, an examination of the bivariate correlations between gender-neutral risk/need factors and recidivism (ranging from .07 to .32) indicate that almost all of the central eight risk factors significantly correlate with recidivism across the various samples.

An examination of the gender-specific factors measured in both supplements yields mild to moderate correlations with outcome depending on the sample. For example, correlations for unsafe housing (-.04 to .23), anxiety/depression (.01 to .23), psychosis (-.01 to .26), and anger/hostility (.03 to .15) range from mild to moderate (and significant or not significant) and vary as a function of the sample. Furthermore, correlations between parental stress (-.08 to .24), relationship dysfunction (-.09 to .28), child abuse (.01 to .22), and adult abuse (-.01 to .24) all

varied greatly across the two supplements and three sub-samples. As such only the most relevant scales for each sample were examined in subsequent regression analyses.

Results of various regression analyses indicate that LSI-R was strongly associated with recidivism across all samples. Parental stress and self-efficacy were significantly related to outcome measures in all three samples of probationers and when added to the gender-neutral scales in the model these scales added a modest contribution to the model however, this same contribution was not noted in the Maui sample. Child abuse and relationship scales illustrated significant incremental validity when added to LSI-R assessments (prison sample) and this trend was noted across all regions. The pre-release sample, illustrated an insignificant increase in incremental validity when the relevant gender-responsive (e.g., victimization, self-efficacy) needs were added to the model.

In general, findings from Van Voorhis and colleagues (2010) support the gender neutral LSI-R in its ability to significantly predict future criminal behaviour with women offenders. However, in contrast to Rettinger and Andrews (2010) their work suggests that certain gender-responsive needs add incrementally to the prediction, curiously however, this is only illustrated with certain types of offenders (e.g., probationers and prisoners) and in certain regions (e.g., Minnesota and Missouri).

As discussed previously, Rettinger and Andrews (2010) found no significant incremental impact on the validity of gender-responsive variables. There are a number of elements within the research design that may account for these differences for example, gender-responsive variables in Van Voorhis et al. (2010) were measured according to self-report and interview form, and this data was not archival therefore, the researchers were able to accurately create the supplemental items to fully represent the gender-responsive literature (this was considered a limitation

according to Rettinger and Andrews). It is plausible that incremental validity in this study is due to a better measure, or representation of gender-responsive variables.

Furthermore, sentence severity (or offender risk level) could also account for some of these differences specifically, Rettinger and Andrews' (2010) sample consisted of provincial female offenders (overall these women are of less risk when compared to federal offenders), while Van Voorhis and colleagues (2010) utilized a number of samples ranging in severity. As illustrated with the wide range of correlations in their findings, incremental validity – for certain variables – vary as a function of population (and therefore, perhaps severity of offence). It is also of interest to note the lack of findings in the pre-release sample of the Van Voorhis et al. study, one could speculate that prison misconducts at the end of a sentence may decrease as some offenders may attempt to avoid conflicts (that they may not have previously) in order to avoid any additional time to their sentence.

Feminist criminology: Pathways to crime and the unique female experience. The gender-specific criminological perspective originates from sociological and feminist literatures. Kathleen Daly (1992, 1994) was one of the first researchers to investigate pathways to offending among women. A content analysis of court records based on a small number of women ($n = 40$) convicted in New Haven, Connecticut between 1981 and 1986 led Daly to conclude that there were five types or classes of women offenders. The first, referred to as the “street women pathway,” (27.5%) is defined as one who runs away either due to the thrill of the street or to remove oneself from an abusive home environment. Daly (1994) further defines these women as those who are frequently incarcerated, have extensive criminal records, and support themselves through prostitution, theft, and selling drugs. The second, “the harmed and harming women pathway” (37.5%) is subdivided into three subcategories based on their outcomes including

whether they use alcohol to cope, support drug habits, or could not cope with their circumstances. However, the underlying commonality is a history of sexual or physical abuse and neglect, difficulty growing up and early substance abuse problems.

Daly's (1994) third typology, the "battered women pathway" (12.5%) encompasses female offenders previously or currently in relationships with violent men. These women typically make their way into the criminal justice system as a result of their abuse or fighting off a violent man in their lives. The "drug-connected women" (12.5%) is the fourth pathway, a pathway that is defined by an absence of criminal convictions. In fact, women on this pathway are characterized by their involvement in selling or using drugs within their relationships (typically with family members or intimate partners).

Daly's (1994) final pathway includes female offenders who commit criminal acts for financial gain (referred to by others as the "economically motivated" (10%) offender; Steffensmeier & Allan, 1996). These offenders are not motivated by, and do not typically use drugs, have previous arrests or have any of the characteristics typical of the other pathways. Furthermore, Daly argued that this pathway is not specific only to female offender populations as it is frequently seen in male populations. In sum, Daly's work proposes the importance of a number of variables including a history of (or current) abuse/victimization, substance abuse, and financial difficulties (see Table 1 for a summary of the variables according to each of the five pathways).

Table 1

Variables Characterizing each of Daly's (1994) Five Proposed Pathways to Female Felony Court

Harmed and Harming	Street	Economically Motivated	Battered	Drug-Connected
Uses alcohol to cope	Typical offences: prostitution, theft, selling drugs	Financial motivated offences	Previous or current relationship with violent men	Absence of criminal convictions
History of sexual,/physical abuse, neglect	Frequently incarcerated	Little or no criminal record	Enter criminal justice system as a result of abuse or fighting off violent men	Sells or uses drugs within family/intimate relationships
Difficulty coping	Extensive criminal record	No drug abuse		
Early onset and current substance abuse	Run away (thrill or abuse removal)			
Difficulty growing up				

It is of interest to note that when creating the typology, the street women ($n = 10$) and harmed and harming women ($n = 15$) pathways accounted for a large majority of the sample, thus, illustrating the importance of victimization and drug use to the offending patterns of female offenders (Chesney-Lind & Pasko, 2004).

Although Daly (1994) provided a foundation for several research studies that emerged following her publication, there are a few limitations that should be noted. First, the typologies were developed qualitatively using a small sample of 40 offenders (resulting in very small sub-samples of typologies) and no males were included in the analysis for comparison purposes. To

date, Daly's typology has not been thoroughly examined using any quantitative statistical classification procedures.

Thus, the current study intends to explore potential female offender typologies using a quantitative classification approach (rather than qualitative) with a large sample of female offenders – while also incorporating a large male offender sample for comparison purposes – to determine whether these classifications are gender-neutral or gender-specific. The inclusion of a male comparison group will be novel in that much of the pathways perspective has yet to utilize male comparison groups quantitatively. Despite this, many of these studies assert these variables are specific to females. Therefore, the degree to which these offender typologies quantitatively differ as a function of gender will make an important contribution to the gender neutrality/specificity debate.

Pathways variables: Prevalence and correlations. Subsequent studies guided by Daly's (1994) proposed typology tend to focus on many of the variables that emerged from the various pathways. For example, McClellan, Farabee, and Crouch (1997) conducted a comparative analysis of a large sample of male ($n = 1030$) and female ($n = 500$) Texas prisoners to examine gender differences in victimization, substance abuse, and criminality.

Results indicated that women offenders reported higher rates of child and adult victimization, depression, and illicit drug use compared to their male counterparts. Not surprisingly, women were also more likely to run away as youth (an essential component to Daly's street women pathway). Findings also revealed a moderate correlation between depression and childhood victimization for women ($r = .30$), and a weaker correlation for men ($r = .18$). According to the authors' these findings suggest that depression and negative

emotionality often manifest themselves through overt, criminal behaviour in female offenders (McClellan et al., 1997).

There are limitations worth noting in this study. Specifically, this “comparative analysis” reveals a higher prevalence of certain characteristics (e.g., abuse, drug use) with female offenders. However, this non-experimental, cross-sectional design does not allow for conclusions regarding the extent to which these characteristics cause or influence criminal behaviour, or the degree to which they are relevant for risk assessment and or treatment.

McClellan et al.’s (1997) study reveals interesting patterns, however, given the nature of the design the findings do little more than suggest that these characteristics warrant further examination in future research. Although the current study is also non-experimental and cross-sectional in nature it offers a quantitatively novel approach in this area, and as it explores two important elements to the debate. The first is the degree to which these variables that are more prevalent among female than male offenders actually differentiate female offenders from one another and second, the degree to which these variables differentiate female offenders from their male offender counterparts.

More recently, Belknap and Holsinger (2006) set out to examine the pathways perspective in a large sample of boys ($n = 281$) and girls ($n = 163$) incarcerated in various youth facilities in the state of Ohio. The primary objective of the study was to help account for the link between childhood abuse and subsequent delinquent behaviour. Data concerning the youths’ demographics, family, school, peer relations, self-esteem/mental health, offending history, and history of abuse were obtained through self-report surveys completed anonymously while participants were supervised by research staff.

Findings revealed two overarching trends in the data. First, girls reported significantly greater amounts of abuse (verbal, sexual, physical, and witnessing abuse) particularly sexual abuse, when compared to their male counterparts. Second, rates of abuse reported by the boys in the sample while exceptionally high, although they were still not as high as abuse reported by girls. It is of interest to note that approximately half of the girls and two-fifths of the boys indicated their previous victimization histories led to their previous offending behaviour; although both boys and girls revealed this, girls were significantly more likely to do so.

In terms of family history and relationships, girls were significantly more likely to report abandonment by a parent and a preference for institution living as opposed to living at home. The latter finding is particularly relevant given that pathways theories suggest that females commit crimes to escape victimization occurring within their homes. Furthermore, a consideration of the mental health and self-esteem variables revealed that girls' who reported a higher frequency of mental health problems, were more likely to engage in self harming behaviours, to consider and attempt suicide, and to report low self-esteem (Belknap & Holsinger, 2006).

These prevalence statistics *lend* support to the possibility of differing pathways as they suggest that victimization, mental health, self-esteem, and familial relationships are reported more frequently with delinquent girls. However, as mentioned in the discussion of the McClellan et al. (1997) limitations, this study is similarly limited in its non-experimental, cross-sectional design. Specifically, certain characteristics may be more prevalent among young female offenders however, that does not suggest that these characteristics are the cause of their offending patterns.

In addition, these variables may also be prevalent among non-offending female counterparts, suggesting that the characteristics have little to do with female criminality (and are simply representative of gender differences in the general population). An examination of non-offending counterparts would be useful to assist in determining if that is the case. The current study seeks to understand whether female offending classes emerge and also, whether these classes (as informed by hypothesized female specific factors) differentiate female offenders from male offenders.

Furthermore, female pathways and classification systems have not been tested quantitatively and as Bailey (1994) notes, classification “is so ubiquitous that not only do we generally fail to analyze it, we often even fail to recognize its very existence. Classification is arguably one of the most central and generic of all our conceptual exercises” (p. 1). Thus, failing to recognize the existence—and failing to test the empirical nature of female typologies with respect to criminality—is a major gap in the gender-specificity versus gender-neutrality debate.

Hubbard and Pratt (2002) attempted to address the relevant predictors of female delinquency using a meta-analytical approach. Their findings offer support for both the gender-neutral perspective as many of the predictors of male delinquency are the same for females (e.g., antisocial attitudes, antisocial peers, antisocial personality pattern) however, a few “female prevalent” variables also emerged as robust predictors of female offending (e.g., family relationships, history of physical/sexual assault).

Specifically, Hubbard and Pratt (2002) conducted a meta-analysis to create a hierarchy of predictors of delinquent behaviour among girls and to determine whether the strong predictors for females are the same as those that predict delinquency in males. An electronic literature search of all published empirical studies examining female delinquency resulting in a total of 97

effect sizes (effect sizes reported in the study are standardized correlation coefficients) generated from a total of 5,981 cases. Not surprisingly, results indicated that the primary predictors of delinquency in males (antisocial associates, antisocial attitudes, antisocial personality, and prior history of antisocial behaviour) emerged as relatively strong predictors of delinquency in females, ranging from .18 to .53. Specifically, antisocial peers emerged as the strongest predictor ($r = .53$).

Of interest to the current study, two factors that were unexamined in previous meta-analyses – school relationships (mean effect size = .25) and physical/sexual abuse (mean effect size = .21) – emerged as relatively strong predictors of criminal behaviour in girls. The authors also note that family (of origin) relationships (mean effect size = .17) yielded a “respectable” effect size suggesting this variable is worth of future research.

The findings from this study go beyond comparative/prevalence studies typically conducted in the gender-specificity area and suggest that for girls, abuse, family, and school relationships may be important elements when considering delinquent behaviour. It is worth noting that no boys were included in the analyses and thus, although the findings indicate the importance of certain variables (abuse, familial relationships) conclusions regarding the importance of these variables to girls, and girls alone cannot be made. Specifically, similar findings may have been revealed for boys had there been a male comparison group involved in the analyses. This helps to illustrate the importance of the male comparison group in the current study.

Further research from the gender-specific perspective illustrates the importance of feminist variables using pathway analyses. Specifically, Salisbury and Van Voorhis (2009) conducted a study designed to quantitatively assess female probationers' paths to incarceration

with a sample of 313 women processed through Missouri's Department of Corrections. The sample included women who were on probation for a variety of offences including drug, theft, and forgery (7.3% of women were on probation for a violent offence). Approximately 80% of the women were new to the correctional system as their index offence was their first felony offence.

Risk/need was measured using two instruments (self-report and interview based) developed by the Missouri Women's Issues Committee for the Women's Needs and Risk Assessment Project. These two scales were factor analyzed and items loading above .50 (among each of the domains) were retained and added to create a summed Risk/Need scale including various subscales (employment/financial, educational strengths, family support, substance abuse, dynamic substance abuse, history of mental illness, depression/anxiety, child/adulthood victimization). It should be noted that data pertaining to child/adulthood victimization, self-efficacy, and relationship dysfunction were obtained using self-report measures. Finally, recidivism was measured using dichotomous (yes or no) variable and participants were scored as "yes" if they were readmitted for any reason within the 2 year follow-up period.

Bivariate correlations and path analysis (an extension of multiple regression) were used to assess the various relations between the variables for three pathway models (childhood victimization, relational, and social human capital). Bivariate correlations between prison admission and the various scales associated with the childhood victimization model reveal that the strongest relations occur between static ($r = .16$), dynamic ($r = .23$) drug abuse, and current depression/anxiety ($r = .18$). Path analyses for this model suggest that childhood victimization served as an indirect influence resulting in five pathways to recidivism. Furthermore, each of the

variables in this model revealed either an indirect (mental health and childhood abuse) or direct (depression/anxiety and current drug addiction) effect on recidivism.

Bivariate correlations and path analysis for the relational model indicate that all risk/need factors in this model (self-efficacy, current depression/anxiety, and current/dynamic substance abuse) with the exception of two (relationship dysfunction and adult victimization) emerged as significant correlates with prison readmission with correlations ranging from .28 to - .36. Path analyses suggest that depression/anxiety and current drug addiction (as revealed in the childhood victimization model) were directly associated with recidivism and that those variables were affected by relationship dysfunction, reduced self- efficacy, and adult victimization.

A consideration of the bivariate correlations revealed in the third and final model suggests that educational strengths ($r = -.19$), self-efficacy ($r = -.12$), and employment/financial difficulties ($r = .21$) were all mild predictors of prison readmission. Path analyses for this particular model reveal that educational strengths and employment/financial difficulties had a direct effect of prison readmission with low self-efficacy, relationship dysfunction, and reduced family support all contributing indirectly to the model.

This model suggests that certain gender-specific variables appear to contribute to female criminality, however, there are a few limitations that need to be discussed. The first is common to almost all gender-specific studies as many of these studies assert that their findings illustrate a gender-specific approach however, these studies typically do not utilize male comparison groups. Specifically, male comparison groups are required prior to the assertion that they are gender specific as male offenders subjected to the same analyses may yield similar findings. Importantly, this would suggest these pathways or variables are not genuinely female-specific.

Therefore, this study is not able to offer conclusions to the degree to which the pathways that emerged are gender-specific.

Furthermore, bivariate correlations between prison readmission and the variables in the current analyses ranged from .01 to .23. The highest correlation ($r = .23$) illustrates the relation between recidivism and substance abuse, the next highest correlation in the analyses ($r = .21$) emerges between recidivism and employment/financial difficulties, both are risk factors from the Central Eight (Andrews & Bonta, 2006). Following these variables are educational strengths ($r = -.19$) and current depression/anxiety ($r = .18$).

The strength of the relations between the Central Eight and recidivism are not surprising given the extensive research in that area supports the findings, however, the relations between the remaining (gender-specific) variables and recidivism are relatively small considering. It would be of interest to examine the gender-neutral variables using path analysis to determine how these variables compare to the gender-specific variables, to assess which variables account for more variance, and to determine if any of the other Central Eight play a more direct role in recidivism. Although the current study will not incorporate many of the Central Eight, it will examine female-prevalent (or gender-specific) variables to determine the degree to which these variables differentiate female offenders from their male counterparts.

Gender Differences: Implications for Accurate Risk Assessment

Risk assessment is not only essential for determining one's risk to re-offend but also for prison placement and to determine custody levels within correctional institutions. Properly determining one's custody level is crucial as it helps with the security and safety of offenders. Moreover, it determines housing, privileges, movement within the facility, and access to programming (Brennan, 1998; Van Voorhis & Presser, 2001).

However, research indicates that prison classification systems and risk assessment instruments are better for classifying men than women (Hardyman & Van Voorhis, 2004) and the result is a high number of female offenders are over-classified as high-risk. Women who are unnecessarily classified as high-risk are not given access to certain programming that would serve to benefit them. Furthermore, they are restricted in terms of the level of freedom within the institution (Brennan, 1998; Van Voorhis & Presser, 2001). In essence, risk assessment can be likened to a domino effect, if done incorrectly at the start the negative effects may be impossible to ignore.

Wright, Salisbury, and Van Voorhis (2007) examined the relationship between institutional misconducts and various gender-neutral and gender-specific needs (using a gender sensitive “trailer” along with the gender-neutral risk assessment instrument) with a sample of 272 newly incarcerated women in the Missouri Department of corrections. Findings revealed that gender-specific needs such as childhood abuse, psychosis, depression/anxiety, and unsupportive relationships were moderately related to 6 and 12 month institutional misconducts with correlation coefficients ranging from $r = .31$ ($p < .01$) for current psychosis (and the number of misconducts at 12 months) to $r = .08$ ($p < .10$) for adult harassment (and the number of misconducts at 6 months).

When considering gender neutral needs correlations ranged from $r = .09$ ($p < .10$) for employment/financial difficulties (and number of misconducts at 12 months) to $r = .20$ ($p < .01$) for family support (and number of misconducts at 12 months). These findings indicate that the gender specific needs tend to be larger correlates of prison misconducts for the females in this study.

This research shares many of the limitations previously discussed as it neglect to incorporate a male comparison group and also, given the non-experimental nature of the design it is not possible to determine if these variables cause the prison misbehaviour, or how much of an impact the variables have above and beyond the influence of gender neutral variables. Despite these limitations however, there remains uncertainty into the degree to which these variables may impact a women's ability to effectively rehabilitate, as institutional misconducts (as they may lose access to programming etc.) may serve as a barrier to treatment access. As such it is important to examine these variables further.

Finally, meta-analysis conducted by Smith, Cullen, and Latessa (2009) yielded 27 effect sizes from 25 published and unpublished data sets. The purpose of their study was to examine the relationship between the LSI-R (total scores) and recidivism for female offenders. The majority of the studies incorporated in the meta-analysis used reincarceration or reconviction as a measure of recidivism with anywhere between 12 to 24 months follow-up period.

Findings revealed that the mean effect size between recidivism and the LSI-R (Andrews & Bonta, 1995) for female offenders was strong ($r = .35$, $CI = .34$ to $.36$). In addition, within-sample (for gender) effect sizes were statistically similar for males and females. Specifically, 16 data sets in their sample allowed for gender comparisons and results indicated that the LSI-R predicted recidivism almost identically for both males ($r = .26$) and females ($r = .27$), with overlapping confidence intervals.

Smith et al. (2009) concluded that "the LSI-R performs virtually the same for female offenders as it does for male offenders" (p. 198) when considering the identification of risk/need (as measured by the LSI-R) and reductions in recidivism. However – as discussed below – Reisig and his colleagues (2006) conducted an examination of the rates of recidivism on a large

sample of 235 women offenders currently supervised in the community (parole or probation) in Minnesota and Oregon. Data associated with biographical information were “gleaned” from numerous sources (including interviews) regarding each participant’s relationship information (childhood, family, and intimate partner), substance abuse, criminal histories as well as other factors.

This information was then reviewed and discussed by two team members who then *manually* placed each participant into one of Daly’s (1994) five offending typologies on the basis of their offence and personal characteristics. After participants were placed into the various typologies. Eight percent of the female offenders were classified as street women pathway, 44 percent were classified as drug-connected pathway, 17 percent were classified as harmed and harming women pathway, 7 percent were classified as battered, and finally, 24 percent were classified as economically motivated. Following this manual classification, 35 cases were randomly selected and blindly coded by the third author to assess the level of inter-rater agreement. Kappa statistic ($\kappa = .76$) was high suggesting that the three authors were in “excellent” agreement with the participants’ typological placement.

It should be noted that 30 women were excluded from the final analysis due to an inability to adequately classify them into one of the five categories due to various reasons. Their final classification revealed a large proportion of drug-connected, harmed and harming, and economically motivated offending pathways and smaller proportions of street and battered women pathways. These proportions are different from those revealed in Daly’s (1994) work however, the authors attribute these differences to the less serious nature of the offenders in their sample.

Results of a chi-square analysis indicated a “more than adequate” association between recidivism and LSI-R risk rating for the economically motivated offending group with no evidence of misclassification. This is illustrated in the increase in rates of recidivism from low (22%), moderate (27%), to high risk (80%). However, results of the association between recidivism and LSI-R risk for all other groups did not yield such positive findings.

First, it should be noted that due to low cell counts, the four other pathways were grouped together to encompass a general “gendered pathway.” Findings suggest misclassification as women within this category were both over and under-classified. This is illustrated as rates of recidivism actually decreased from low (58%), moderate (53%), to high-risk (37%) offenders. Most importantly, their findings indicate that the LSI-R was unable to accurately predict recidivism for 76% of the women following one of the four gendered pathways.

For the purposes of the current research there are a few findings and limitations that must be discussed. For example, their study is limited in their utilization of a very subjective (manual) form of classification as they did not use quantitative statistical procedures. Although there was a third “blind” coder and inter-rater reliability was sufficient, this study may have yielded different results had the authors employed quantitative analytical methods.

Furthermore, some women in the Reisig et al. (2006) study were unclassifiable and this may suggest that more typologies exist. In addition, this study is limited in that there is no male comparison group. Specifically, it would be of interest to determine whether a sample of males could have been classified into any of the gendered pathways, or if those pathways as determined by the researchers were truly female specific.

Summary and Purpose of the Present Study

Taken together, a review of the gender-neutral and gender-specific perspectives indicates that certain variables predict recidivism equally for males and females. However, as advocated by feminist researchers, there is evidence that some variables (e.g., parenting responsibilities, previous abuse histories, self-esteem) may be more prevalent among female offenders. Although it is not possible to implement a true experimental design to assess whether these female prevalent variables (e.g., mental illness, history of victimization) are the cause of criminal behaviour in females, the current study attempts to determine if they truly differentiate the female offender population from their male counterparts.

Importantly, the feminist-orientated typology research as defined by Daly (1992, 1994) suggests that female offenders can be qualitatively classified into one of five pathways to crime including; street, harmed and harming, battered, drug-connected, and economically motivated offending pathways. Each pathway is characterized by a combination of certain female-specific (e.g., histories of victimization, negative familial relations in youth) and gender-neutral variables (e.g., substance abuse) and these variables are said to differentiate males from females.

Moreover, work by Reisig and colleagues (2006) indicates that gender-neutral risk assessment (as measured by the LSI-R) with female offenders – subjectively classified into Daly's (1992, 1994) pathways – misclassifies women offenders' risk levels in all typologies except for the economically motivated category. A category that is characterized by an offending context that is similar to that of males. Thus, these findings illustrate the importance of studying various offender classifications with respect to gender.

Therefore, more empirical investigations into the various female prevalent variables in addition to pathways/typologies proposed by Daly (1992, 1994) and other feminist researchers are required. Furthermore, quantitative taxonomic analyses have not been performed as a means

to examine the importance or relevance of female prevalent variables in any empirical research studies. The implications (if these variables typologically differentiate females from males) to risk assessment – particularly with respect to the female offending population – are essential to ensure that effective classification and appropriate treatment can be confidently administered.

Research Questions and Hypotheses

The study is exploratory in nature for a number of reasons. First, no studies have attempted to examine typologies using these hypothesized female relevant variables in a quantitative analytical approach. Furthermore, although both Daly (1992, 1994) and Reisig et al. (2006) attempted to examine various classifications of females their approaches were qualitative and subjective. As such, it is difficult to hypothesize if female specific typologies will emerge using a quantitative classification approach.

Third, quantitative tests of typological membership have not been conducted on Canadian samples. This is important as it is difficult to hypothesize how the results will differ from American samples given Canada's high proportion of Aboriginal offenders (Kong & AuCoin, 2008). Lastly, although Daly's (1992, 1994) and Reisig et al.'s (2006) work qualitatively suggests the existence of these pathways, their work did not address whether these pathways are truly female-specific.

Hypothesis 1

The various classes that emerge for females will differ from the classes that emerge for males.

Hypothesis 2

There will be a class of individuals with stable accommodation, education beyond grade 10, no substance abuse (or associations with abusers), and no suicide attempts or mental health concerns that will be similar to an economically motivated classification (for both genders).

Hypothesis 3

Classes characterized by parenting responsibilities, education, coping, and mental health will be more prevalent among female offenders when compared to their male counterparts.

Method

Sample

The data are archival in nature, obtained from Correctional Service of Canada's Offender Management System (OMS). Specifically, the original database consisted of 1,530 ($n = 765$ females, and $n = 765$ males) federal offenders assessed using the Offender Intake Assessment (OIA) between November 1st, 1994 and September 1st, 2000. The female sample was comprised of all women who were assessed using the OIA. The male sample was comprised of a random sub-sample of men (stratified by Aboriginal status¹) assessed using the OIA (i.e., 765/15479). It should be noted that 71 cases were missing data associated with the suicide indicator and were therefore subsequently dropped from analyses. This will be discussed further in the results section, however, all proceeding descriptive statistics were conducted on the final reduced sample.

A consideration of the mean age of the sample indicates that males ($M = 40.02$, $SD = 10.75$) were significantly older than females ($M = 38.21$, $SD = 8.99$), $t(1459) = 3.50$, $p < .001$, with a total sample age range of 23 to 87 for males and 23 to 71 for females. Furthermore, approximately 15% of the males and 25% of the female offenders in the sample had past or

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¹ One may argue that the sample should have been stratified by index offence however, this was not possible as the sample was previously reduced prior to receipt.

present drug offences, 38% of males and 28% of females had been convicted of a past or present robbery offence. Moreover, 36% of males and 21% of females were convicted of a violent offence (past/present), and finally 66% of males and 47% of females had been charged with a previous provincial offence.

Measures

At the time of sentencing, a case management officer (parole officer) is assigned to manage and synchronize the collection of all relevant information pertaining to the offender from various sources including criminal records, police reports, court transcripts, victim impact statements, and pre-sentence reports (Motiuk, 1997). This information is then used as a means to identify critical and immediate concerns such as health, security, or suicide risk prior to transfer and admission to any Canadian federal institution.

At the time of an offender's arrival and official admission to the intake unit, a brief screening process is completed (to assess and address immediate concerns), proceeded by the core elements of the Offender Intake Assessment (OIA): the Criminal Risk Assessment (e.g., offence severity, criminal history), the Dynamic Factor Identification and Analysis (Motiuk, 1997) and immediate risk concerns assessment (suicide and security).

Dynamic Factors Identification and Analysis (DFIA; Brown & Motiuk, 2005; Motiuk, 1997). The DFIA is comprised of the following seven domains; 1) employment, 2) marital/family history and relations, 3) associates/social interaction, 4) substance abuse, 5) community functioning, 6) personal/emotional, and 7) attitude. As previously discussed, these factors are empirically related to the prediction of recidivism and also reduce rates of re-offending when targeted in treatment.

These seven domains are divided into 35 principle components which are further divided into 94 subcomponents which in turn are divided into 197 indicators (see Appendix A). The needs rating process is conducted by parole officers who use all available information (including; personal characteristics, interpersonal influences, situational determinants, environmental conditions) to score each of the 197 indicators (comprised of yes/no statements). As will be discussed shortly, 13 of these 197 indicators were used in the current study. These statements are then used as a guide to determine each offender's need level rating for each component, each domain, and finally, for an overall total intervention need rating (low, medium, or high).

Psychometric tests of concurrent validity indicate that the DFIA process performs well (Brown & Motiuk, 2005; Motiuk, 1997) as illustrated by moderate to strong correlations between the overall OIA risk level and the Criminal Risk Assessment components ($r = .17$ to $r = .49$, $p < .001$). Moreover, these findings are consistent with those that emerged between the OIA process and other measures of risk (e.g., SIR-R1 and security risk score). Furthermore, acceptable internal consistency has been illustrated with the DFIA at the domain level with male, female, and Aboriginal offender populations yielding Cronbach's alphas ranging from .62 (community functioning for women offenders) to .96 (substance abuse for women offenders).

In addition, inter-rater and test-re-test reliability have not been conducted on the DFIA therefore, they are not reported here. However, it is worth noting that parole officers receive extensive training for the OIA process (and for administration of the DFIA) and are monitored for quality assurance.

Suicide indicators. As previously discussed, the OIA serves many functions, one of which is to assess immediate risk concerns associated with security and suicide (Motiuk, 1997). Thus, one indicator assessing history of suicide attempt will be included in the analyses.

Data Preparation

Data preparation (deleting missing cases, combining indicators), descriptive statistics, and the primary analysis (LCA) were conducted using SAS (Version 9.1).

Indicator elimination. Although it would be ideal to include a large number of indicators in the study, large numbers are not recommended given the exponential increase in the cells involved in the contingency table (S. T. Lanza, personal communication, September 14, 2010). Specifically, the contingency table for the present analysis is computed based on the number of possible responses for a given question (i.e., dichotomous = 2) to the power of the number of indicators (10).

Furthermore, this is multiplied by the number of group comparisons (males and females = 2). Thus, for the current study the contingency table includes $(2 \times 2^{10} = 2 \times 1024 = 2048)$ over two-thousand cells that will require interpretation (Collins & Lanza, 2010). As previously described, the DFIA is comprised of 197 indicators. For the purpose of the current study these 197 indicators were scaled down to 13. Prior to the analyses, the following inclusion/exclusion criteria were generated:

Step one. Remove indicators not *explicitly* discussed in feminist literature (Table 2).

Table 2

Indicators Removed According to Step One of Inclusion/Exclusion Criteria

Domain	Indicator
Employment	Finds learning difficult?
	Has learning disabilities?
	Has physical problems that interfere with learning?
	Has memory problems?
	Has concentration problems?
	Has problems with reading?
	Has problems with writing?
	Has problems with numeracy?
	Has difficulty understanding instructions?
	Has physical problems that interfere with work?
	Has no employment history?
	Unemployed at the time of arrest?
	Unemployed 90% or more?
	Unemployed 50% or more?
	Has an unstable job history?
	Often shows up late for work?
	Has poor attendance record?
	Has difficulty meeting workload requirements?
	Lacks initiative?
	Has quit a job without another?
	Has been laid off from work?
	Has been fired from a job?
	Lacks employment benefits?
	Job lacks security?
	Has difficulty with co-workers?
	Has difficulties with superiors?
	Prior vocational assessment(s)?
	Has participated in employment programs?
	Has completed an occupational development program?
Marital Family	Sibling relations negative during childhood?
	Other relative(s) relations negative during childhood?
	Family members involved in crime?

	Has been arrested for child abuse?
	Has been arrested for incest?
Associates/Social Interaction	Socially isolated? Has many criminal acquaintances? Has mostly criminal friends? Has been affiliated with a gang? Resides in a criminogenic area? Unattached to any community groups? Relations are described as predatory? Has difficulty communicating with others?
Community Functioning	Residence is poorly maintained? Has poor self-presentation? Has poor hygiene? Has physical problems? Has dental problems? Has dietary problems? Has problems writing? Unable to express verbally? Has no hobbies? Does not participate in organized activities? Prior assessment for community function? Has participated in a community skills program? Has completed a community skills program?
Personal/Emotional	Feels especially self-important? Physical prowess problematic? Ethnicity is problematic? Religion is problematic? Gang member? Unable to recognize problem areas? Has difficulty solving interpersonal problems? Unable to generate choices? Unaware of consequences? Goal setting is unrealistic? Has disregard for others? Socially unaware? Impulsive? Incapable of understanding the feelings of others? Narrow and rigid thinking? Aggressive? Assertion problem?

Poor conflict resolution?
 Manages time poorly?
 Gambling is problematic
 Has low frustration tolerance?
 Hostile?
 Takes risks inappropriately?
 Thrill seeking?
 Non-reflective?
 Is not conscientious?
 Manipulative?
 Has difficulty performing sexually?
 Sexual identity problem?
 Inappropriate sexual preferences?
 Sexual attitudes are problematic?
 Mentally deficient?

Attitude

Negative towards the law?
 Negative towards police?
 Negative towards courts
 Negative towards Corrections?
 Negative towards community supervision?
 Negative towards rehabilitation?
 Employment has no value?
 Interpersonal relations have no value?
 Values substance abuse?
 Basic life skills have no value?
 Personal/Emotional stability has no value?
 Elderly have no value?
 Ethnically intolerant?
 Intolerant of other religions?
 Intolerant of disabled persons?
 Disrespectful of personal belongings?
 Disrespectful of public property?
 Disrespectful of commercial property?
 Supportive of instrumental violence?
 Lacks direction?
 Non-conforming?

Note. A total of 108 indicators were removed during this process (89 remained).

Step two. Remove variables following a “trigger” (i.e., default indicators). Specifically, there are several trigger indicators (e.g., “Has been married/common-law in the past?”) within three domains (Employment, Marital/Family, and Substance Abuse) of the DFIA (Brown & Motiuk, 2005) that are followed by default indicators (“Satisfied in your relationship?”). Default indicators are automatically scored as “no” if the trigger indicator does not apply. Therefore, one who is “single” would be (inaccurately) scored as “unsatisfied in their relationship,” (a relationship that is not true) thus, this clearly impedes one’s ability to accurately assess and describe the findings. Indicators removed in this step are listed in Table 3.

Table 3

Indicators Removed According to Step Two of the Inclusion/Exclusion Criteria

Domain	Default (D) Indicators Following the Triggers (T)
Employment	Has no employment history? (T) Salary has been insufficient? (D)
Marital/Family	Has been married/common-law in the past? (T) Dissatisfied with current relationship? (D) Money problems affect relationship(s) past/present? (D) Sexual problem affect relationship(s) past/present? (D) Communication problems affect the relationship(s)? (D) Has been a victim of spousal abuse? (D) Has been a perpetrator of spousal abuse? (D) Has no parenting responsibilities? (T) Unable to handle parenting responsibilities? (D) Unable to control the child's behaviour appropriately? (D) Perceives self as unable to control the child's behaviour? (D) Supervises child improperly? (D) Does not participate in activities with the child? (D) Lacks an understanding of child development? (D) Family is unable to get along as a unit? (D)
Substance Abuse	Abuses alcohol? (T) Began drinking at an early age? (D) Drinks on a regular basis? (D) Has history of drinking binges? (D) Has combined the use of alcohol and drugs? (D) Drinks to excess during leisure time? (D) Drinks to excess in social situations? (D) Drinks to relieve stress? (D) Drinking interferes with employment? (D) Drinking interferes with marital/family relations? (D) Drinking interferes with social relations? (D) Drinking has resulted in law violations? (D) Drinking interferes with health? (D) Abuses drugs (solvents, prescription drugs, etc.)? (T) Began using drugs at an early age? (D) Uses drugs on a regular basis? (D) Has gone on drug-taking sprees? (D) Has combined the use of different drugs? (D) Uses drugs to excess during leisure time? (D) Uses drugs to excess in social situations? (D) Uses drugs to relieve stress? (D) Drug use interferes with employment? (D) Drug use interferes with marital/family relations? (D)

Drug use interferes with social relations? (D)
 Drug use has resulted in law violations? (D)
 Drug use interferes with health? (D)

Note. Triggers can be used in the analyses, it is the default indicators that are not conducive to the analyses. Furthermore, 39 indicators were removed in this step (50 remained).

Step three. Variables with frequencies nearing an 80:20 split (Rummel, 1970; Schwalbe et al., 2008) were deleted for females. Specifically, Rummel (1970) and Schwalbe et al. (2008) suggest using a 90:10 split. However, the current study required narrowing down over 200 indicators to ten therefore, stringent criteria were utilized (see Table 4).

Table 4

Indicators Removed According to Step Three of the Inclusion/Exclusion Criteria

Domain	Indicator	Frequencies	
		No	Yes
Employment	Has less than grade 8?	83.7	16.3
Community Functioning	Unaware of social services?	94.4	5.6
Personal Emotional	Diagnosed as disordered in the past?	86.7	13.3
	Diagnosed as disordered currently?	90.1	9.9
	Current hospitalization?	98.6	1.4
	Receiving outpatient services prior to admission?	90.6	9.4
Attitude	Supportive of domestic violence?	97.5	2.5
	Women/Men roles are unequal?	86	14
	Marital/Family relations have no value?	97	3

Note. This step resulted in the removal of 9 indicators (41 remained).

Step four. Variables were grouped into female type domains based on domains discussed in gender-specific literature (e.g., marital/family, dependents, mental health). This step was intended to ensure the inclusion of at least one indicator representing each of the female-specific

domains (and to assist when eliminating redundant indicators). Table 5 illustrates the new domains formed in this step.

Table 5

Indicators Organized According to Feminist Domains (Step Four)

Feminist Domain	Indicator
Economic/Education	Has less than grade 10? Has no high school diploma? Lacks a skill area/trade/profession? Dissatisfied with skill area/trade/profession? Has unstable accommodation? Difficulty meeting bills? Has outstanding debts? Has no bank accounts? Has no credit? Has no collateral?
Relation Problem: Child	Childhood lacked family ties? Mother absent during childhood? Maternal relations negative as a child? Father absent during childhood? Paternal relations negative as a child? Parent's relationship dysfunctional during childhood? Spousal abuse during childhood?
Relational Problem: Adult	Currently single? Has no parenting responsibilities? Prior marital/family assessment(s)? Has participated in marital/family therapy? Has completed a marital/family intervention program? Associates with substance abusers? Family ties problematic? Often victimized in social relations? Easily influenced by others?
Substance Abuse	Abuses alcohol? Abuses drugs (solvents, prescription drugs, etc.)? Prior substance abuse assessment(s)? Has participated in substance abuse treatment?

	Has completed substance abuse treatment?
Mental Health	Copes with stress poorly?
	Worries unreasonably?
	Receiving outpatient services prior to admission?
	Prior personal/emotional assessment(s)?
	Prescribed medication in the past?
	Prescribed medication currently?
	Past hospitalization?
	Received outpatient services in the past?
	Past program participation?
	Current program participation?

Note. No indicators were removed in this step therefore, 41 indicators remained.

Step five. Variables that were completely removed (or extensively modified) from DFIA-R (Brown & Motiuk, 2005) were removed from the current list. Furthermore, variables that were combined in the revised version of the DFIA-R were subsequently combined in the present study².

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² This step will be discussed further in the proceeding “combining indicators” sub section.

Table 6

Indicators Removed from the Revised Version of the DFIA (Step Five)

Feminist Domain	Indicator
Economic/Education	Has no high school diploma? Lacks a skill area/trade/profession? Dissatisfied with skill area/trade/profession? Difficulty meeting bills? Has outstanding debts? Has no bank accounts? Has no credit? Has no collateral?
Relation Problem: Child	Childhood lacked family ties? Mother absent during childhood? Father absent during childhood? Parent's relationship dysfunctional during childhood? Spousal abuse during childhood?
Relational Problem: Adult	Currently single? Prior marital/family assessment(s)? Has participated in marital/family therapy? Has completed a marital/family intervention program? Family ties problematic? Often victimized in social relations?
Substance Abuse	Prior substance abuse assessment(s)? Has participated in substance abuse treatment? Has completed substance abuse treatment?
Mental Health	Worries unreasonably? Receiving outpatient services prior to admission? Prior personal/emotional assessment(s)? Prescribed medication in the past? Prescribed medication currently? Past program participation? Current program participation?

Note. This step resulted in the removal of 29 indicators (12 remained).

Combining indicators. Of these 13 indicators, six (three pairs) were combined to create composite indicators representing mental health history (in/out patient services), relationship quality with one's parents (negative relations with parents), and substance abuse (drugs and alcohol). This is relevant as these variables were also combined to represent one indicator in the revised version of the DFIA (Brown & Motiuk, 2005).

Specifically, 1) "Abuses alcohol?" and "Abuses drugs?" were combined to represent one composite indicator for substance abuse, 2) "Past hospitalization?" and "Received outpatient services in the past?" were combined to represent one composite indicator for mental health and finally, 3) "Maternal relations negative as a child?" and "Paternal relations negative as a child?" were combined to represent one composite indicator of conflict within one's family of origin.

Composites were made so that a) if any individual answered yes to either of the two indicators for each composite they were coded as "yes," b) if any individual answered no to both they were coded as "no," and c) if any individual answered yes to both they were coded as "yes." Frequencies were computed before and after composites were created to ensure there were no coding errors (none were found). Therefore, a total of 10 indicators will be included in the study (Table 7).

Table 7

Ten Indicators Included in the Analyses for the Present Study

Indicator	DFIA domain	Combined
Has less than grade 10?	Employment	No
Has unstable accommodation?	Community Functioning	No
Has no parenting responsibilities?	Marital/Family	No
Associates with substance abusers?	Substance Abuse	No
Easily influenced by others?	Associates/Social Interaction	No
Paternal/maternal relations negative as child?	Marital/Family	Yes
Abuses alcohol/drugs?	Substance Abuse	Yes
Copes with stress poorly?	Personal/Emotional	No
Past in/out patient services?	Personal Emotional	Yes
Inmate has previous suicide attempt?	N/A	No

Note. “Abuses drugs?” and “Abuses alcohol?” are phrased differently in the DFIA-R, however, given the relevance of these two indicators to the present study the decision was made to keep these two indicators.

Statistical Analyses

Exploratory latent class analysis (LCA) was used to examine the pathways/gender specific variables proposed by Daly (1994) and examined by researchers such as McClellan et al. (1997), Belknap and Holsinger (2006), Reisig et al. (2006) and others. With LCA competing models with different numbers of latent classes are estimated then, empirical model fit indices are compared to identify the most parsimonious model. After which characteristics associated with each of the latent classes are examined to evaluate their meaning (Cleveland, Collins, Lanza, Greenberg, & Feinberg, 2010; Collins & Lanza, 2010; Lanza, Collins, Lemmon, & Schafer, 2007; Lanza, Rhades, Nix, & Greenberg, 2010; Schwalbe et al., 2008). Thus, it is both the model fit, and the substantive meaning that are used to determine the final solution.

LCA yields four kinds of results as it 1) identifies statistically distinct groups, 2) reveals the prevalence of these groups within the sample, 3) classifies each participant into a particular

group, and 4) provides a probability estimate that members belonging to a particular group will answer 'yes' on each indicator. Therefore, the following analyses will determine a) whether statistically distinct groups of female offenders will emerge, b) whether these groups are similar to groups identified in previous qualitative studies (e.g., Daly, 1992, 1994; Reisig et al., 2006), c) whether there are more groups in our Canadian sample and d) whether these groups are statistically different for males and females (Collins & Lanza, 2010; Schwalbe et al., 2008).

Gender or "group" differences can be assumed when measurement invariance is observed across all groups and for all item response probabilities. Specifically, measurement *variance* (when the null hypothesis of measurement invariance is rejected) suggests that the two groups significantly differ and therefore, cannot be compared in the same model. This suggests that the meaning of the classes significantly differ across groups (Collins & Lanza, 2010; Lanza et al., 2007).

To determine measurement invariance the likelihood ratio G^2 (Agresti, 1990) statistic (a deviance statistic that can be likened to χ^2 and is compared to a χ^2 distribution) from the optimal freely estimated (with no parameter restrictions model)³ is compared to a model in which parameter restrictions (that equalize variance across the two groups)⁴ are imposed. The G^2 difference and the difference in degrees of freedom are compared using the χ^2 distribution. A significant alpha suggests that the null hypothesis of measurement invariance should be rejected (similar to homogeneity of variance). In this case, subsequent analyses must be conducted separately by gender.

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³ Freely estimated models with no rho restrictions allow all parameters to vary across groups (Collins & Lanza, 2010; Lanza et al., 2010)

⁴ Rho restrictions serve to constrain the item response probabilities (rho) to be equal across groups

LCA is differentiated from Cluster Analysis (CA) in that CA forms groups according to rules regarding the *degree of similarity* between cases. In contrast to that approach, LCA estimates the probability of *group membership* (using maximum likelihood parameter estimates) while considering both the number of cases in each class and the mean level of observed variables within the classes (Schwalbe et al., 2008). Furthermore, findings from a Monte Carlo study indicated that latent class models outperformed models conducted using CA, specifically, latent class analysis proved to be more consistent and accurate when considering classification (Cleland, Rothschild, & Haslam, 2000).

LCA is differentiated from Factor Analysis (FA) in that FA serves to group continuous variables into continuous latent factors. In contrast, LCA serves to group discrete variables into discrete latent groups as opposed to latent factors. Thus, while both techniques utilize latent structure methods, factor analysis adopts a variable centered approach whereas LCA adopts a person centered approach (Collins & Lanza, 2010; McCutcheon, 1987).

Thus, when considering the processes and method of computation, LCA is better suited to our research objectives than either CA or FA. It is worth noting the differences between FA and LCA. However, beyond the variable versus person level, FA and LCA are conceptually similar. Therefore, given that LCA may be relatively new to the readers', various findings will be discussed with reference to FA to ease understanding.

Results

Data Screening

Prior to receipt, the CSC data had been stripped of identifiers therefore, the anonymity of offenders was maintained. Missing data had been imputed using mode substitution on the 13 DFIA indicators therefore, there were no missing cases in the analyses. It should be noted

however that the extent of the missing data was minimal with a range of 1 case (0.06%) for “Abuses alcohol?” and “Has no parenting responsibilities?” to a maximum of 21 cases (1.44%) for “Associates with substance abusers?”

Furthermore, mode substitution was not applied to the “previous suicide attempt” indicator. Specifically, data for 39 males and 32 females were missing for this particular indicator. Mode substitution was not used as it would have increased the split of the variable well beyond the recommended .80/.20 split. Consequently, cases with missing values were deleted resulting in an overall reduction of sample size by 4.18% for females ($n = 733$) and 5.10% males ($n = 726$).

Descriptive Statistics

Descriptive statistics associated with each indicator for the total sample and by gender are displayed in Table 8. Not surprisingly given step three of indicator reduction, these frequencies illustrate good variability as each indicator is beyond a .20/.80 split. This however, is not the case for one indicator (previous suicide attempt) for the male offenders (given the theoretical importance of this variable for females it remained included).

Table 8

Percentage of Indicators Endorsed Positively for the Total Sample and Each Gender

Indicator	Total Sample (<i>N</i> = 1459)		Females <i>n</i> = 733		Males <i>n</i> = 726	
	<i>N</i>	%	<i>N</i>	%	<i>n</i>	%
Has less than grade 10?	704	48.25	305	41.61	399	54.96
Has unstable accommodation?	504	34.54	249	33.97	255	35.12
Has no parenting responsibilities?	584	40.03	271	36.97	313	43.11
Associates with substance abusers?	912	62.51	426	58.12	486	66.94
Easily influenced by others?	669	45.85	340	46.38	329	45.32
Paternal/maternal relations negative as child?	640	43.87	341	46.52	299	41.18
Abuses alcohol/drugs?	1003	68.75	448	61.12	555	76.45
Copes with stress poorly?	838	57.44	392	53.48	446	61.43
Past in/out patient services?	380	26.05	236	32.20	144	19.83
Inmate has previous suicide attempt?	250	17.14	157	21.42	93	12.81

Exploratory LCA: Initial Baseline Model Selection

As mentioned previously, the first step in conducting exploratory LCA with group comparisons is to determine a baseline model. To do so, a number of initial models are computed (with no group separation), and fit statistics are compared to determine the optimal

baseline model. In the present study, five models were generated (the reason for a five model selection will become clear with a review and explanation of the various models and fit statistics in Table 9). Specifically, models with two, three, four, five, and six class solutions were computed and fit statistics were compared.

Table 9

Six Models Computed to Determine Optimal Baseline Model with no Group Separation

Number of Classes in Model	Likelihood Ratio G^2	df	AIC	BIC	% of seeds
2	1065.18	1002	1107.18	1218.17	100
3	930.79	991	994.79	1163.93	35
4	819.25	980	905.25	1132.52	100
5	786.71	969	894.71	1180.13	40
6	763.76	958	893.76	1237.32	35

Note. Boldface type indicates the selected model. AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria. The value of the seed (as specified in the output) is arbitrary (must be greater than 1 and less than 2 million be utilized). The seed generates a sequence of random starting values and seeds are commonly set at 1000, 2000, 3000 etc. (Collins & Lanza, 2010).

As illustrated in Table 9, fit statistics converge, indicating that a four class solution is optimal. First, when assessing model fit the Likelihood ratio G^2 statistic (likened to χ^2) and its associated degrees of freedom are examined for each model to determine the degree of change (large decreases in degrees of freedom relative to the drop in G^2 are not desirable).

In addition, two other fit statistics are considered--the AIC and the BIC . These two fit indices are similar to the Likelihood G^2 however, these two statistics "penalize" (or adjust) the G^2 based on the sample size and the number of estimated parameters (and are considered a more reliable means of determining fit; Collins & Lanza, 2010; Lanza et al., 2010).

Furthermore, smaller *AIC*'s and *BIC*'s indicate the most parsimonious and optimal model fit. Thus, a comparison of the *BIC* indices illustrate a decrease from models 2, 3, to 4, subsequently increase in models 5 and 6 suggesting model 4 is the optimal model. An examination of the *AIC* indices (Table 9) further suggest model 4 is optimal as these indices decrease drastically until the four class model solution, at which point the decrease becomes much less apparent⁵ (Collins & Lanza, 2010; Lanza et al., 2010).

Moreover, seeds (as presented in Table 9) are used in LCA to invoke random starting values for the rho parameters (item response probabilities) in each model. The output associated with each model reveals the percentage of seeds associated with the model. Thus, the percentage of seeds⁶ associated with each model is the percentage of random starting values that will give the same answer (a higher percentage is indicative of a better model fit). Lastly, Lanza et al. (2007) suggest that prior to selecting a baseline model the log-likelihood values should be examined to determine model "identification." Well identified models are those that reveal one dominant solution across seeds (in other words, with different random starting values).

Therefore, models were computed with various seeds (i.e., 1000, 2000, and 3000) and log-likelihood values were examined across iterations. These iterations reveal convergence as the log-likelihood values are repeated across models with different seeds. This further suggests the model is well identified and is an optimal model when classifying males and females together.

Exploratory LCA: Determining Gender Differences with Measurement Invariance

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⁵ These indices can be likened to the point of inflexion in a scree-plot in FA however, it should be noted that there are more statistical guides for determining the best solution in LCA when compared to the subjectivity of a scree plot in FA.

⁶ LCA analyses conducted in the present study were set to "seeds = 1000, and 2000, and 3000".

After the baseline model (for all cases) was computed, two four-class models (using gender as a grouping variable) were subsequently computed to determine if measurement invariance held. As previously discussed, measurement invariance is assessed by comparing the difference between two G^2 statistics, (the G^2 from a freely estimated model and in addition to the G^2 from a restricted model). Table 10 illustrates the fit statistics for the two four-class models (freely estimated and rho restricted).

Table 10

Fit Statistics Comparing Freely Estimated (FE) and Rho Restricted (RR) Four Class Models (as Determined from the Baseline Model) to Explore Measurement Invariance

Model Type	Number of Classes in Model	Likelihood Ratio G^2	Df	AIC	BIC	% of seeds
FE (G^2_2)	4	1299.85	1961	1471.85	1926.41	85
RR (G^2_1)	4	1397.38	2001	1489.38	1732.52	100
$G^2_2 - G^2_1 = 97.53, df = 40, p < .001$						
$N = 1459$						

Hypothesis 1. An examination of the G^2 difference test ($G^2_\Delta = 97.53, df = 40, p < .001$) illustrates a significant difference between the freely estimated and rho restricted models, indicating measurement invariance has not held as the obtained value exceeds the critical ($\chi^2 = 65.76$) value. Thus, any or all combinations of the following may be occurring: a) (*at least one* of) the item response probabilities differ between groups b) the distribution of prevalence(s) of class membership significantly differ between the two groups and finally, c) the same number of classes (four) may not be appropriate or optimal for both groups (Collins & Lanza, 2010).

As noted by Collins and Lanza (2010) comparisons of groups in cases when measurement invariance does not hold may (or may not) be similar to comparing “apples” to “oranges.” Specifically, Collins and Lanza indicate that group differences may be statistically significant although conceptually meaningless and that judgement (as guided by theory and research) on the part of the researcher is required. In the present study, gender differences are theoretically relevant and anticipated (see hypothesis 1) and therefore, the observed measurement invariance is considered conceptually meaningful⁷. As such, subsequent models were conducted separately for males and females.

Exploratory LCA: Classification of Female Offenders

To determine the optimal model for females, a number of models with a variety of classes were computed for the female sample. An examination of the fit indices in Table 11 indicates model 4 is the optimal model for female offenders in the current study. First, a consideration of the G^2 statistic from models 1 to 3 illustrates a relatively large drop that begins to become less dramatic at model 4.

The same pattern is illustrated with the corresponding *AIC*'s (a drastic drop from models 1 to 2 followed by a moderate drop from 2 to 3 to 4), however at model 4, this drop appears to level. An examination of the *BIC*'s illustrates a similar pattern however, it should be noted that although the smallest *BIC* is observed in model 3, the percentage of seeds indicates that only 55% of the seeds (random starting values) would yield this particular solution (revealing instability within this model).

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⁷ This will be further illustrated in the display and discussion of the results presented for the models conducted for males and females separately.

Table 11

Six Models Computed to Determine Optimal Baseline Model for Females Only (n = 733)

Number of Classes in Model	Likelihood Ratio G^2	<i>Df</i>	<i>AIC</i>	<i>BIC</i>	% of seeds
1	1578.75	1013	1598.75	1644.72	100
2	850.53	1002	892.53	989.07	100
3	767.16	991	831.16	978.27	55
4	713.87	980	799.87	997.54	100
5	689.78	969	797.78	1046.03	35
6	666.61	958	796.61	1095.42	25

Note. Boldface type indicates the selected model.

Thus, an examination of the fit statistics in Table 11 suggests a four class solution is optimal when considering female offenders⁸. This is further supported with an inspection of the log-likelihood estimates across iterations yielded for models with differing seeds (i.e., 1000, 2000, and 3000). This suggests the model is well identified regardless of the random starting values. Therefore, assessment of the item response probabilities and latent class probabilities for the four class solution are revealed below in Table 12, a graphical depiction of the item response probabilities for the four classes is displayed in Figure 1.

Before a discussion of these classes begins it should be noted that given that Hypotheses 2 and 3 involve a consideration of the models for both males and females, those hypotheses will

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⁸ It should be noted that the majority of the fit statistics converge at a 4 class solution however, the lowest BIC is observed in the 2 class solution. Given this, an examination of the probabilities associated with a 2 class solution were assessed however, these indices lose "subjective meaning." Specifically, many of the indices fall between .30 and .70 (thus, the meaning is "washed away").

be referred to when appropriate and discussed in more depth in a subsequent gender comparison section (see below).

Table 12

Item Response (Probability of Endorsing an Item) and Latent Class Probabilities for a Four-Class Model of Female Offending

Indicator	Latent Class			
	Class 1 (36%)	Class 2 (27.67%)	Class 3 (9.69%)	Class 4 (26.64%)
Has less than grade 10?	0.2520 (0.75)	0.4914 (0.51)	0.3192 (0.68)	0.5949 (0.41)
Has unstable accommodation?	0.1583 (0.84)	0.3716 (0.62)	0.2720 (0.73)	0.5762 (0.42)
Has parenting responsibilities? ⁹	0.6887 (0.31)	0.5617 (0.44)	0.6531 (0.35)	0.6142 (0.39)
Associates with substance abusers?	0.2070 (0.79)	0.8833 (0.12)	0.0144 (0.99)	0.9794 (0.02)
Easily influenced by others?	0.4196 (0.58)	0.4203 (0.58)	0.2984 (0.70)	0.6292 (0.37)
Paternal/maternal relations negative as child?	0.3088 (0.69)	0.3951 (0.60)	0.5383 (0.46)	0.7227 (0.28)
Abuses alcohol/drugs?	0.1072 (0.89)	0.9958 (0.004)	0.4204 (0.58)	0.9621 (0.04)
Copes with stress poorly?	0.1527 (0.85)	0.6819 (0.32)	0.7613 (0.24)	0.8155 (0.18)
Past in/out patient services?	0.0923 (0.91)	0.1541 (0.85)	0.7198 (0.28)	0.6613 (0.34)
Inmate has previous suicide attempt?	0.0058 (0.99)	0.1038 (0.89)	0.4920 (0.51)	0.5089 (0.49)

Note. Responses that characterize each latent class are in bold type. For ease of interpretation in this first model, the probabilities of a “no” response are rounded to the nearest decimal place, and displayed below (in brackets) the probability of “yes” for each corresponding indicator.

⁹ The question is phrased as a “double negative” therefore, for ease of interpretation, item response probabilities associated with “no” response (i.e., those who have parenting responsibilities) are included in the table for ease of interpretation (the indicator was also re-phrased in this table to account for this change).

Similar to factor analysis, LCA does not provide “labels” with each emergent class. Therefore, an examination is required to assist with the subjective meaning of the findings. Although there are no firm guidelines for interpretation, Collins and Lanza (2010), and Lanza et al., (2007, 2010) suggest interpreting (and placing primary importance on) item response probabilities closer to 0.00 and 0.99 as item response probabilities closer to the extremes are less indicative of chance (0.50/0.50). Item response probabilities around .30/.70 appear to be reported in many articles thus, the same criteria was utilized here.

Female offenders: Class 1. An examination of the latent class probability (probability of class membership) for the first class suggests that 36% of the female offenders in the present study can be defined by very low probabilities of suicide attempt (0.06), substance abuse (0.11), and associating with substance abusing friends (0.20). They are further defined by high probabilities of reporting parenting responsibilities (0.69), education beyond grade 10 (0.75), stable accommodation (0.84), and coping well with stress (0.85).

Briefly, this class can be summarized as parents, with stable accommodation, more education, good coping, positive relationships with their parents in their child hood, and virtually no history of mental health concerns. As such, given the absence of female prevalent risk factors this class will hereon in be referred to as the “Potential Economic and Other” (PEO) female offender class.

Female offenders: Class 2. An examination of the latent class probability for the second class suggests that 27.67% of female offenders tend to fall into this particular category. An examination of item response probabilities suggest that female offenders in class 2 are defined by low probabilities of mental health history (0.15) and previous suicide attempts (0.10), and high probabilities of reporting, poor coping with stress (0.68), spending time with substance

abusing friends (0.88), and substance abuse problems (0.99). Therefore, given the very high probabilities of substance abuse and spending time with substance abusing friends (and poor coping with stress) this class will subsequently be referred to as the “Problematic Coping, Substances and Associations” (PCSA) female offender class.

Female offenders: Class 3. An examination of the latent class probability for the third class suggests that approximately 10% of female offenders tend to fall into this particular category. Item response probabilities suggest that female offenders in this are defined by low probabilities of associating with substance abusers (0.01), unstable accommodation (0.27), and high probabilities of reporting in/out patient services (0.72), and poor coping with stress (0.76). Therefore, this class of offenders will be referred to as the “Poor Mental Health and Coping” (PMHC) female offender class.

Female offenders: Class 4. A consideration of the latent class probability for the final emergent female class (class 4) indicates that approximately 27% of female offenders in the present study are defined by item response probabilities above 0.50 for all indicators. Specifically, these females are characterized by moderate probabilities of responding “yes” to previous suicide attempt (0.51), unstable accommodation (0.58), lower levels of education (0.60), parenting responsibilities (0.61), easily influenced by others (0.63), and receiving in/outpatient services in the past (0.66).

However, the indicators that emerged with very high probabilities are, having negative relations with their parents in childhood (0.72), coping poorly with stress (0.82), abusing alcohol and or drugs (0.96), and finally associating with substance abusers (0.98). Although three indicators (above .80) appear to strongly identify or define this particular category, this group

will be referred to as the “Overall High Need” (OHN) female offender class given that none of their item response probabilities are below 0.50.

To better understand the nature of the various classes, posterior probabilities associated with each of the emergent classes are examined. Posterior probabilities (also referred to as classification probabilities) are the probability of classification into each class, for each case (therefore, in a four class solution, each case is given a posterior probability for each class). Thus, mean posterior probabilities for each class can offer indication of correct classification (Table 13).

Table 13

Descriptive Statistics Associated with the Posterior Probabilities for each Emergent Female Offender Class

Class	<i>M</i>	<i>SD</i>	Minimum	Maximum
PEO	0.9319	0.1101	0.4562	0.9975
PCSA	0.7600	0.1287	0.4372	0.9504
PMHC	0.8258	0.1553	0.3952	0.9980
OHN	0.8238	0.1512	0.4791	0.9929

An examination of the ranges for each of the respective classes suggests that some individuals in each class are not necessarily well placed (Table 13). Despite this however, mean posterior probabilities are quite high for each class suggesting overall that response patterns within each group are overall quite homogeneous (which is desired when considering classification).

Figure 1. Graphical representation of (positively endorsed) item response probabilities for the four emergent classes of female offenders.

Latent class separation is illustrated when the item response probabilities for a particular class are clearly differentiated from the remaining classes. While the PEO class appears to illustrate latent class separation from each of the other classes, the OHN class appears to mimic the PMHC and PCSA classes at two different time points. Specifically, the OHN class is similar to the PCSA (not surprisingly) when it comes to the substance abusing indicators and moreover, the OHN class is similar to the PMHC class for the mental health and coping variables. Overall, the OHN label appears to suit this particular class as it has both mental health and substance abuse components revealed in the two other classes in addition to negative relations with their parents.

Exploratory LCA: Classification of Male Offenders

Next, to determine the optimal model for males, a number of models with a variety of classes were computed. An examination of the fit indices in Table 14 indicates model 2 is the optimal model for male offenders in the present study. Specifically, a consideration of the G^2 statistic from models 1 to 2 illustrates a relatively large drop that begins to become less drastic at model 3.

An assessment of the *AIC*'s reveals a drastic drop from models 1 to 2 followed by a small decrease from 3 to 4 with very little change after model 4 (from 4 through 6). More importantly, an inspection of the *BIC*'s illustrates a similar pattern with the smallest *BIC* observed in model 2. Although the fit statistics also point to a potential three-class model for male offenders the percentage of seeds indicates that only 75% of the seeds are associated with this model (whereas 100% of the seeds are associated with model 2).

Moreover, a comparison of the iteration history supports the two-model solution as this model converged in 96 iterations rather than 283 for the three-class model. Finally, log-likelihood estimates for both a two and three-class model reveals more consistent estimates across seeds (random starting values) for the two rather than three-class model. Therefore, fit statistics, iteration history, and log-likelihood estimates indicate a two-class model of offending is optimal when considering the male offenders in the current study.

Table 14

Six Models Computed to Determine Optimal Baseline Model for Males Only (n = 726)

Number of Classes in Model	Likelihood Ratio G^2	Df	AIC	BIC	% of seeds
1	1112.57	1013	1132.57	1178.44	100
2	697.23	1002	739.23	835.57	100
3	631.77	991	695.77	842.57	75
4	586.44	980	672.44	869.71	85
5	563.37	969	671.37	919.10	60
6	540.31	958	670.31	968.50	15

Note. Boldface type indicates the selected model.

Thus, item response and latent class probabilities for the two-class solution are displayed in Table 15.

Table 15

Item Response (Probability of Endorsing an Item) and Latent Class Probabilities for a Four-Class Model of Male Offending

Indicator	Latent Class	
	Class 1 (41.05%)	Class 2 (58.95%)
Has less than grade 10?	0.4265 (0.57)	0.6353 (0.36)
Has unstable accommodation?	0.1376 (0.86)	0.5000 (0.50)
Has parenting responsibilities?	0.5888 (0.41)	0.5550 (0.45)
Associates with substance abusers?	0.3001 (0.70)	0.9266 (0.07)
Easily influenced by others?	0.2865 (0.71)	0.5692 (0.43)
Paternal/maternal relations negative as child?	0.2513 (0.75)	0.5237 (0.48)
Abuses alcohol/drugs?	0.4587 (0.54)	0.9774 (0.02)
Copes with stress poorly?	0.3545 (0.65)	0.7953 (0.20)
Past in/out patient services?	0.1321 (0.87)	0.2445 (0.76)
Inmate has previous suicide attempt?	0.0662 (0.93)	0.1712 (0.83)

Note. Responses that characterize each latent class are in bold type. For ease of interpretation in this first model, the probabilities of a “no” response are rounded to the nearest decimal place, and displayed below (in brackets) the probability of “yes” for each corresponding indicator.

Male offenders: Class 1. The latent class probability for the first male class (class 1) indicates that 41.05% of the male offenders in the present study can be defined by relatively low item response probabilities (low probabilities of positively endorsing the indicators) across all

indicators. Specifically, this particular class is similar to the PEO class revealed in the female offenders sample as both classes illustrate high probabilities of stable accommodation, coping well with stress, and positive relationships with their parents in childhood.

Moreover, males in this class have rather low probabilities of suicide attempt, mental health history, associating with substance abusers, and of being easily influenced by others. Similar to females, this class can be summarized as offenders with positive relations to their own parents in their childhood, stable accommodation, more education, good coping, and virtually no history of mental health concerns. As such, this class of male offender will be referred to as the “Potential Economic and Other Parallel” (PEOP). The term parallel is used in this context given that this class is similar to the PEO revealed with females.

Male offenders: Class 2. An examination of the latent class probability for the second class suggests that approximately 59% of male offenders tend to fall into this particular category. An examination of item response probabilities suggest that the male offenders in class 2 are defined by high probabilities of responding “yes “to abusing alcohol/drugs, associating with substance abusing others, and poor coping with stress.

Moreover, male offenders in this class have low probabilities of mental health history, and suicide. This class is similar to the PCSA class (class 2) that emerged for female offenders, therefore, this class will subsequently be referred to as the “Problematic Coping, Substances and Associations Parallel” (PCSAP) male offender class.

Table 16

Descriptive Statistics Associated with the Posterior Probabilities for each Emergent Male Offender Class

Class	<i>M</i>	<i>SD</i>	Minimum	Maximum
PEOP	0.8973	0.1390	0.5027	0.9997
PCSAP	0.9059	0.1211	0.5030	0.9995

As discussed with the female offender classes, examinations of posterior probabilities associated with each of the emergent classes are useful for understanding the nature of the classes. Table 16 displays the descriptive statistics associated with the posterior probabilities for the two emergent male classes. Overall, high means indicate a high probability of correct classification. Although the minimum value for the range suggests that there are some cases that illustrate heterogeneity in their response patterns relative to the remainder of the class.

Figure 2. Graphical representation of (positively endorsed) item response probabilities for the two emergent classes of male offenders.

An examination of figure 2 illustrates latent class separation is adequate in terms of the two indicators associated with substance abuse (and accommodation) however, there appears to be little separation among the other indicators as the pattern of response patterns for the two classes appears relatively similar. However, given that these are female prevalent variables this finding is not surprising.

Gender Comparisons

Measurement invariance – as previously discussed – suggested the following differences could be occurring a) (*at least* one of) the item response probabilities differ between groups b) the distribution of prevalence(s) of class membership significantly differ between the two groups and finally, c) the same number of classes (four) may not be appropriate or optimal for both

groups (Collins & Lanza, 2010). The findings suggest that in fact, all of the above are occurring as the item response probabilities and the number of classes differ by gender and, not surprisingly then, the latent class group prevalence differ by gender.

Hypothesis 2. It was hypothesized there would be a class of individuals with stable accommodation, education beyond grade 10, no substance abuse (or associations with abusers), and no suicide attempts or mental health concerns that will be similar to an economically motivated classification (for both genders). Findings did in fact reveal a classification with these characteristics, moreover, this class was revealed for both males and females.

Specifically, 36% of females fell into this category while, 41.05% of males fell into this category. Although it was hypothesized that this class would be an economically motivated class of offenders (and would be the same for males and females), further consideration suggests this is unlikely. Specifically, these classes are not likely to be solely economically motivated, however, this cannot be firmly concluded as indicators associated with the nature of the offences were not included. This will be discussed further in the proceeding section.

Hypothesis 3. Lastly, it was hypothesized that classes characterized by parenting responsibilities, education, coping, and mental health will be more prevalent among female offenders when compared to their male counterparts. This hypothesis was partially confirmed as findings indicate that none of the male offender classes yielded high probabilities of positive response to mental health services and or suicide. Moreover, neither of the male classes were characterized by all of those factors (parenting, education, coping, and mental health), whereas the OHR female class was characterized by moderate to high probabilities of those characteristics.

Discussion

The current study was designed to contribute to the gender-specificity/gender-neutrality debate by using LCA— a novel, quantitative, person-centered analytical approach to classification. The gender-specific approach states that the processes and pathways to female offending behaviour are distinct for males and females (e.g., Belknap & Holsinger, 2006; Chesney-Lind & Pasko, 2004a; Daly, 1994; Salisbury & Van Voorhis, 2009; Steffensmeier & Allan, 1996). While the gender-neutral perspective suggests the variables that influence, predict, cause, and/or relate to criminal behaviour in males are the same for females (e.g., Andrews & Bonta, 2006; Burgess & Akers, 1966; Dowden & Andrews, 1999; Gottfredson & Hirschi, 1990; Moffitt, 1993; Moffitt, 1994; Simourd & Andrews, 1994; Smith, Cullen, & Latessa, 2009).

Previous studies examining female-specificity have not typically incorporated male comparison groups and despite this, tend to conclude that certain variables are specific to females (e.g., Belknap & Holsinger, 2006; Daly, 1994; McClellan, et al., 1997; Reisig, et al., 2006; Salisbury & Van Voorhis, 2009; Steffensmeier & Allan, 1996). As such, the purpose of the present study was to examine and compare these variables using large samples of both genders, and to examine the degree to which these variables – or patterns of needs – manifest differently for each gender using quantitative classification.

Simply put, the gender comparisons from current study offer support for both perspectives as findings suggest that one or perhaps two of the classes may reflect gender-neutrality. Moreover, the findings suggest that there are two (perhaps three) potential classes of female offenders that reflect “pathways” associated gender-specific literature. It is important to note that given the measurement invariance determined in the first step of LCA with group comparisons it is not appropriate to assume these groups are gender-neutral as the variance

associated with these groups suggests the nature of these groups differ (Collins & Lanza, 2010). Despite this, the similarities between the groups will be discussed cautiously.

A consideration of the “gender-neutral” findings reveals that one gender neutral class – the PEO class – emerged for females and males. PEO can be defined as parents, with stable accommodation, more education, good coping, positive relationships with their parents in their childhood, and virtually no history of mental health concerns. A comparison to previous qualitative classification studies indicates this PEO class is in accordance with Daly’s (1994) and Reisig et al.’s (2006) definition of an economically motivated offender (less troubled offenders with financially motivated offences, little to no substance abuse, more educated, and little financial difficulty). Specifically, with the exception of the nature of the index offences (as it was not included in the present study) these classes appear to be similar.

Although Daly (1994) noted a small proportion of offenders within the economic pathway (less than 12%) this may be due to the less serious nature of her sample. A consideration of Reisig et al.’s (2006) more serious offending population suggests the proportion of offenders falling within this category is similar to this study (approximately 24%). However, it is difficult to compare the emergent classes to previous qualitative studies as the present study utilized fewer variables (i.e., variables associated with the nature of the offences).

Interestingly, a similar class – the PEO – emerged within the male sample. These two classes are similar with respect to the latent class probabilities (they are within 5%), and relatively similar with respect to the probability of responding “yes” to parenting responsibilities, associating with substance abusers, easily influenced, accommodation, negative maternal/paternal relationships as a child, history of in/outpatient services, and lack of suicide attempts. These two classes differ however, in terms of the item response probabilities

associated with coping with stress (more men in this class report problems coping with stress), level of education (more women in this class report having education beyond grade 10 relative to men), and finally, drug/alcohol abuse (more men report drug/alcohol abuse).

Specifically, a quick glance at this class suggests that the PEO and PEOP groups are relatively well adjusted. However, an examination of the statistics associated with rates of incarceration for both males and females suggests there are a very small proportion of offenders that are convicted solely for offences associated with economic gain (Kong & AuCoin, 2008).

In addition, consideration of the frequencies in the present study indicate that many of the offenders in the present study have served previous (provincial) time and given the overall serious nature of federal offending behaviour it is likely that other variables not included in the analyses are important for understanding this particular class (perhaps this is a nested typology and other variables would differentiate this class into two smaller classifications). However, given the design of the current study (cross-sectional) and the inability of LCA to include a large number of indicators (i.e., related to the nature of offences) it is not possible to fully understand the nature of this particular class of offenders in the present study.

As previously mentioned Reisig et al.'s (2006) study resulted in the exclusion of 30 cases (15%) of their sample as they were unclassifiable according to Daly's (1994) five proposed typologies. Given the latent class large prevalence(s) for both the PEO and PEOP classes (36% for females and 41.05% males) it is speculated that this class is encompassing not only the economically motivated offenders, as it may also be a "catch-all" of offenders that *cannot* be characterized by the female prevalent indicators selected for the present study. This is supported by the notion that LCA tends to classify the "difficult to classify" cases into the modal latent

class (Collins & Lanza, 2010). For this particular study, the PEO class is in fact the modal class as it includes the highest proportion of female offenders.

A second class that emerged as similar for both genders is the class associated with coping and substance abuse – the PCSA – class. This class is primarily characterized by high probabilities of associating with substance abusers, abusing substances, and coping poorly with stress. The emergence of a class associated with substance abuse is not surprising as gender-neutrality and gender-specificity proponents both point to the relevance of substance abuse with respect to criminality (Andrews & Bonta, 2006; Belknap, 2007; Brown & Motiuk, 2008; Daly, 1992; Chesney-Lind & Shelden, 2004; McClellan, Farabee, & Crouch, 1997).

Of interest however is the notion that within this particular class, the male parallel group were more likely to score a ‘yes’ to poor coping with stress and previous in/outpatient services (10% for both indicators). Although, an examination of the “copes with stress poorly” indicator across the female offender classes indicates this indicator was relevant (almost 70%) for three out of four of the female offender classes.

In addition, the item response probabilities for each of the remaining indicators are similar across the two groups. These two groups differ however in that almost 60% of the male sample can be classified as PCSAP while approximately 28% of females are classified within this group. In general, this appears to be a gender-neutral group characterized by maladaptive coping, associating with substance abusers, and abusing substances.

As previously mentioned however the measurement variance associated with these groups makes it difficult to form firm comparisons and conclusions with regards to these groups. Moreover, it is difficult to discuss the two male classes as the study was designed to understand the patterns occurring among female prevalent variables. For example, the inclusion of more

indicators (e.g., those relevant to males) may have differentiated these two pathways and may also have yielded differing results for males and females. Although it is interesting to observe the emergent patterns of these particular indicators within the male sample, the remainder of the discussion will focus on the remainder of the female classes.

As previously discussed, the work of both Daly (1992, 1994) and Reisig et al., (2006) revealed a drug-connected women pathway – characterized by an absence of criminal convictions, and by the use (or sales) of drugs within family/intimate relationships. An examination of the characteristics associated with the PCSA female class suggests this class could potentially be tapping into a drug-connected pathway given the high probabilities of positively responding to associating with drug abusers and abusing drugs.

However, the research design in the current study (e.g., reason for and context of substance abuse) did not allow for a full examination of these pathways as proposed by Daly (1992, 1994) and Reisig et al. (2006). Specifically, as mentioned previously, indicators associated with the nature of the offences (or lack of history previous to the current offence) were not included. Thus, it is not known whether this class is characterized by drug related offences. Although this could be reasonably speculated as more than a quarter of the women in the present study were serving time for drug related crimes.

Finally, when considering the PCSA the percentage of individuals falling into the drug-connected pathway in Daly's (1994) work was relatively small (not surprising as it was a less severe sample). However, the percentage of offenders falling into the drug-connected pathway in Reisig et al.'s (2006) work was relatively large. Of interest the proportion of offenders falling into the PCSA pathway falls between the two previous qualitative classification approaches.

However, this is not surprising as the OHN classification also incorporates a proportion of offenders who also abuse substances.

An examination of the final two classes that emerged for females provides support for the gender-specificity debate. Specifically, findings from the LCA in the present study resulted in the emergence of two additional and distinct classes that did not emerge for males – the PMHC and OHN. As previously discussed, the PMHC is characterized as offenders with a history of in/outpatient services, and poor coping with stress. This particular class constitutes a small portion of the overall sample and will be discussed prior to the OHN classification.

It is worth noting that neither Daly (1994) nor Reisig et al.'s (2006) qualitative classifications yielded a group of female offenders that could be distinguished solely by poor coping and a history of in/outpatient services. However, as previously discussed, Salisbury and Van Voorhis (2009) examined pathways using path analysis and their findings suggested the presence of a childhood victimization pathway. According to their study, this was the only emergent pathway that was defined by a measure of mental health. It is possible that this particular pathway starts with childhood victimization (as measured by the victimization proxy indicator - "negative relations with mother/father") that in turn, leads to mental illness and substance abuse and eventual criminal behaviour.

Of interest, the probabilities associated with mental illness within this emergent class are high although the probabilities of substance abuse and negative parental relations were near chance (distinguishing them from the pathway proposed by Salisbury and Van Voorhis). It would be of interest to examine how this class may have emerged with indicators that directly assess childhood victimization and current mental health (rather than a history of mental health as utilized in the present study) as included in the Salisbury and Van Voorhis (2009) study.

In addition, previous studies examining gender-specificity have pointed to the importance of mental health and coping by examining these variables within samples of female offenders – or by assessing univariate correlations between such variables and past and future female criminality, suggesting they cause or lead females down a pathway to criminality (Hubbard & Pratt, 2002; McClelland, et al, 1997; Salisbury & Van Voorhis, 2009).

The present study took a novel approach by examining these variables using a quantitative classification technique and findings illustrate these some of these hypothesized female specific variables do in fact quantitatively cluster together into a class defined by mental health history (PMHC). Despite this however, the present study cannot state that these variables lead or cause female criminality.

A consideration of the final emergent (gender-specific) class (OHN) lends support to the gender-specificity debate and highlights the potential interaction of numerous variables deemed important by feminist researchers (e.g., mental health, negative family relations in childhood, poor coping, drug/alcohol abuse, easily influenced by others). An examination of this class is overall similar to the harmed and harming pathway as proposed by Daly (1994).

Specifically, Daly's harmed and harming women pathway is characterized by poor coping, substance abuse, and poor relations with parents in childhood as supported in the present study. However, Daly also noted neglect, history of physical/sexual abuse, early onset of, and current substance abuse. As mentioned with each of the other class discussions the present study did not have indicators that identify victimization history (proxy only with respect to relations with parents in childhood) and the age of onset for the substance abuse. Thus direct comparisons or firm conclusions relating the present class to Daly or Reisig et al.'s (2006) pathways are not possible.

Previous work examining female prevalent variables have often concluded that certain variables are more relevant for female offenders without utilizing male comparisons groups (Chesney-Lind & Pasko, 2004; Hubbard & Pratt, 2002; McClellan et al., 1997). Findings from the current study suggest that at least two classes, one characterized by poor mental health history and poor coping, another characterized by high rates of needs overall of female offenders emerged that were not witnessed among their male counterparts.

It should also be noted that while some variables were relevant for both genders (e.g., associating with substance abusers, poor coping with stress, and abusing alcohol/drugs), others (not surprisingly) emerged as relevant only for females (e.g., past in/outpatient services and previous suicide attempt). It is not surprising that none of the variables were relevant for males only as the variables were selected based on gender-specific literature.

Other variables for example, parenting responsibilities and or parental stress are frequently associated as a female specific need factor for criminality (Ferraro & Moe, 2003; Ross, Khashu, & Wamsley, 2004). Although this variable emerged as steadily across all four female classes, the probability was never overtly high or distinctive in any particular class. Moreover, the probability (although slightly lower) of parental responsibilities was also apparent across the two male classes and an examination of the frequencies in the present study actually reveals that a higher percentage of males in the present study reported having parenting responsibilities relative to the female counterparts.

Overall the present study indicates that males and females significantly differ in terms of classification as the number of suitable classes for each gender differed. Moreover, what is of interest to the present study is the manner in which these variables present themselves within the

classes. In other words, the patterns that emerged in these classes as these patterns are different between genders.

It is important to note however, that many of these variables deemed as female “specific” are often displayed in males, albeit a small proportion of males. Given this, this gender-specificity versus neutrality debate may be better understood as gender-saliency versus neutrality as “saliency” refers to frequency and predictive power. Thus, suggesting that these variables are more relevant for females, but not exclusive (or specific) to females.

The present study sought out to assess the degree to which female prevalent variables may differentially classify “types” of offenders, and whether these types would significantly differ for males and females. From a feminist perspective, this study was novel with the use of a male comparison group. Specifically, previous feminist studies have examined variables without using male comparison groups and have tended to conclude these variables are relevant only for female criminality.

The present study however, illustrates that many of these variables are more prevalent, but more importantly, these variables combine to create distinct need profiles that are different from the profiles that emerged for males. Furthermore, these variables tend to cluster together in a manner similar to proposed feminist pathways to criminality. Although the findings do not confirm pathways theory, the present exploratory analyses lend support to those theories, provide potential support for gender-neutrality and gender-saliency on a descriptive level (although not causal, or predictive), and most importantly, offer a platform for future examinations of pathways perspectives using quantitative analyses.

Limitations and Future Research

There are limitations to the current study that must be acknowledged. As mentioned previously, although it would be ideal to include a large number of indicators, large numbers are not recommended given the exponential increase in the cells involved in the contingency table (S. T. Lanza, personal communication, September 14, 2010). As such, the number (and nature) of indicators limit the conclusions that can be drawn in the present study. For example, as previously discussed, indicators associated with the nature of the offences associated with each of the classes of offenders were not included. Perhaps the inclusion of such variables would provide a better understanding of potential pathways, and also, better differentiate males from females.

Furthermore, limitations associated with the DFIA are worth noting as the DFIA is a tool that was developed for men on a population of men and as such, the tone of the assessment is very male-based. Despite this, it is interesting that female specific classes still emerged. However, the emergence of these classes would likely be much more apparent with variables tailored appropriately to those that have emerged from female-specific studies.

Moreover, given the large number of variables deemed as relevant to female criminality, the present design was very restrictive. Therefore, future research studies attempting to understand pathways or, classes of female offenders would benefit from research designs that would allow for indicators to be created from the ground up (based on theory) and also, to incorporate the nature of the offences.

Specifically, the present study suffered in that the use of archival data did not allow for the present researcher to utilize the most appropriate indicators (indicators were selected based on theory, however, they were not specific to the needs of the present study, and many were not available). Moreover, future studies could perhaps select and create indicators associated with

female-specific variables. For example, indicators associated with running away, victimization (type, context, and whether it is still occurring), and school relationships would have been particularly informative for the present study.

Moreover, indicators associated with the nature of the various offences would also allow more insight into potential classes of female offenders. Specifically, Daly (1992) and Reisig et al. (2007) qualitatively classified offenders using variables associated with the nature of the offences to help determine motivation for criminal behaviour (for economic gain, to obtain drugs, sell drugs for intimate partner). The inclusion of such variables may increase the differentiation occurring between males and females.

Furthermore, although the design of the studies does not allow for causal explanations of criminal behaviour it does offer insight into gender differences associated with criminality. Moreover, the exploratory nature of the present study offers insight into potential gender-specific classes (or pathways) of female criminality and most importantly, provides a spring board for future research and direction in this area.

Given that female-specific classes appear to exist it would be of interest to assess these quantitative classes using a similar design to Reisig, et al.'s (2006) qualitative classification approach, and determine the degree to which female-specific versus gender-neutral offending patterns result in over and misclassification of female offenders. As mentioned however, given the lack of context sensitive indicators this is not possible within the context of the present study.

Furthermore, if future qualitative classification studies are ultimately able to create a design that allows for reliable classifications to emerge it would be of interest to assess the rates of recidivism associated with each respective class of female offender. More specifically, to determine the degree to which the classes differ in terms of their risk to reoffend. A better

understanding of offender types and their respective offender patterns could help to inform treatment and perhaps better prevent reoffending with more appropriate treatment.

Moreover, this study is limited in that the sample is a very serious sample of federal offenders and as such, these findings may not generalize to less serious, provincial populations. However, if in fact, these classes are similar to pathways one may speculate that provincial offenders are on a pathway (increasing in offence severity) that may ultimately lead them to federal incarceration. In fact, many of the female offenders in the current study had served time in provincial facilities. If this is in fact the case, findings from studies attempting to classify and understand female criminality may serve to prevent or intervene and treat these offenders before their offending behaviour becomes serious enough to warrant federal incarceration.

It is also worth noting that many research studies examining the prevalence of various female-specific variables tend to infer these variables cause criminal behaviour in women. The difficulty with this inference is that these studies rarely use comparison groups of non-offending counterparts. Thus, (and is the case with the present study) such studies are not able to state that these variables are only present with offenders.

Specifically, these female-specific variables may simply be a representation of the female population in general. Similarly, this study is limited in its capacity to state that these variables only cluster together in the female offender population as it may be (and is quite possibly) true that variables such as poor coping, parenting and a history of mental illness cluster together in a similar fashion outside of the offender population. Finally, future research on additional samples is required to determine if in fact a four class solution is appropriate for other female offender samples.

In sum, variable centered approaches (e.g., correlation and regression) offer insight into a variety of relations, while person-centered approaches such as LCA describe those variable relations as they combine into classes, or, need profiles of similar individuals. These need profiles may suggest that certain mechanisms differentially influence female criminality.

The present study took a novel approach by examining female prevalent variables using this person-centered quantitative classification technique. Although the present study cannot state that these variables lead or cause female criminality this approach lends support to gender-specificity debate as the findings differentially classified female and male offenders. However, findings indicate that some women offenders are the same as some men offenders—offering support for gender-neutrality as well. The present study provides a platform for future research as these classes describe patterns of needs across female offenders that are not present in male offenders.

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Appendix A: Dynamic Factors Identification and Analysis**Employment Domain**

Ability	Education/skills	Has less than grade 8?
Ability	Education/skills	Has less than grade 10?
Ability	Education/skills	Has no high school diploma?
Ability	Education/skills	Finds learning difficult?
Ability	Education/skills	Has learning disabilities?
Ability	Education/skills	Has physical problems that interfere with learning?
Ability	Education/skills	Has memory problems?
Ability	Education/skills	Has concentration problems?
Ability	Education/skills	Has problems with reading?
Ability	Education/skills	Has problems with writing?
Ability	Education/skills	Has problems with numeracy?
Ability	Education/skills	Has difficulty understanding instructions?
Ability	Education/skills	Lacks a skill area/trade/profession?
Ability	Education/skills	Dissatisfied with skill area/trade/profession?
Ability	Health	Has physical problems that interfere with work?
Work Record	Work History	Has no employment history?
		Unemployed at the time of arrest?
		Unemployed 90% or more?
		Unemployed 50% or more?
		Has an unstable job history?
		Often shows up late for work?
		Has poor attendance record?
Work Record	Performance	Has difficulties meeting workload requirements?
		Lacks initiative?
Work Record	Dismissal/Departure	Has quit a job without another?
		Has been laid off from work?
		Has been fired from a job?
Rewards	Economic Gain	Salary has been insufficient?
		Lacks employment benefits?
Rewards	Security	Job lacks security?

Co-worker relations	Quality	Has difficulty with co-workers?
Supervisory Relations	Quality	Has difficulties with superiors?
Interventions	History	Prior vocational assessment(s)?
		Has participated in employment programs?
		Has completed an occupational development program?

Marital/Family

Family background	Cohesion	Childhood lacked family ties?
	Maternal Relations	Mother absent during childhood?
		Maternal relations negative as a child?
	Paternal Relations	Father absent during childhood?
		Paternal relations negative as a child?
	Parental inter-relations	Parent's relationship dysfunctional during childhood?
		Spousal abuse during childhood?
	Sibling relations	Sibling relations negative during childhood?
	Other relative(s) relations	Other relative(s) relations negative during childhood?
	Criminality	Family members involved in crime?
Marital Relation	Status	Currently single?
		Has been married/common-law in the past?
Marital Relation	Quality	Dissatisfied with current relationship?
		Money problems affect relationship(s) past/present?
		Sexual problem affect relationship(s) past/present?
		Communication problems affect the relationship(s)?
		Has been a victim of spousal abuse?
		Has been a perpetrator of spousal abuse?
Parenting responsibility	Dependents	Has no parenting responsibilities?
Parenting responsibility	Parenting Skills	Unable to handle parenting responsibilities?
		Unable to control the child's behaviour appropriately?
		Perceives self as unable to control the child's

		behaviour?
		Supervises child improperly?
		Does not participate in activities with the child?
		Lacks an understanding of child development?
		Family is unable to get along as a unit?
Parenting responsibility	Child Abuse	Has been arrested for child abuse?
		Has been arrested for incest?
Interventions	History	Prior marital/family assessment(s)?
		Has participated in marital/family therapy?
		Has completed a marital/family intervention program?

Associates/ Social Interaction

Attachments	Status	Socially isolated?
Attachments	Substance abusers	Associates with substance abusers?
Attachments	Pro-criminal	Has many criminal acquaintances?
		Has mostly criminal friends?
		Has been affiliated with a gang?
		Resides in a criminogenic area?
Attachments	Pro-social	Unattached to any community groups?
Interpersonal Relations	Style	Relations are described as predatory?
		Often victimized in social relations?
Interpersonal Relations	Influence	Easily influenced by others?
Interpersonal Relations	Communication	Has difficulty communicating with others?

Substance Abuse

Alcohol Abuse	Pattern	Abuses alcohol?
		Began drinking at an early age?
		Drinks on a regular basis?
		Has history of drinking binges?
		Has combined the use of alcohol and drugs?
Alcohol Abuse	Situations	Drinks to excess during leisure time?
		Drinks to excess in social situations?
		Drinks to relieve stress?
Alcohol Abuse	Interference	Drinking interferes with employment?
		Drinking interferes with marital/family relations?
		Drinking interferes with social relations?
		Drinking has resulted in law violations?
		Drinking interferes with health?
Drug Abuse	Pattern	Abuses drugs (solvents, prescription drugs, etc.)?
		Began using drugs at an early age?
		Uses drugs on a regular basis?
		Has gone on drug-taking sprees?
		Has combined the use of different drugs?
Drug Abuse	Situations	Uses drugs to excess during leisure time?
		Uses drugs to excess in social situations?
		Uses drugs to relieve stress?
Drug Abuse	Interference	Drug use interferes with employment?
		Drug use interferes with marital/family relations?
		Drug use interferes with social relations?
		Drug use has resulted in law violations?
		Drug use interferes with health?
Interventions	History	Prior substance abuse assessment(s)?
		Has participated in substance abuse treatment?
		Has completed substance abuse treatment?

Community Functioning

Accommodation	Stability	Has unstable accommodation?
Accommodation	Maintenance	Residence is poorly maintained?
Deportment	Self-presentation	Has poor self-presentation?
Deportment	Hygiene	Has poor hygiene?
Health	Physical	Has physical problems?
Health	Dental	Has dental problems?
Health	Nutritional	Has dietary problems?
Finance	Budgeting	Difficulty meeting bills?
		Has outstanding debts?
Finance	Accounts	Has no bank accounts?
Finance	Credit	Has no credit?
Finance	Collateral	Has no collateral?
Communication	Written	Has problems writing?
	Verbal	Unable to express verbally?
Leisure	Hobbies	Has no hobbies
Leisure	Organized Activities	Does not participate in organized activities?
Support	Social Assistance	Unaware of social services?
		Has used social assistance?
Intervention	History	Prior assessment for community function?
		Has participated in a community skills program?
		Has completed a community skills program?

Personal/Emotional

Self-concept	Personal	Feels especially self-important?
		Physical prowess problematic?
Self-concept	Social-cultural	Family ties are problematic?
		Ethnicity is problematic?
		Religion is problematic?
		Gang member?
Cognition	Cognition	Unable to recognize problem areas?
		Has difficulty solving interpersonal problems?
		Unable to generate choices?
		Unaware of consequences?
		Goal setting is unrealistic?
		Has disregard for others?
		Socially unaware?
		Impulsive?
		Incapable of understanding the feelings of others?
		Narrow and rigid thinking?
Behavioural	Aggression	Aggressive?
Behavioural	Assertion	Assertion problem?
Behavioural	Coping	Copes with stress poorly?
		Poor conflict resolution?
		Manages time poorly?
Behavioural	Gambling	Gambling is problematic
Behavioural	Frustration	Has low frustration tolerance?
Behavioural	Hostility	Hostile?
Behavioural	Neuroticism	Worries unreasonably?
Behavioural	Risk Taking	Takes risks inappropriately?
Behavioural	Sensation seeking	Thrill seeking?
Behavioural	Self-monitoring	Non-reflective?

Behavioural	Conscientiousness	Is not conscientious?
Behavioural	Manipulation	Manipulative?
Sexual Behaviour	Dysfunction	Has difficulty performing sexually?
Sexual Behaviour	Identity	Sexual identity problem?
Sexual Behaviour	Preference	Inappropriate sexual preferences?
Sexual Behaviour	Attitudes	Sexual attitudes are problematic?
Mental Ability	Functioning	Mentally deficient?
Mental Health	Disordered	Diagnosed as disordered in the past?
		Diagnosed as disordered currently?
Interventions	Assessments	Prior personal/emotional assessment(s)?
Interventions	Medication	Prescribed medication in the past?
		Prescribed medication currently?
Interventions	Psychological/Psychiatric	Past hospitalization?
		Current hospitalization?
		Received outpatient services in the past?
		Receiving outpatient services prior to admission?
Interventions	Programs	Past program participation?
		Current program participation?

Attitude

Justice	Laws	Negative towards the law?
Justice	Enforcement	Negative towards police?
Justice	Judicial System	Negative towards courts
Justice	Corrections	Negative towards Corrections?
		Negative towards community supervision?
		Negative towards rehabilitation?
Society	Convention	Employment has no value?
		Marital/Family relations have no value?
		Interpersonal relations have no value?
		Values substance abuse?
		Basic life skills have no value?
		Personal/Emotional stability has no value?
Society	Elderly	Elderly have no value?
Society	Women (Men)	Women/Men roles are unequal?
Society	Minorities	Ethnically intolerant?
		Intolerant of other religions?
		Intolerant of disabled persons?
Property	Personal	Disrespectful of personal belongings?
Property	Communal	Disrespectful of public property?
Property	Commercial	Disrespectful of commercial property?
Violence	Domestic	Supportive of domestic violence?
Violence	Instrumental	Supportive of instrumental violence?
Lifestyle	Goal Directed	Lacks direction?
Lifestyle	Conforming	Non-conforming?