Examining Subtypes of Psychopathy in a Sample of Individuals with Sexual Offenses: A Comparison of Statistical Perspectives

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A dissertation presented to the

Department of Psychology at

Rosalind Franklin University of Medicine and Science

ROSALIND FRANKLIN UNIVERSITY

OF MEDICINE AND SCIENCE

College of Health Professions

REPORT OF FINAL EXAMINATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN CINICAL PSYCHOLOGY

The Chair of the Examining Committee is asked to report the result to the Office of the Dean without delay

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Title of Thesis as Accepted: Examining Subtypes of Psychopathy in a Sample of Individuals with Sexual Offenses: A Comparison of Statistical Perspectives

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August 2014 version

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Abstract

Despite the possibility of the existence of subtypes of psychopathy being a topic of both theoretical and empirical interest for decades, there is little agreement regarding the number or nature of these possible subtypes. Methodological limitations and inconsistencies in the literature have made drawing conclusions difficult, and the situation is further compounded by the possibility that the commonly used statistical subtyping analyses may not model the data as accurately as has been assumed. Furthermore, investigation of subtypes in psychopathy has thus far largely ignored individuals with sexual offenses as a specific population. The current study aimed to address both the statistical concerns and lack of attention to such individuals in the subtyping literature by comparing different statistical subtyping approaches in a sex offense-specific sample.

Introduction

Psychopathy has long been viewed as a complex construct worthy of study particularly in forensic populations. Even from early in its conception it has been viewed by some as a non-unitary construct, with multiple subtypes that were posited to have different etiologies or comorbid symptom patterns, and this view has persisted into the modern literature. Despite the large body of work on the topic, however, there is little agreement on the number, nature, or necessity of subtypes of psychopathy. This may be due in part to methodological variations across studies and the potential use of inappropriate statistical methods used to define subgroups. Additionally, though there have been a number of studies examining psychopathy subtypes in general and violent offender populations, the subtyping literature has broadly neglected more specific offender populations for whom subtypes of psychopathy may have significant clinical relevance, specifically individuals with sexual offenses. The current study is designed to address both of these gaps in the literature by examining subtypes of psychopathy in a sexual offense-specific sample and comparing different statistical approaches, specifically latent profile analysis and factor mixture modeling.

Subgroups of Psychopathy

Historical Perspectives

The idea of subgroups existing within the broader construct of psychopathy is not new. The assertion by clinicians that psychopathy was not necessarily a unitary construct but rather consisted of different subtypes was present even prior to Hervey Cleckey's seminal work on psychopathy, which helped solidify and narrow the definition of the syndrome itself (Cleckley, 1941/1988). As early as 1907, Kraepelin suggested three subtypes of psychopathy: the born criminal, characterized by deficient affect and morality; morbid liars and swindlers,

characterized by both interpersonal talent and superficiality; and the impulsive psychopath. The impulsive psychopath was further broken down into the spendthrift, described as living a parasitic lifestyle, and the vagabond, described as prone to boredom and thus living without plans (Kraepelin, 1907/1981). Partridge (1928) also discussed subtypes of psychopathy, positing three different subtypes (e.g., delinquent, inadequate, emotionally unstable). Herve (2012) argued that Partridge's subtypes represented two distinct developmental pathways for psychopathy, either biologically predetermined (*delinquent* and *inadequate*) or resulting from the individual being raised in a chaotic family (*emotionally unstable*). It is this author's impression, Partridge himself did not appear to address the etiology of psychopathy or how it relates to the subtypes he identified[1].

Henderson (1939) proposed three subtypes of psychopathy: the predominantly aggressive, the primarily passive/inadequate, and the predominantly creative. He described aggressive psychopaths as being impulsive, reactive, and emotionally immature. Such individuals became resentful towards society and attempted to get back at it however they could, their actions characterized by a callous lack of empathy. Passive/inadequate psychopaths were narcissistic and interpersonally effective (though superficial), often acting in a cold and manipulative manner. They were considered less aggressive and impulsive than their aggressive counterparts but less empathetic. The third subtype, the creative psychopath, was grandiose and impulsive, viewing themselves as too brilliant or superior to be bound by society's normal rules. Though not generally as overtly aggressive as the aggressive psychopath, the creative psychopath's grandiosity often put them in conflict with others through which their aggressive tendencies would be revealed (Henderson, 1939). Though Henderson viewed these subtypes as

[1] Partridge's investigation of heterogeneity in psychopathy eventually led him to criticize the application of the term "psychopathy" as too broad to be useful (Partridge, 1930), noting many of the same issues as Cleckley (1941) noted.

distinct enough to be distinguishable, he ultimately viewed them as more similar than they were different and as all being subsumed under the broader construct of the psychopathic personality (Henderson, 1942).

Karpman (1946) took a different view of psychopathy subtypes. Contrary to Henderson's view, Karpman posited two subtypes that he viewed as fundamentally distinct from one another: the idiopathic (i.e. without known cause or process) or primary psychopath and the symptomatic or secondary psychopath. Though the primary and secondary psychopath were described as being superficially identical in their behaviour, the behaviour of the secondary psychopath was attributed to an underlying non-psychopathic pathology; though the secondary psychopath behaved in a manner indistinguishable from the primary psychopath, this behaviour was seen as the result of a non-psychopathic underlying condition such as neurosis or psychosis as opposed to resulting from psychopathy itself. The behaviour of the primary psychopath, however, was not seen as being attributable to such underlying non-psychopathic pathology (Karpman, 1946). Because the secondary psychopath's seemingly psychopathic behaviour was ultimately due to an underlying pathology other than psychopathy, Karpman did not view such individuals as actually having psychopathy despite being extremely difficult to differentiate both behaviourally and clinically (Karpman, 1948a); the differentiation between the two groups, in Karpman's view, lay not in the individuals' behaviour but in the motivation behind said behaviour (Karpman, 1948b).

In addition to differentiating between primary and secondary psychopathy, Karpman (1946) also proposed different distinct presentations subsumed within the broader category of primary psychopathy. Within this category, he differentiated between the aggressive-predatory psychopath and the passive-parasitic psychopath. The aggressive-predatory psychopath was direct, impulsive, and without guilt or conscience; such individuals viewed the world and people

around them as little more than means to gratify their own base desires, and were actively predatory in the pursuit of these desires (Karpman, 1946). Passive-parasitic psychopaths, though similar to aggressive-predatory psychopaths in many regards, were not actively predatory when pursuing their immediate desires unless no other option was available. Instead, they would seek to obtain the assistance and resources of others with no intention of repaying such help (Karpman, 1946).

Arieti (1963,1967) discussed a similar distinction, positing two subtypes: the pseudopsychopath/symptomatic psychopath and the idiopathic/true psychopathy. Similar to Karpman's (1946) discussion of primary/idiopathic psychopathy and secondary/symptomatic psychopathy, Arieti (1963,1967) viewed the behaviour of the pseudopsychopath as resulting from a non-psychopathic pathology but the behaviour of the idiopathic psychopath as having no such external origins, and thus being "true" psychopathy. Whereas pseudopsychopaths were believed to have the capacity to experience lasting and complex emotions but were unable to control their behaviour using these emotions due to underlying non-psychopathic pathology, the idiopathic psychopath lacked such lasting and complex emotions in the first place and was thus able to act upon impulses, urges, and more primitive emotions without impedance (Hervé, 2012).

Arieti (1963, 1967) further broke the idiopathic psychopath into four types: the simple, the complex, the dyssocial, and the paranoiac. The simple psychopath was driven by the desire for immediate gratification and motivated by primitive emotions, with little concern or anxiety regarding the long term consequences of his or her actions. The complex psychopath was also believed to be driven to satisfy his or her often socially or morally unacceptable goals, but was able to adopt longer term strategies in order to successfully meet these desires. Whereas the simple psychopath was seen as being concerned with "how to do it", the complex psychopath

was seen as being concerned with both "how to do it" and "how to get away with it" (Arieti, 1967, p.256). The dyssocial psychopath, according to Arieti, sought to satisfy his or her need for primitive gratification through the sanction of the authority of a special group. This group may be criminal in nature (i.e., gangs), but non-criminal group membership that allows the gratification of the dyssocial psychopath's desires would also suffice. Paranoiac psychopaths were described as presenting with both psychopathic and psychotic features, with paranoid and delusional features that are systematic and do not appear to serve only to rationalize, justify, or excuse antisocial behaviour. Similar to the dyssocial psychopath, the paranoiac psychopath was posited to act out within a system but utilizing a psychological rather than social system.

Modern Conceptualizations of Primary and Secondary Psychopathy

Karpman and Arieti's ideas of primary versus secondary psychopathy have continued to be prevalent in the literature and have been adopted by many contemporary researchers. Mealey (1995a, 1995b) proposed an evolutionarily-based approach to psychopathy (referred to as sociopathy in text) that differentiated between primary and secondary psychopathy. According to Mealey (1995b), the primary psychopath was genotypically predisposed to psychopathy due to temperament and autonomic hyperarousal that hinder normative moral development and socialization. Such individuals would exhibit chronic antisocial behaviour without emotion or guilt, and would be characterized by high scores on Factor 1 traits on the PCL-R (Mealey, 1995a; 1995b). Though high levels of Factor 2 traits may also be present, they were not required for primary psychopathy (Mealey, 1995a). The inborn nature of primary psychopathy suggested that it should be found in similar baserates cross-culturally as it was seen as resulting from genetic rather than environmental factors (Mealey, 1995b). Secondary psychopathy, on the other hand, was more heavily influenced by environment than genetics, resulting in a presentation that could

vary across time and culture. Such individuals' antisocial behaviour was not considered inherently unemotional and was tied more heavily to their circumstances and thus was not viewed as chronic, as would be the case with primary psychopathy, and they would be characterized by high scores on Factor 2 but not Factor 1 traits on the PCL-R (Mealey, 1995a; 1995b).

Lykken (1995) also discussed primary and secondary psychopathy. He viewed the experience, or rather lack thereof, of fear and anxiety to be a core feature of primary psychopathy (Lykken, 1957; 1995). He argued that all individuals experience some level of innate fear for certain stimuli and the ability to associate such stimuli with conditions and situations but that this level varies between individuals. Individuals who exist on the low end of this spectrum in innate fearfulness are at higher risk to develop primary psychopathy as they are not as receptive to normative socialization regarding antisocial behaviour, which often relies on punishment and fear (Lykken, 1995). This lack of fear and anxiety, particularly in the face of known or anticipated punishment, was argued to result in the disinhibition of antisocial tendencies, and was not simply the consequence of a poor childhood environment but rather inherent to the individual themself.

When discussing secondary psychopathy, Lykken (1995) did not provide the same level of etiological and developmental background as he did for primary psychopathy, stating that secondary psychopathy was a more speculative category. He did discuss the possible neurological underpinnings of both primary and secondary psychopathy however, drawing on the concepts of the behavioural inhibition system (BIS) and behavioural activation system (BAS). According to Lykken, the BIS was said to organize behaviour in response to aversive stimuli such as pain whereas the BAS, also referred to as the approach system, was said to organize the

behavioural response to rewarding or non-punishing stimuli. Lykken hypothesized that primary psychopathy involved a weak BIS whereas secondary psychopathy may involve a normal BIS but overactive BAS. As such, though individuals with secondary psychopathy lacked the fearlessness of primary psychopathy, the fear and anxiety felt by such individuals was overridden by the abnormally active BAS, resulting in a similar behavioural profile as seen in primary psychopathy.

It should be noted that, though some later authors (e.g., Mokros et al. 2019) have equated these terms, Lykken distinguished between secondary psychopathy and what he termed sociopathy. Though secondary psychopathy was viewed as distinct from primary psychopathy, particularly in terms of neurological underpinnings and experiences of anxiety, both were still subsumed under the broader category of psychopathic personalities. Sociopathy, on the other hand, was viewed as a separate and distinct category of personality from psychopathy that resulted from inadequate socialization rather than from an inherent and innate disposition. Though Lykken acknowledged that the distinctions between the psychopathic and sociopathic personalities are often blurry and an individual may be appropriately categorized as both (i.e. a psychopathic individual who was also inadequately socialized), he still differentiated between the two constructs.

Porter (1996), similar to Arieti and Karpman, also discussed the possibility of primary and secondary subtypes of psychopathy that are behaviourally identical in most respects but have different developmental etiologies. The predominant form of psychopathy, termed fundamental psychopathy by Porter, was highly genetic in nature and resulted in an inherent incapacity to form affective bonds. The development of secondary psychopathy, however, was much more reliant on environment, and Porter conceptualized the affective detachment seen in secondary

psychopathy as a dissociative response to a traumatic childhood environment rather than an innate incapacity. Furthermore, though childhood trauma and abuse could occur with both fundamental and secondary psychopathy, Porter argued such abuse may be reactive in the case of fundamental psychopathy (i.e. abusive behaviour may be in response to the child's temperament or unemotional behaviour) but passive in the case of secondary psychopathy (i.e. occurring irrespective of and not in response to the child's behaviour).

Empirical Examination of Subgroups

Multiple researchers have attempted to better understand the nature of psychopathy through the use of person-centered analyses, primarily through the use of cluster analysis, latent class analysis (LCA), and latent profile analysis (LPA). As opposed to variable-centered analyses, person-centered analyses allow for the detection of latent subgroups defined by distinct constellations of traits (Hicks et al., 2017). Such an approach can be utilized not only to identify subgroups but also to investigate associations between membership in the subgroups and predictors, outcomes, and other variables (Hicks et al., 2017; Howard & Hoffman, 2018). Due to the methodological importance of how psychopathy is measured, the specific measures of psychopathy and psychopathic traits are noted in the following sections reviewing the literature.

Youth and Adolescents

Some authors have examined subgroups differing in callous/unemotional (CU) traits, a construct highly related to and often predictive of adult psychopathy in children (Barry et al., 2000), to investigate subtypes in child and adolescent samples. Kahn et al. (2013) used model-based cluster analysis to examine subtypes of callous/unemotional (CU) traits in a community sample of clinic-referred adolescents in the community. CU traits as reported by both parents and the youth themselves (Antisocial Process Screening Device [APSD]; Frick & Hare, 2001) as well

as indices of child trauma and PTSD symptoms, anxiety, and depression were included as clustering variables. Three clusters were identified. The first cluster, labelled the primary group, was characterized by high levels of CU traits and low levels of anxiety/depression, trauma exposure, and PTSD symptoms. The second cluster, labelled the secondary group, was also characterized by high levels of CU traits, but also exhibited high levels of the other clustering variables as well. The third cluster, labelled the anxious-conduct group, was characterized by low levels of CU traits, high levels of anxiety/depression, and moderate to high levels of trauma exposure and PTSD symptoms. The secondary group exhibited high levels of impulsivity whereas the primary group exhibited the lowest levels of the three groups. In regards to physical aggression, the secondary group scored higher than either the primary or anxious-conduct groups. The secondary group also scored higher on externalizing and cruelty as well as behavioural activation than the primary group, whereas the primary group scored lower than the secondary group on behavioural inhibition.

Fanti et al. (2013) used an LPA to examine subtypes of youth with CU traits in a sample of community adolescents in Cyprus. Indices of conduct problems and anxiety were included as clustering variables along with self-reported CU traits (Inventory of Callous-Unemotional Traits [ICU]; Frick, 2004), and a four group model was found to be the best fitting model. Group 1, the low risk group, was below average on all three clustering variables. Group 2, the anxious group, was characterized by low levels of CU traits and conduct problems and high levels of anxiety. Group 3, the primary CU group, exhibited high levels of CU traits and conduct problems but low levels of anxiety. Group 4, the secondary CU group, was characterized by high scores on all three variables, though this group still exhibited lower levels of anxiety than the anxious group.

External validation analyses indicated that the anxious and secondary CU groups scored lower on self-esteem than the low risk and primary CU groups. Both CU groups exhibited higher levels of impulsivity and narcissism than the non-CU groups though the secondary CU group scored higher on narcissism than the primary CU group, and the anxious group scored higher on impulsivity than the low risk group. Both CU groups scored non-significantly higher on sensation seeking than the non-CU groups. In terms of reactive aggression, the secondary CU group scored higher than all three other groups, with the primary CU group scoring higher than the anxious group, which scored higher than the low risk group. Both CU groups scored higher than the non-CU groups on proactive aggression, with the secondary CU group scoring higher than the primary CU group, a finding that appears to be somewhat out of line with modern conceptualizations of primary and secondary presentations of psychopathic traits. Furthermore, both CU groups also appeared to be more susceptible to peer pressure and scored higher on popularity striving than the non-CU groups, a finding that appears at odds with modern conceptualizations of psychopathy in general. The CU groups, however, scored lower on conformity/obedience than their non-CU counterparts.

Kimonis et al. (2012) performed model-based cluster analysis, with a measure of anxiety and a self-report measure of psychopathy with three subscales (YPI; Andershed et al., 2002) as clustering variables, on a sample of male juvenile offenders with high levels of psychopathic traits. Two clusters were identified: a primary and a secondary group. Compared to the primary group, the secondary group reported higher levels of anxiety, worry, physiological symptoms of anxiety, and social concerns/concentration, as well as higher total YPI and Impulsive-Irresponsible lifestyle factor scores. The secondary group reported significantly more maltreatment and scored higher on all measures of negative emotionality and symptoms than

both the primary group and a non-psychopathic comparison group. Specifically, the secondary group endorsed higher levels of depression, social withdrawal, attention problems, and anger problems. When compared on a task assessing processing of distressing emotional stimuli, it appears that the primary group was more disengaged than the secondary group, indicating they were attending away from distressing stimuli to a greater degree than the secondary group. Specifically, the primary group had a negative facilitation score for distressing stimuli whereas the secondary group had a positive facilitation score; the authors argue that higher facilitation scores reflect greater attentional orientation to the emotional stimuli presented. It should be noted that, though the primary and secondary groups differed significantly from each other, neither group differed significantly from the comparison youths.

Andershed et al. (2008) conducted a model-based cluster analysis (MCA) on a sample of male juvenile delinquents in Germany. Psychopathic traits were assessed with the screening version of the PCL-R (PCL:SV; Hart et al., 1995). The authors utilized a three-factor model for the PCL:SV for the MCA, which includes the same affective, interpersonal, and lifestyle traits as the four-factor model but does not include the antisocial facet. A three-cluster solution was found to be the best fitting model. The first cluster, referred to as the psychopathic personality cluster, was elevated on all three factors. The second, referred to as the low traits cluster, had relatively low scores on all three factors. A third cluster that was elevated on the affective factor and the lifestyle factor but not the interpersonal factor was referred to as the unemotional/impulsive-irresponsible cluster. The clusters did not differ on the number of registered crimes, but individuals in the low traits cluster were significantly less likely than either other cluster to have been previously incarcerated. Conduct disorder diagnoses were more common in the psychopathic personality cluster compared to the other two, and individuals in this cluster had

higher rates of substance use for all substances measured with the exception of alcohol and cannabis. The third group poses an interesting problem. The elevations on two of the three subscales indicate that this group is distinctly different from individuals low or high in psychopathic traits; however this presentation is not a prototypical expression of psychopathy and does not appear to align with either a primary or secondary presentation.

Lee et al. (2010) used model-based cluster analysis, with scores on a three-factor model of psychopathy (PCL:YV; Forth et al., 2003) and a measure of anxiety as clustering variables, to investigate subtypes of psychopathy in a sample of male juvenile offenders. Three clusters were identified: low, moderate, and high psychopathic traits groups. The low group scored lower on all three factors of the PCL:YV than the other two groups. The moderate and high groups did not differ on affective or lifestyle facet scores, but the high group scored significantly higher on the interpersonal facet. In regards to anxiety, all three groups were significantly different from each other, with the high group exhibiting the most anxiety and the moderate group exhibiting the least. The high group exhibited less extraversion and agreeableness than the low group and lower conscientiousness than either the low or moderate groups. All three groups differed from one another on neuroticism, with the high group reporting the highest levels - a finding that appears at odds with common conceptualizations of primary psychopathy - and the moderate group reporting the lowest levels. Both the moderate and high groups were rated as being less amenable to treatment and as being more dangerous than the low group, though there were no group differences in violent recidivism.

Kimonis et al. (2011) used model-based cluster analysis to investigate subtypes of psychopathic traits in juvenile offenders scoring high on such traits, with scores on a four-factor model of psychopathy (PCL:YV; Forth et al., 2003) and an anxiety measure as the clustering

variables. A two cluster solution was found to be the best fitting model, and the groups were referred to as primary and secondary psychopathy groups. The secondary group scored higher on anxiety and on the interpersonal facet of the PCL:YV; the two groups did not differ on any of the three remaining facets. The secondary group scored significantly higher on hostility, depression, general distress, and abuse history than the primary group. This group also engaged in more institutional violence over a three year period than the primary group, and these violent incidents were more likely to be reactive rather than proactive in nature. The primary group exhibited higher levels of responsibility and impulse control than the secondary group. Though the higher levels of psychological distress and internalizing pathology seen in the secondary group do align with conceptualizations of secondary psychopathy, the finding regarding responsibility and impulse control in the primary group is surprising; such a finding may align somewhat with Mealey's views as both irresponsibility and impulsivity are Factor 2 traits however.

Nijhof et al. (2011) used LCA to examine subtypes of self-reported psychopathic traits (YPI; Andershed et al., 2002) in a sample of Dutch adolescents in residential care. Analyses indicated that a three class model was the best fitting solution. One group, referred to as the relatively normal group, scored low on all three YPI subscales. The second group had average to moderate scores on the grandiose/manipulative and callous/unemotional subscales but relatively high scores on the impulsive/irresponsible subscale and was labelled the impulsive non-psychopathic group. The last group scored high on all three subscales and was referred to as the psychopathy-like group. Both the psychopathy-like and impulsive groups exhibited significantly higher levels of externalizing behaviours than the relatively normal group. Though the psychopathy-like group did not differ from the relatively normal group on internalizing behaviour, the impulsive group displayed higher levels of this construct. The relatively normal

group had fewer vandalism, property, and violent offenses than either of the other two groups; though the psychopathy-like and impulsive groups did not differ on vandalism, the psychopathy-like group had more property and violent offenses. The psychopathy-like group and the impulsive group also had higher rates of soft drug use than the relatively normal group.

In a similar study assessing an incarcerated rather than clinical sample, Dembo et al. (2007) conducted an LCA on a sample of 203 youths and identified 3 classes: low, moderate, and high psychopathy (Youth Psychopathic Traits Inventory [YPI]; Andershed et al., 2002). Youth in the high psychopathy group were more likely to have higher rates of criminal thinking, self-reported delinquency, substance use, and experiences of stressful events and family conflict, and were more likely to have been diagnosed with CD than youth in either the moderate or low psychopathy groups.

da Silva et al. (2019) conducted an LPA on a forensic sample of male adolescents, with replication in a community male adolescent sample, to examine profiles of self-reported psychopathic traits (Youth Psychopathic Traits Inventory-Short [YPI-S]; van Baardewijk et al., 2010). A three-class solution was found to be the best fitting solution in both samples, with the classes labeled as Low Psychopathic Profile, Average Psychopathic Profile, and High Psychopathic Profile. Membership within the High Psychopathy Profile was associated with a higher risk for CD, ODD, and substance dependence, higher number of comorbid diagnoses, higher risk of recidivism, and more aggression.

Overall, the literature suggests that psychopathic traits in adolescents appear to fall into distinct subtypes, with the number of subgroups found ranging between two and four. There is some evidence consistent with the presence of distinct groups differing on traits associated with primary and secondary psychopathy; however, some studies found that subgroups were

differentiated into high, medium and low levels of traits rather than primary and secondary presentations. Differentiations between primary and secondary presentations, when such subgroups were found, generally aligned with the predicted theoretical differences between such groups (i.e. greater anxiety, negative affect, and trauma in secondary presentations), though such findings were often observed only in studies that examined youth who exhibited high levels of psychopathic traits rather than the full spectrum of presentations. Additionally, the findings were not wholly consistent on the associations between subgroup membership and external validators, and there were notable exceptions, particularly the findings of Lee et al. (2010). In fact, Lee and colleagues' finding that youth with high levels of psychopathic traits also had the highest levels of anxiety and neuroticism appears directly contradictory to the predicted theoretical differences; however, it is important to note that Lee et al.'s groups do not appear to align with the idea of primary versus secondary psychopathy to begin with. Given that the groups differed based on overall levels of traits, the moderate group identified in the analyses represents subclinical levels of psychopathic traits as opposed to secondary psychopathy. Group differentiation based on overall trait levels as opposed to different trait combinations was seen in several other studies examining youth as well, such as da Silva et al. (2019) and Dembo et al. (2007), indicating that, though there may be distinct patterns of psychopathic traits present in subsets of adolescents, these patterns may be better characterized in some samples as different levels of traits rather than traditionally understood primary and secondary presentations.

Adults

Analyses of Non-PCL-R Measures. Blackburn et al. (2008) examined the use of the self-report Antisocial Personality Questionnaire (APQ; Blackburn & Fawcett, 1999) in a sample of 79 male forensic psychiatric patients who were labeled "psychopathic" by the authors due to a

score of 21 or higher on the PCL-R. The APQ is further broken down into eight subscales (Self-control, Self-esteem, Paranoid Suspicion, Avoidance, Resentment, Aggression, Deviance, Extraversion) and two higher-order factors, Impulsivity and Withdrawal. Traditional cluster analysis identified 4 clusters based on APQ scores: primary psychopath, secondary psychopathy, controlled, and inhibited. The primary and secondary psychopath clusters scored similarly on the Impulsivity scale, and both scored higher than the controlled or inhibited clusters. When examining the Withdrawn subscale, the secondary psychopath and inhibited clusters scored higher than the primary psychopath and controlled clusters. The secondary psychopathy cluster was more withdrawn than the inhibited cluster however, as was the primary psychopath cluster compared to the controlled cluster. Though the four clusters did not differ significantly on total PCL-R scores, differences were observed for factor scores. Contrary to expectations, the primary group had the lowest scores on Factor 1 and highest scores on Factor 2, and the controlled group scored highest on Factor 1 and lowest on Factor 2, a finding that is notably at odds with general conceptualizations of primary and secondary psychopathy. In regards to facet scores, the primary group scored lower on the interpersonal facet than the controlled group and lower on the affective facet than both the controlled and secondary groups. The primary group scored marginally higher on the antisocial facet compared to the controlled group however.

The authors then compared the group on several external validators. Groups did not differ significantly on criminal history. The secondary and inhibited groups were more likely to meet diagnostic criteria for PTSD and anxiety disorder than the primary and controlled groups, and were also more likely to report experiencing childhood abuse. When examining personality disorders, the secondary group had the most severe personality pathology in general, but both the primary and secondary groups were characterized by high levels of adult and child antisocial PD

traits.The controlled group generally showed relatively few PD traits, with histrionic and narcissistic traits being the exception. The inhibited group primarily exhibited borderline, dependent, histrionic, and adult antisocial traits. The secondary group was found to be significantly more neurotic, introverted, and antagonistic and less conscientious than the other groups, whereas the controlled group was generally more agreeable and conscientious and less neurotic. The inhibited group was also neurotic and introverted, but not to the degree of the secondary group.

Drislane et al. (2014) used model based cluster analysis to examine subtypes of psychopathy in a non-forensic sample of men being evaluated for service in the Finnish military. All participants included in analyses scored at or above the 95th percentile of the Triarchic Psychopathy Measure (TriPM; Patrick, 2010), which is a self-report measure of psychopathic traits that includes three subscales: boldness, meanness, and disinhibition. A two-class model was found to be the best fitting model. The clusters were compared both to each other and to a comparison group comprised of the remaining sample of individuals who scored below the 95th percentile on the TriPM. Compared to the comparison group, individuals in cluster 1, referred to as the “primary psychopathy group”, scored higher on all three subscales of the TriPM and lower on measures of anxiety and depression. Cluster 2, referred to as the “secondary psychopathy group”, also scored higher than the comparison group on the disinhibition and meanness subscales but did not differ on the boldness subscale, and had higher levels of anxiety and depression. When compared to each other, the two clusters differed only on the boldness subscale, with the primary group scoring higher than the secondary group, and anxiety/depression, with the secondary group scoring higher than the primary group.

Participants in the primary group exhibited higher levels of externalising problems and lower levels of internalizing problems than the comparison group. The secondary group, on the other hand, exhibited higher levels of both externalizing and internalizing problems compared to the comparison group. The secondary group also exhibited higher levels of internalizing problems than the primary group. Both psychopathy groups had higher rates of arrest than the comparison group for all major crime categories, with the primary group having a higher rate of violent crime than the secondary group.

Falkenbach et al. (2008) examined psychopathy subtypes in a male undergraduate sample through model-based cluster analysis, with a non-clinical self-report measure of psychopathy (Levenson's Psychopathy Scale [LPS]; Levenson et al., 1995), and indices of BIS, BAS,, and anxiety used as clustering variables. Four clusters were identified. Cluster 1, the Primary-Psychopathic-like-traits group, was characterized by higher scores on the primary subscale of the LSP, above average scores on the secondary subscale of the LSP, and average scores on the BIS, BAS, and anxiety. Cluster 2, the Secondary-Psychopathic-like-traits group, was characterized by average primary LSP scores, higher secondary LSP, BIS, BAS, and anxiety scores compared to the other groups. Cluster 3, the Low Anxiety group, exhibited below average scores on all measures. Cluster 4, the Normal Temperament group, was characterized by below average scores on the LSP and average scores on the BIS, BAS, and anxiety. The Primary- and Secondary-like groups had significant higher levels of aggression than the Low Anxiety or Normal Temperament groups, and instrumental aggression was preferentially associated with the Primary-like group.

Falkenbach et al. (2014) examined psychopathy subtypes in a community sample using model-based cluster analysis, with self-reported psychopathy (PPI; Lillienfeld & Andrews, 1996)

and measures of narcissism, anxiety, and borderline features. Results indicated that a six cluster solution was the best fitting model. The Primary Psychopathy cluster was characterized by higher scores on overt narcissism and Factor 1 traits of psychopathy. The Secondary Psychopathy cluster had higher scores on Factor 2 traits of psychopathy, anxiety, covert narcissism, and borderline features. These two groups were considered the Psychopathic Traits groups, whereas the remaining four groups were considered the Low Psychopathic Traits groups. Two clusters characterized by generally low levels of psychopathology, and were referred to as Low Psychopathology group 1 and Low Psychopathology group 2. Two groups characterized by high anxiety and borderline features were also observed, and were referred to as Neurotic Features group 1 and Neurotic Features group 2.

When compared to each other, the Primary group had greater positive affect and lower negative affect, overall aggression, hostile aggression, and angry aggression than the Secondary group, as well as lower scores on secondary psychopathic traits as measured by a non-clinical measure of psychopathy (LPS; Levenson et al., 1995). Though the finding of lower negative affect for the Primary group is not surprising, the finding of greater positive affect is unexpected given the emphasis on lack of affectivity in many conceptualizations of primary psychopathy. Both Neurotic Features groups scored similarly to the Primary group on secondary psychopathy traits and overall aggression and did not differ from the Secondary group on positive or negative affect. Neither Low Psychopathology group differed from the Secondary group on positive or negative affect. The Low Psychopathy groups all had higher BIS scores than the Primary group but did not differ from the Secondary group.

Lee and Salekin (2010) examined subtypes of psychopathy in a non-clinical undergraduate sample using model-based cluster analysis, examining students who scored in the

top one third on a non-clinical self-report measure of psychopathy (PPI-SF; Lillienfeld & Andrews, 1996). Analyses indicated two subgroups in both male and female participants, which were referred to as primary and secondary groups in both cases. For male participants, the primary group was characterized by higher scores on the social potency, fearlessness, impulsive nonconformity, and stress immunity subscales, whereas the secondary group was characterized by higher scores on Machiavellian egocentricity and blame externalization and lower scores on stress immunity. The two groups did not differ on total PPI-SF scores. For female participants, the primary group was characterized by higher scores than the secondary group on all subscales, as well as higher overall PPI-SF scores. For male subtypes, the primary group exhibited less neuroticism and more extraversion than the secondary group, whereas the secondary group exhibited less guilt and more externalization and antisocial behaviour than the primary group. Though the higher levels of externalization and antisocial behaviour are in line with some contemporary views of secondary psychopathy, particularly those of Mealey, the lower levels of guilt are more surprising, as higher levels of Factor 1 traits- such as lack of guilt and remorse- are generally viewed as more characteristic of primary psychopathy. For female subtypes, though the primary and secondary groups significantly differed from a non-psychopathic comparison group, they did not significantly differ from each other on any variables measured.

Boduszek et al. (2017) conducted an LPA on a sample of 1,126 Polish adult male prisoners. Psychopathy was measured using the Psychopathic Personality Traits Scale (PPTS), a self-report measure that emphasizes non-behavioural aspects of psychopathy. The PPTS provides scores on 4 factors: affective responsiveness, cognitive responsiveness, interpersonal manipulation, and egocentricity. Models including up to six classes were assessed, with a five class model fitting the data best. The first class, labeled the low psychopathy group, was

characterized by low scores on all four factors. Class 2, labeled the moderate affective/cognitive responsiveness group, was characterized by moderate mean scores on the affective and cognitive factors but low scores on the interpersonal and egocentricity factors. Class 3, labeled the high interpersonal manipulation group, was characterized by low scores on the affective, cognitive, and egocentricity factors but high scores on the interpersonal manipulation factor. Class 4, labeled the moderate psychopathy group, was characterized by moderate scores on the affective, cognitive, and egocentricity factors and high scores on the interpersonal manipulation factor. Class 5 was characterized by high scores on the interpersonal manipulation and egocentricity factors and very high scores on the affective and cognitive factors, and was labeled the high psychopathy group; this group appears to align with common conceptualizations of primary psychopathy, though the authors did not identify it as such. Compared to class 1, individuals in class 2 were significantly less likely to be homicide offenders. White-collar criminals and those convicted of property crime were significantly more likely to belong to class 3 in comparison to class 1, whereas individuals in class 5 were more likely to engage in general violent offending.

Studies Employing the PCL-R. Blagov et al. (2011) examined psychopathy subtypes in a sample of 91 male inmates who were deemed psychopathic based on PCL-R scores of 30 or higher using Q-factor analysis (QFA). Indices of personality, affect, anger expression, sensation seeking, temperament, and socialization were used as clustering variables. Results indicated that a 2 Q-factor model best fit the data. The first Q-factor, labeled secondary psychopathy, was characterized by poor emotional and behavioural controls, and individuals in this group tended to be violent, abusive, unempathetic, and irresponsible. The second Q-factor, labeled primary psychopathy, was characterized by grandiosity, manipulation, lying without remorse, and effective social skills, but without the associations with negative emotionality and

emotional/behavioural dysregulation seen with the first Q-factor. Partial correlations indicated that primary psychopathy was positively associated with higher age at first criminal charge, extraversion and positive affect, and higher levels of self-reported activity and energy. Primary psychopathy was negatively associated with internal anger expression, self-reported neuroticism and fearfulness, and observer-reported inattention and hyperactivity. Secondary psychopathy was associated with a higher number of antisocial and violent behaviours, higher anger expression both internally and externally, childhood abuse, higher negative emotionality, and lower anger control, openness, and socialization. These findings appear to be in line with many conceptualizations of primary versus secondary psychopathy, with the finding of higher levels of childhood abuse among secondary psychopaths aligning particularly well with Porter's theory of secondary psychopathic traits as a dissociative trauma response.

Hicks et al. (2004) performed model-based cluster analysis on a sample of 96 male prisoners who scored at or above 30 on the PCL-R, with scores on a measure of personality (Multidimensional Personality Questionnaire - brief form [MPQ-BF]; Patrick et al., 2002) used as the clustering variables within this sample. Two clusters were identified; the groups did not differ on total PCL-R or Factor 1 scores, but the second group scored slightly higher on Factor 2. The first group's most extreme score on the MPQ-BF was a negative score for Stress Reaction; as such, individuals in this group were referred to as emotionally stable psychopaths. Individuals in this group exhibited elevated scores on social potency, alienation, and achievement compared to the normative comparison group, and lower scores on stress reaction, social closeness, and harm avoidance. The second group's most extreme score was on the Aggression scale, and individuals in this group were referred to as aggressive psychopaths, mirroring to some extent Karpman's aggressive-predatory psychopath. Relative to the normative group, individuals in the

aggressive psychopathy group scored lower on well-being, social closeness, control, harm avoidance, and traditionalism, and higher on social potency, stress reaction, alienation, and aggression. Compared to the emotionally stable psychopaths the aggressive psychopaths scored lower on well-being, achievement, and control, and higher on stress reaction, alienation, and aggression. Additionally, individuals in the aggressive psychopathy group engaged in a greater number of fights as both children and adults and had an earlier age at first criminal charge than individuals in the emotionally stable psychopathy group, whereas the emotionally stable psychopathy group scored higher on socialization and estimated IQ. Just as the aggressive psychopathy group appears to mirror Karpman's aggressive-predatory psychopath, the emotionally stable group bears a resemblance to Karpman's passive-parasitic psychopath; the elevated levels of socialization and social potency may indicate an ability to obtain resources and assistance from others and pursue their desires through more non-aggressive means.

Coid et al. (2012) utilized the PCL:SV to examine psychopathy subtypes in a British community sample, using a four-factor model of psychopathy. Cluster analyses revealed 5 clusters. Cluster 4 exhibited traits similar to that of a prototypical criminal psychopathy, with high scores on all 4 facets. Cluster 3 exhibited high antisocial facet and relatively high lifestyle facet scores but low scores on the interpersonal and affective facets, indicating noticeable antisociality and criminal lifestyle without the affective and interpersonal traits seen in cluster 4. This cluster appears to align well with Mealey's conceptualization of secondary psychopathy; however it may also align with individuals with ASPD but without psychopathy. Cluster 2, which the authors referred to as being suggestive of "successful" or "white-collar" psychopathy, exhibited high interpersonal facet and moderately high affective facet scores but low lifestyle facet scores, a pattern of traits that harkens back to Arieti's complex psychopath, whom Arieiti

described as being concerned with both gratifying their needs as well as "getting away with it". This group may also possibly harken back, to a lesser degree, to Arieti's dyssocial psychopath as individuals who use the authority of a group (legally sanctioned in this case) to gratify their needs. Cluster 1 exhibited moderately high scores on the antisocial facet but low scores on all other facets, whereas cluster 3 was characterized by high scores only on the lifestyle facet.

Poythress et al. (2010) used model-based cluster analysis to examine subtypes of psychopathic features in a sample of adult male offenders. Scores on a three-factor model of psychopathy (interpersonal, affective, and lifestyle facets of the PCL-R; Hare, 2003) along with measures of anxiety, harm avoidance, BAS, and early abuse were used as clustering variables. A five cluster solution was identified, though one cluster was very small in size and appeared to be an outlier group with potentially unreliable responses and was thus excluded from further analyses. The first cluster, referred to as Karpman's secondary psychopath, was characterized by significant features of ASPD, slightly elevated lifestyle facet scores compared to interpersonal and affective facet scores, though it is not indicated whether this elevation is statistically significant, as well as high levels of early trauma, moderate scores on fearless temperament and BAS subscales, and high anxiety; this group also appears to align well with Porter's conceptualization of secondary psychopathy. The second cluster, the non-psychopathic ASPD group, was characterized by low levels of psychopathy and what appear to be moderate scores on all other indices, though the authors do not comment on the levels of constructs for this group other than psychopathy. It is somewhat interesting that the authors describe this group as a non-psychopathic ASPD group given the low scores on the lifestyle and antisocial facets, and this group may be better characterized as general offenders. The third cluster, referred to as the primary psychopathy group, was characterized by higher scores on the interpersonal and

affective facets rather than the lifestyle facet- though, again, the statistical significance of this difference was not reported- as well as low scores on harm avoidance and anxiety, and high levels of reward sensitivity. The last cluster, referred to as the fearful psychopath, was characterized by elevated levels of lifestyle and particularly affective traits as well as a prominent elevation of harm avoidance. The authors argued that this last group may be representative of Mealey's secondary psychopath as individuals in this group were more likely to have been raised in a large family than individuals in any other group[2]. The elevated level of affective traits observed in this cluster, however, appears at odds with Mealey's conceptualization.

Though three psychopathy subgroups were found, group comparisons focused on the two predicted primary and secondary groups. The secondary group exhibited significantly higher levels of internalizing and externalizing symptomatology and impulsivity than the primary group. The primary group made significantly more errors than the secondary group on a passive avoidance learning task, which appears to fall in line with Lykken's view of primary psychopathy existing on the low end of the spectrum of fear experience. When examining treatment engagement, motivation, and behaviour, the secondary group had fewer unexcused absences and higher treatment motivation than the primary group, though the two did not differ on counselor-rated levels of disruptive behaviour nor on post-treatment recidivism. The primary group was more likely to receive general institutional infractions, whereas the secondary group was more prone to aggressive misconduct during incarceration.

[2] The authors note that the fearful psychopath group was also less likely than all other groups except the secondary psychopathy group to have been raised in an intact, two parent household, though this second finding was not significant.

Skeem et al. (2007) used model-based cluster analysis, with psychopathy (PCL-R; Hare, 2003) and an index of trait anxiety as clustering variables, to examine subgroups of violent offenders with clinical psychopathy (PCL-R ≥ 29), resulting in a two cluster solution that the authors argued reflected primary and secondary psychopathy. The two groups did not differ on levels of antisocial behaviour; despite this, the secondary group had lower total levels of psychopathic traits, with significantly lower scores on all facets except the antisocial facet, and greater anxiety than the primary group, though mean total PCL-R scores for both groups fell above 30. Compared to the primary group, the secondary group exhibited higher levels of borderline traits, irritability, social withdrawal, and major mental illness, and lower levels of assertiveness and global clinical functioning. The two groups did not differ on impulsive or narcissistic traits. The higher level of psychiatric comorbidity appears consistent with Karpman and Arieti's views of secondary psychopathy resulting from an underlying non-psychopathic pathology.

Vassileva et al. (2007) performed k-means and Ward's cluster analysis on a sample of adult male inmates. Two measures of psychopathy (PCL-R; Hare, 2003; Interpersonal Measure of Psychopathy [IM-P]; Kosson et al., 1997) and indices of trait anxiety and substance use were used as clustering variables. Four clusters were identified. The first cluster, labeled secondary psychopathy, was characterized by more severe substance abuse problems, higher anxiety, and the highest Factor 2 scores compared to all other clusters. The second cluster, referred to as non-psychopathic criminals with alcohol and drug problems, exhibited substance abuse but not dependence as well as low levels of psychopathy and below average levels of anxiety. The third cluster, labeled primary psychopathy, had average Factor 2 scores but elevated Factor 1 scores and levels of interpersonal traits, as well as less severe (though still present) substance abuse and

lower anxiety than the secondary psychopathy cluster. The fourth and last cluster, referred to as criminals with features of psychopathy, exhibited an absence of substance abuse problems and levels of psychopathic traits lower than those of the primary and secondary clusters but higher than those of the other non-psychopathic cluster; this cluster may be representative of individuals with ASPD but not psychopathy. Secondary psychopaths exhibited greater criminal versatility and more non-violent charges than either of the non-psychopathic clusters. Primary psychopaths had the greatest number of violent charges out of all four clusters, as well as greater criminal versatility and more incarcerations than the non-psychopathic clusters.

Swogger and Kosson (2007) performed k-means cluster analysis on a sample of White adult male inmates using the same clustering variables as Vassileva et al. (2005), though the authors used a three factor model of psychopathy as opposed to the two factor model utilized by Vassileva et al. (2005). Analyses indicated the presence of four clusters, referred to as low psychopathology criminals, criminals with negative affect, primary psychopaths, and secondary psychopaths. Low psychopathology criminals exhibited substance abuse but were otherwise characterized by low levels of all other clustering variables. Criminals with negative affect were characterized by substance abuse and moderate anxiety and a similar pattern of psychopathic traits as the low psychopathology criminals. Primary psychopaths exhibited mild substance abuse and moderate anxiety, as well as higher scores on the IM-P and interpersonal and affective facets of the PCL-R than all other clusters and higher scores on the behavioural dimension of the PCL-R than either of the two previous clusters. Secondary psychopaths were characterized by high levels of anxiety and considerable substance abuse, elevated behavioural features of psychopathy compared to the non-psychopathic clusters, and lower levels of affective psychopathic traits than the primary psychopathy cluster. Men in the primary psychopathy cluster had a greater number

of violent charges than all other groups, whereas the secondary psychopathy group had a greater number than only the criminals with negative affect. Both psychopathy clusters exhibited greater criminal versatility and displayed more symptoms of ASPD than than the non-psychopathic clusters. Only the secondary cluster exhibited a greater number of CD symptoms than the non-psychopathic groups.

Swogger et al. (2008) attempted to replicate the findings of Swogger and Kosson (2007) in a sample of African American adult male inmates using the full range of scores on a three factor model of psychopathy. A total of six clusters were identified: primary psychopaths, secondary psychopaths, low psychopathology criminals, anxious antisocial criminals, alcohol dependent criminals, and drug dependent criminals. The primary psychopathy cluster was characterized by moderately low anxiety scores, moderate substance abuse, high levels of interpersonal and affective psychopathic traits, and slightly elevated lifestyle traits; the elevation of Factor 1 traits in this group appears in line with Mealey's conceptualization of primary psychopathy. The secondary psychopathy cluster had moderately high anxiety and substance abuse scores, and high scores across all dimensions of psychopathy; it is interesting to note that, though the total scores were similar, this group had slightly higher total PCL-R scores than the primary group, a finding that does not appear in line with conceptualizations of primary versus secondary psychopathy. The significance of this difference was not reported by the authors however. The low psychopathology criminals exhibited drug abuse and, to a lesser degree, alcohol abuse, but very low anxiety and no elevations on any dimensions of psychopathy. The anxious antisocial criminals were characterized by very high levels of anxiety and moderately high levels of affective and lifestyle psychopathic traits. Alcohol dependent criminals exhibited high levels of anxiety and alcohol dependence, but moderate to low scores across all

psychopathy dimensions. Lastly, drug dependent criminals were characterized by drug dependence, moderate anxiety, and low levels of psychopathic traits.

Both primary and secondary psychopathy clusters had a greater number of violent and non-violent charges than the low psychopathology criminals and greater criminal versatility than both low psychopathology criminals and anxious antisocial criminals. This pattern is in line with Karpman's view that, in regards to antisocial behaviour, primary and secondary variants of psychopathy were more similar than they were different. Additionally, the primary psychopathy cluster also had a greater number of non-violent charges than the anxious antisocial criminal cluster. Primary psychopaths had more symptoms of ASPD than low psychopathology criminals and drug dependent criminals, and more CD symptoms than low psychopathology criminals. Secondary psychopaths exhibited a greater number of ASPD and CD symptoms than all clusters except for the primary psychopath cluster.

Dhingra et al. (2015) examined subtypes of psychopathy in a civil psychiatric sample. An LCA of PCL:SV item scores indicated that a four class solution provided the best fit. Class 1 was characterized by a high probability of endorsing all psychopathy items, suggesting a class of prototypical psychopathic individuals, whereas Class 2 was characterized by a moderate probability of endorsing all items except for adolescent and adult antisocial behaviour. Class 3 was characterized by a high probability of endorsing antisocial-lifestyle items but a low probability of endorsing affective-interpersonal items; this appears to align with Mealey's view of secondary psychopathy or, alternatively, ASPD without psychopathy. Class 4 was characterized by a low probability of endorsing all items except lack of goals, and was held as the reference group in all subsequent analyses. These three classes had an increased likelihood of violence perpetration compared to Class 4. Classes 1 and 3 had a higher likelihood of violence

victimization and were more likely to be male than Class 4. Lastly, Class 1 had higher levels of property crime than Class 4.

Hare (2003) performed an LPA on a sample of male forensic psychiatric patients who had been administered the PCL-R, and identified four classes using the facet scores as clustering variables: a psychopath group, with elevated scores on all four facets; a callous-conning group, with elevation primary on the interpersonal and affective facets; a sociopathic offender group, with elevations primarily on the lifestyle and antisocial facets; and a general offender group, with low scores across all four facets. The profile of PCL-R facet scores for the callous-conning group appears to mirror the "successful" or "white collar" psychopathy group observed by Coid et al. (2012), and may harken to Arieti's complex or possibly dyssocial psychopath; alternatively, the elevation of Factor 1 as opposed to Factor 2 traits aligns well with Mealey's view of primary psychopathy, and the relative lack of externalizing and overtly antisocial behaviour appears largely consistent with Karpman's passive/parasitic subtype of primary psychopathy. The score profile of the sociopathic group appears reminiscent of either Mealey's secondary psychopath or ASPD without psychopathy.

Lehmann et al. (2019) conducted an LPA on a sample of German adult male violent offenders across the full range of PCL-R scores, identifying four latent groups. The prototypic group was characterized by high scores on all facets, though scores on the affective facet were noticeably lower than scores on the other three facets, scoring below the callous-conning group (discussed below) on this facet by a moderate mean difference as measured by Cohen's *d* (though no significance value was given). This is a finding that appears somewhat at odds with general conceptualizations of prototypic psychopathy. The callous-conning group was characterized by high scores on the interpersonal and affective facets and average scores on the

lifestyle and antisocial facets; similar to the findings of Hare (2003) and Coid et al. (2012), this group may harken back to Arieti's complex psychopath, his dyssocial psychopath, Mealey's primary psychopath, or Karpman's passive parasitic psychopath, though the lack of elevation on Factor 2 traits makes the appropriateness of applying Karpman or Arieti's subtypes to describe this group dubious. The sociopathic group exhibited almost the opposite pattern, with high scores on the lifestyle and antisocial facets but average scores on the interpersonal and affective facets; though the authors labeled this group as sociopathic, ASPD without psychopathy may also be an appropriate label. Mealey's conceptualization of secondary psychopathy also appears to align well with the facet score profil of this group. Lastly, the general offender group was characterized by low scores on all four facets. The authors then compared the groups on criminogenic needs (i.e., characteristics, traits, or problems that relate to an individual's risk of reoffense) and recidivism risk. Though the subtypes did not differ on criminogenic needs (i.e., education/employment, attitudes/orientation, accommodation, alcohol/drug problems), the prototypic group was at highest risk for any form of recidivism. Compared to the general offender group, all three groups were at elevated risk for general recidivism. The prototypic and sociopathic groups were also at elevated risk for violent and severe violent recidivism. The prototypic and callous-conning groups were at a higher risk for both sexual and severe sexual recidivism.

Mokros et al. (2015) identified three latent groups in a sample of adult male offenders with PCL-R scores of 27 or higher using LPA: manipulative, aggressive, and sociopathic. The manipulative group had very high mean scores on the interpersonal facet but a low mean score on the antisocial facet, whereas the aggressive group had a very high mean score on the antisocial facet and a moderately high score on the interpersonal facet; the two groups did not

differ on the affective or lifestyle facets, both scoring much higher on these facets than the non-psychopathic reference group. The sociopathic group had high mean scores on the lifestyle and antisocial facets and moderately elevated scores on the interpersonal facet but very low mean scores on the affective facet that were comparable to those of the reference group and much lower than the scores for the manipulative and aggressive groups. The sociopathic group did resemble the aggressive group in terms of antisociality, however, with scores on the lifestyle and antisocial facets that were comparable to those of the aggressive group. The manipulative group had higher average IQ and number of years of education than the aggressive group, whereas the aggressive group had a greater number of ASPD symptoms and higher levels of criminal tendencies. When pooled into a single group, referred to as the psychopathic group, the manipulative and aggressive groups had lower mean scores on behavioural inhibition and anxiety and higher levels of callous affect than the sociopathic group.

When discussing the implications of the subtypes observed, the authors argue that the manipulative and aggressive groups represent subtypes of specifically primary psychopathy, drawing parallels to Karpmans' passive/parasitic and aggressive predatory psychopaths and Arieti's complex and simple psychopaths as well as Hicks et al. (2004)'s emotionally stable and aggressive subgroups. The sociopathic group was seen as aligning with Karpman and Arieti's views of secondary psychopathy. The authors argue that, though this group would be considered "psychopathic" by some researchers based on PCL-R ratings, the relative lack of affective features appears at odds with conceptualizations of psychopathy as a construct and thus such individuals are not actually psychopathic. Such a group may represent ASPD without psychopathy, and the authors state that the presence of this group may be due to their use of a

PCL-R cutoff score that was somewhat lower than customary, noting that this group was not observed when analyses were run using a cutoff score of 30 as opposed to 27.

Several patterns of finding emerge from the literature. As would be expected based on theories of psychopathy subtypes, classes labeled as secondary in the literature tended to have higher levels of comorbid psychopathology, particularly anxiety/negative affectivity, substance abuse/externalizing pathology, and trauma. This comorbidity aligns well with several theories of secondary psychopathy, such as Porter's theory of secondary psychopathy resulting from a dissociative trauma response and both Karpman and Arieti's view of secondary psychopathy as resulting from an underlying non-psychopathic pathology. Additionally, these groups tended to have elevated Factor 2 traits compared to Factor 1 traits, which aligns well with Mealey's conceptualization of secondary psychopathy. It is possible, however, that subgroups with high levels of Factor 2 traits but low levels of Factor 1 traits may represent ASPD without psychopathy as opposed to secondary psychopathy; this is particularly highlighted by the disappearance of such a group in the Mokros et al. (2015) study when participants were restricted to those scoring 30 or higher on the PCL-R (i.e., individuals customarily considered to have clinical psychopathy) as opposed to those scoring 27 or higher.

In regards to primary psychopathy, many studies assigned this moniker to groups that were observed to have generally elevated levels of psychopathic traits, often with Factor 1 traits elevated compared to Factor 2 traits, and several studies identified a group with high levels of Factor 1 traits but low levels of Factor 2 traits. It should be noted that, though the idea of Factor 1 traits being central to primary psychopathy as opposed to Factor 2 traits has become relatively pervasive in the empirical literature, Mealey's theory of primary versus secondary psychopathy is the only such theory to assert that only Factor 1 traits are necessary for an individual to be

classified as a primary psychopath. Such a group may potentially align with several different conceptualizations of primary psychopathy. Interestingly, several studies identified groups that appear to possibly mirror specific subgroups within the broader category of primary psychopathy, suggesting that while many more modern conceptualizations of psychopathy subtypes focus primarily on the primary versus secondary distinction, a finer and more nuanced distinction may also be beneficial to consider.

Overall, though there is significant evidence consistent with the presence of subgroups within psychopathy, there is little agreement on the number or nature of these groups. The number of groups found ranges from two to six, and the variation between studies on how psychopathy was measured, the clustering/grouping variables used, and the statistical analyses conducted makes true comparisons difficult. Furthermore, some studies only examined participants who had elevated levels of psychopathic traits (i.e., Hicks et al., 2004; Blagov et al., 2011; Drislane et al., 2014) whereas others included the full range of such traits, further complicating any attempts to fully compare findings. The type of sample used also differed across studies, with some studies examining incarcerated individuals whereas others examined community samples. The differences between forensic and non-forensic populations may impact the number and nature of subtypes observed in each respective sample, particularly given the difference in psychopathy prevalence between the two; with an estimated prevalence of .03-2% in the general population (Partick & Drislane, 2015) but 15-25% in incarcerated populations (Woodworth & Porter, 2002), some subtypes of psychopathy- particularly more prototypical or severe presentations- may be more easily observable in forensic populations. The higher prevalence may also allow for more nuanced distinctions between subtypes of psychopathy than may be possible in samples with lower prevalence.

Interpretation of the literature is also further complicated by often inconsistent language used to describe the subgroups identified, an issue that was also present in the adolescent literature. Many authors, such as Vassileva et al. (2007) and Skeem et al. (2007), explicitly referred to at least a subset of their observed groups as primary and secondary psychopathy, drawing on the theoretical foundations laid by individuals such as Arieti and Karpman. Others, however, such as Boduszek et al. (2017), referred to their subgroups with more descriptive and less theoretically based language. Still others, such as Lehmann et al. (2019) and Mokros et al. (2015), utilize the term "sociopathic" when discussing what is traditionally referred to as secondary psychopathy, arguing that the term "secondary" does not make clinical sense as the etiological and developmental differences between primary and secondary psychopathy mean, in the authors' view, that secondary psychopathy should not be considered "psychopathy" in the traditional sense. It should be noted, however, that there is a long clinical history of the use of the term "secondary" to refer to a symptom(s) or disorder(s) that is present as a result of another disorder, a use that aligns with theoretical perspectives that view the psychopathic traits in secondary psychopathy as developing from non-psychopathic pathology (i.e., Karpman, Arieti, Porter). As such, the current study will utilize the term "secondary psychopathy."

Despite the large and growing body of empirical literature on subtypes of psychopathy, few solid conclusions can be drawn. Though the literature is generally consistent with the presence of subtypes within psychopathy, the above mentioned methodological and linguistic inconsistencies cloud any possible interpretations. Many studies do appear to find subtypes labeled as primary and secondary, however, and these groups often behaved in the theoretically predicted manner, with individuals in secondary groups generally exhibiting higher rates of substance abuse, trauma, anxiety/negative affectivity, and general psychiatric comorbidity.

Psychopathy in Individuals with Sexual Offenses

The relationship between psychopathy and sexual offending has long been an area of interest for researchers and clinicians. The terms “sexual psychopath” and “sexual psychopathy” were often used in the early to mid 20th century to refer to paraphilic offenders or offenders with generally deviant sexual activity; Karpman (1951) attempted to narrow the term to describe sexually deviant individuals whose deviancy was antisocial, criminal, and bore many of the interpersonal and affective hallmarks also observed in his aggressive/predatory subtype of primary psychopathy such as impulsivity, selfishness, lack of moral responsibility, uncontrolled aggression, and difficult interpersonal relationships. Furthermore he emphasized the centrality of sex in the motivation of the sexual psychopath’s behaviour, describing such individuals as having “a compulsive, insatiable, unremitting, unbridled (one might say inexorable), unrelenting [sex] drive that gives the man no rest or peace” (p. 191), arguing that even antisocial behaviour that appears at first glance to not be sexually motivated (i.e., homicide, aggravated assault) ultimately had sexual motivation for these individuals. An increased focus on sexual psychopathy was also prevalent in the legal arena during this time, with multiple “sexual psychopath” laws being passed in the United States during the early to mid 20th century to address individuals who exhibited repeated, compulsive sexual offending behaviours (Karpman, 1951; Freedman, 1987). It should be noted, however, that Karpman found the term “sexual psychopath” to often be overapplied and viewed sexual psychopathy as being a severe- if very particular- form of neurosis rather than psychopathy itself (Karpman, 1951). In his view, the antisocial and criminal behaviour seen in individuals labeled as sexual psychopaths was simply an extreme version of the behaviour seen in paraphilic neuroses; though, he argued, the disorders diverged early in development, they ultimately shared the same genesis. Thus though the sexual

psychopath shared many behaviours and characteristics with the aggressive psychopath, Karpman's arguments place such individuals under the category of secondary psychopathy as their behaviour is motivated by an underlying non-psychopathic pathology.

The concept of a sexual psychopath has continued to garner attention and research into the 21st century. These individuals are viewed as being qualitatively different from other individuals who commit sexual offenses in terms of offending patterns and motivations, with these differences often viewed as being driven by the presence of psychopathic traits (Porter et al., 2000), a distinct departure from Karpman's view that the behaviours of the sexual psychopath were ultimately motivated by an underlying neurosis rather than psychopathy. Furthermore, in contrast with Karpman's view of the sexual psychopath as motivated by uncontrollable sexual desires even when committing seemingly non-sexual crimes, Porter et al. (2001) argued that sexual offenses perpetrated by sexual psychopaths were not, in fact, sexually motivated. Instead, these offenders were motivated by thrill- and sensation-seeking as well as a proneness to boredom; this differentiated them from other individuals with sexual offenses, whose offenses were often motivated by anger or paraphilias. This desire for sensation-seeking and proneness to boredom as central features of these individuals' sexual offending results in more diverse victim profiles and versatile offending behaviour than is often seen in other individuals with a history of sexual offending (Porter et al., 2001).

Much of the literature examining the relationship between psychopathy and sexual offending has focused on the role of psychopathy in both sexual and general recidivism, with evidence suggesting that psychopathy is a better predictor of general as opposed to sexual recidivism (i.e. Serin et al., 2001; Langton et al., 2006; Olver & Wong, 2006). There has also been literature examining the relationships between psychopathy and both sexual violence and

sex crime behaviours. Psychopathy is associated with both self-reported and criminally prosecuted sexually coercive behaviour (Wood, 2019), and psychopathic traits appear to play a significant role in the etiology of sexually coercive behaviour against women (Knight & Sims-Knight, 2016). Despite its associations with sexually coercive behaviour psychopathy appears to serve as a better predictor of general or violent recidivism as opposed to specifically sexual recidivism (Hanson & Morton-Bourgon, 2005, Olver & Wong, 2006), though it may interact with other predictors of sexual recidivism such as sexual deviance (Olver & Wong, 2006; Hawes et al., 2013).

Examinations of the relationship between psychopathy and sexual offense characteristics have revealed a complex set of findings. Higher levels of psychopathic traits appear to be generally related to greater levels of sexually assaultive behaviour (Coid, 1992; Krupp et al., 2012), but this relationship becomes more complicated when victim age is taken into account. Adult rapists and offenders with multiple/mixed victim profiles (i.e., both child and adult victims) appear to exhibit higher levels of psychopathic traits, whereas individuals who sexually offended against exclusively child victims tend to have lower levels of such traits (Serin et al., 1994; Forth & Kroner, 1995; Rice & Harris, 1997; Porter et al., 2000; Stinson et al., 2005; Olver & Wong, 2006)[3]. In fact, individuals with child victims appear to have lower levels of psychopathy than general non-sexual offenders (Olver & Wong, 2006); however, despite lower overall scores, individuals with child victims do not appear to significantly differ from adult offenders on the interpersonal and affective features of psychopathy (Porter et al., 2000; Olver & Wong, 2006; Sohn et al., 2020), suggesting that the differences in total scores between

[3] Though not directly relevant to the current investigation, this differential effect of victim age appears to also be present when examining the retrospective predictive validity of psychopathy on sexual recidivism, with postdictive power being higher for adult rapists as opposed to child molesters (Parent et al., 2011).

individuals with child victims and adult offenders may be driven primarily by the lifestyle and antisocial features. Psychopathy still appears to be dimensionally distributed within child offenders, however (Walters et al., 2016), and child offenders with high levels of psychopathy have a greater number of sex offenses compared to their low psychopathy counterparts (Olver & Wong, 2006).

Despite the longstanding interest regarding the relationship between psychopathy and sexual offending, only one study to date has examined subtypes of psychopathy in a sample of individuals with sexual offenses. Krstic et al. (2018) conducted an LPA on a sample of 958 adult males convicted of sexual offenses followed by external validation based on crime scene behaviour (i.e., violence, physical control, sexual behaviour, paraphilic behaviour). The sample included individuals with the full range of file-rated PCL-R scores, with facet scores being used as the clustering variables. Model results indicated that a four-class solution provided the best fit, and the authors referred to these subtypes as: prototypic, characterized by elevations on all four facets and the highest mean total PCL-R score of the four subtypes; callous-conning, characterized by elevations on the interpersonal and affective facets but relatively low scores on the lifestyle and antisocial facets; sociopathic, characterized by relative elevations on the affective and lifestyle facets and high scores on the antisocial facet but low scores on the interpersonal facet; and general offender, characterized by relatively low scores on all four facets.

Following the LPA, the authors used ratings of crime scene behaviour derived from archival information for external validation of the observed subtypes, conducting one-way ANOVAs and post-hoc follow-up analyses (Krstic et al., 2018). These ratings provided measurements of violence (mean severity of expressive violence before, during, or after the

sexual assault, including sadistic mutilation of sex organs), physical control (mean number of instances of blindfolding, gagging, and/or tying up the victim), sexual behaviour (mean number of instances of the offender performing cunnilingus on the victim, the victim performing fellatio on the offender, and the victim masturbating the offender), and paraphilic behaviour (mean number of instances of exhibitionism and voyeurism). Prototypic offenders were rated significantly higher than all three other subtypes on violence. In regards to sexual behaviour, general offenders scored significantly higher than sociopathic offenders and somewhat higher than prototypic offenders, though the second difference fell short of significance ($p = .071$). A significant effect of subtype was found for physical control, though post-hoc analyses only revealed a non-significant trend suggesting higher scores for prototypic offenders compared to general offenders. A significant contrast indicated that callous-conning offenders appeared to engage in more paraphilic acts than sociopathic offenders ($p < .05$), though the main effect of subtype fell short of statistical significance ($p = .056$).

Krstic et al. (2018)'s findings appear to align with at least some of the prior subtype findings in community and general offender samples suggesting that some of the subtypes observed in such populations may generalize to a more specific population of individuals with sexual offenses, though the previously discussed methodological limitations make comparisons difficult. The callous-conning and sociopathic subtypes are particularly interesting as they are not prototypical expressions of psychopathy, and yet their presence has been observed in several studies. It is interesting to note, however, that the subtype labeled sociopathic in Krstic et al. includes a relative elevation on affective traits of psychopathy in addition to lifestyle and antisocial traits; subtypes labeled as sociopathic in previous studies have generally been characterized by high levels of Factor 2 traits and low levels of Factor 1 traits, including

affective traits. Whereas the second profile (i.e., high Factor 2, low Factor 1) may represent ASPD without psychopathy rather than a subtype of psychopathy itself, the presence of affective traits in Krstic et al. (2018)'s sociopathy subtype suggests that it may represent a subtype of psychopathy itself. The high levels of antisocial behaviour combined with the lifestyle and affective traits of psychopathy but without the interpersonally deceitful and manipulative traits appear to possibly mirror Karpman's aggressive/predatory psychopath.

Given that this is the only study to date to examine subtypes in a sex offense-specific sample, replication in an independent sample is necessary before any conclusions may be drawn. Additionally, the inclusion of measures of internalizing and externalizing pathology as variables for external validation may be beneficial; though these variables are not related to sex offense-specific behaviour they have more readily apparent theoretical implications. Furthermore, they are commonly used external correlates in the broader psychopathy subtyping literature and their inclusion may make drawing comparisons easier and more accurate. The use of sex offense-specific variables in external validation provides important information that bears on the specialized nature of this population; however, such variables limit the generalizability of latent group interpretations to broader populations. As such, the current study included external validation on variables that are both sex offense-specific and indices of internalizing, externalizing, and non-psychopathic personality pathology.

Factor Mixture Modeling

Though LPAs and LCAs are common analyses utilized to investigate subtypes of psychopathy, they are not without their limitations. Both LPAs and LCAs, as well as many modern MCAs, assume local independence: that is, scores on observed variables are assumed to be uncorrelated with each other and do not covary within classes (Hicks et al., 2017; Lubke &

Muthén, 2005; Clark et al., 2013; Hallquist & Wright, 2014). In these analyses, all covariance is modeled to be resulting from differences *between* classes rather than *within* them; though there may be covariance observed between the observed variables, this variance is assumed to be due to the latent variable, and any within-class covariation after the latent classes have been extracted is viewed as error (Lubke & Muthén, 2005). In reality, however, such lack of within-class covariance is often not the case (Hallquist & Wright, 2014). Because LPAs and LCAs do not typically account for dimensionality within subgroups, assuming instead that each group is homogenous rather than representing a distribution of profiles on the observed variables, such analyses may result in the imposition of categorical cutoffs within dimensional traits and thus overestimate the number of meaningfully distinct subgroups within a population (Hallquist & Wright, 2014).

Factor mixture models (FMMs) provide a possible solution to this issue. Whereas LPAs and LCAs are entirely person-centered approaches, FMMs are a hybrid approach that incorporates aspects of both person- and variable-centered analyses. Unlike LPAs and LCAs, which have a single categorical outcome representing class membership, FMMs involve both a categorical variable and one or more continuous variables (Lubke & Muthén, 2005). By allowing the underlying structure of the construct being investigated to be both categorical and dimensional, FMMs allow for both classification of individuals into discrete groups as well as modeling within-group heterogeneity (Clark et al., 2013). This makes FMMs particularly well-suited to model data where there is reason to believe the observed variables in question are correlated with each other or may load onto a higher order dimensional factor (Hallquist & Wright, 2014; Hicks et al., 2017). This may be of particular importance given the factorial nature of psychopathy, particularly when measured using the PCL-R, as in the current study, or any

measure of psychopathy for which the lower order scales are correlated with each other or load onto a higher order construct. As can be seen in many of the previously discussed articles, subtyping studies of psychopathy examine the construct at either the factor or, more recently, facet level; both the factors and facets, however, are viewed by most as ultimately loading onto the higher order dimensional construct of psychopathy. Furthermore, as would be expected of subcomponents of a broader construct, scores on the subcomponents of psychopathy are correlated with each other (Neumann et al., 2015; Krstic et al., 2018). As such, using analyses such as traditional MCAs, LCAs, and LPAs to examine psychopathy subtypes may yield inaccurate results as such analyses do not allow for the higher-order dimensional nature of psychopathy or for covariation between the facet ratings.

FMMs have been utilized in various aspects of psychopathology research, such as understanding subtypes of borderline personality disorder, subtypes of alcohol dependence, and the latent structure of health anxiety (e.g. Kuo et al., 2008; Asmundson et al., 2012; Conway et al., 2012; Hallquist & Pilkonis, 2012; Johnson & Levy, 2019). Only one study to date, however, has investigated subtypes of adult psychopathy through an FMM. Mokros et al. (2020) estimated both a latent class factor-analytic model (LCFA) and an FMM in a sample of 1,266 Austrian adult male violent and sexual offenders, arguing that the FMM may be more appropriate due to inter-correlations between the PCL-R factor scores. It should be noted that, though an LCFA is a form of FMM, such a model still assumes that within-class factor covariance is zero and thus carries the same possible limitations of an LPA or LCA (Clark et al., 2013; Mokros et al., 2020). LCFA models with up to 12 classes were estimated, with a five-class model ultimately determined to be the best model as it was both sufficiently well-fitting while still parsimonious, with the addition of a sixth latent class not resulting in significant model improvement. These

classes were identified as: prototypical psychopaths (LC4), with high mean scores on all four facets; sociopaths (LC5), with relatively high means on the lifestyle and antisocial facets but comparatively low means on the interpersonal and affective facets; callous-conning offenders (LC2), who had interpersonal and affective facet scores comparable to those of the prototypical psychopaths but much lower lifestyle and antisocial facets; and two groups consisting of general offenders (LC1 and LC3), with one group having relatively higher affective and somewhat higher interpersonal facet scores compared to the other general offender group. Up to three latent classes were estimated for the FMM, with a two-class solution determined to be the best-fitting model. The classes identified in the FMM were described as general offenders (LC1) and antisocial/psychopathic offenders (LC2). Between-model comparisons of BIC values indicated that, in line with the authors' predictions, the FMM did indeed more accurately represent the data than the LCFA model. This suggests that the greater number of classes found in the LCFA may have been due to the LCFA's inability to model within-group heterogeneity rather than the observation of actual distinct subgroups.

When compared to each other, antisocial/psychopathic offenders exhibited higher scores on all four facets of the PCL-R than general offenders, though the size of this effect differed between facets. Specifically, a large effect was found for the antisocial and lifestyle facets (Cohen's *d*s = 3.57 and 1.61 respectively), a medium effect was found for the interpersonal facet ($d = .50$), and a small effect was found for the affective facet ($d = .35$). Additionally, the antisocial/psychopathic group exhibited higher rates of both general and violent recidivism than the general offender group.

The Mokros et al. (2020) study was the first to apply FMM to the examination of subtypes within psychopathy, and the results raise several important implications and

possibilities. On a purely computational and analytic level, these results suggest that the statistical analyses commonly utilized in the subtyping literature may not be the most accurate or appropriate investigative approach. The assumptions involved in LPAs, LCAs, and MCAs, specifically the assumption of local independence, may be imposing restrictions that are incongruent with the reality of the data. As such, the results of such analyses may be inaccurate and misleading; this, along with the previously discussed methodological inconsistencies, may be one possible factor underlying the disagreement in the literature regarding both the number and nature of psychopathy subtypes.

The possible theoretical implications of the Mokros et al. (2020) findings are also important to consider. In their sample, the groups provided by the FMM did not differentiate between psychopathic subtypes at all. As was previously discussed, the limitations of traditional LPAs and LCAs may result in the imposition of arbitrary categorical cutoffs on dimensional constructs when applied to data for which the assumption of local independence does not hold, and thus result in more latent groups than are actually present in the sample. If FMMs are indeed a more appropriate analysis compared to LPAs or LCAs, it is possible that some- or even all- of the subtypes identified in the prior literature may reflect this issue rather than the existence of distinct subtypes. However, given that this study was the first of its kind to examine this statistical issue, it was important to test the robustness of the findings and replicate them in independent samples before drawing concrete conclusions.

Study Aims

Aim 1: Evaluate the appropriateness of a latent profile analysis versus a factor mixture model

Traditionally, PCL-R facet profiles have been examined through latent profile or class analyses or cluster analyses. Mokros et al. (2020) argued, however, that FMMs may more accurately represent the facet-level latent groups due to the allowance of empirically derived covariance and heterogeneity within the groups. The authors ultimately found the FMM to be the better fitting model in their sample, as opposed to the LCFA. The current study aims to evaluate the robustness of this finding in an independent sample in order to better understand how to best statistically model psychopathy subtypes. Furthermore, the current study examined a sex offense-specific sample to address the current dearth of literature examining psychopathy subtypes in this population.

Aim 2: External validation of the observed latent groups

After the most appropriate model has been determined, external validity of the resulting latent groups will be assessed. The external variables assessed are demographic characteristics (i.e. age, IQ), trait anxiety, substance use, presence of comorbid personality pathology, and offender classification based on victim ages. The inclusion of external validators that are both specific to sex offense behaviour as well as more general validators allows for latent group interpretation that bears on features specific to this specialized population while also allowing for comparison to psychopathy subtyping literature in less specialized populations.

Methods

Participants

The current study examined a pre-existing dataset of 536 adult males convicted of sexual offenses who were incarcerated in medium and maximum security prisons in New Mexico or in a residential treatment center in Wisconsin. Participants were between the ages of 19 and 66, with a mean age of 37.93. Average estimated IQ was 97.31, with scores ranging from 66 to 134.

Participants had a fourth grade reading level or above, no major medical illnesses, and no history of schizophrenia. The sample size (N = 533) is in line with the guidance provided by the literature for mixture models. The findings of Nylund et al. (2007) suggest that a sample size of 500 is adequate for correct class enumeration for mixture models. Lubke and Neale (2006) provide more in-depth guidance, providing a range of within-class sample sizes for models with small and large class separation. Given that both Krstic et al. (2018) and Mokros et al. (2020) stated that their final models had a high separability of latent classes, the guidelines for models with large class separation were used for the current study. Lubke and Neale (2006) stated that, in models with large class separation, a within-class sample size of between 25 and 50 participants should be sufficient. This suggests that the current sample size of 533 is sufficient to correctly identify between 10 and 21 latent classes, should that number of classes be present. If small class separation is present, Lubke and Neale (2006) state that a within-class sample size of between 75 and 200 participants should be sufficient. Thus, even if class separation is small, the current sample size falls within the range of sufficient sample size for the correct identification of up to seven latent classes. Given that the Mokros et al. (2020) study identified a two-class FMM solution and a five-class LCFA solution and the Krstic et al. (2018) study identified a four-class LPA solution, the current sample size appears sufficiently large to examine the replicability of the findings of either study.

Measures

Psychopathy

Assessment of psychopathy was conducted using the Psychopathy Checklist - Revised (PCL-R; Hare, 2003). The PCL-R is a 20 item behavioural checklist, and scores are derived from interview information, institutional files, and behavioural observations. Total scores are used to

indicate the overall level of psychopathic traits and can be broken down into four facets: interpersonal, affective, lifestyle, and antisocial. The PCL-R, both at the total and facet level, has moderate to excellent interrater reliability and has been cross-validated in multiple samples (Blais & Ritchie, 2016; Hare, 2020).

Anxiety

The relationship between psychopathy and anxiety has long been of interest to researchers and clinicians, appearing in both early formulations of primary versus secondary psychopathy (Karpman, 1946) and later theoretical formulations such as Lykken's low fear hypothesis (Lykken, 1995). Anxiety in the current sample was assessed using the State-Trait Anxiety Inventory (STAI; Spielberger, 1989). The STAI has been shown to have good internal consistency and has been validated in multiple samples (Julian, 2011).

Substance Use

The co-occurrence of substance use disorders (SUDs) with psychopathy is a phenomenon of which researchers and clinicians have long been aware (Ellingson et al., 2018). Though often assessed separately, there is significant overlap between the two constructs (Hare, 2003; Patrick et al., 2005; Blonigen et al., 2010), with the strongest associations generally having been found between SUDs and the impulsive and antisocial traits of psychopathy (Smith & Newman, 1990; Patrick et al., 2005; Walsh et al., 2007; Ellingson et al., 2018). Substance use in the current sample was assessed using the substance abuse and dependence module of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First et al., 1997). A subset of participants was administered the substance abuse module of the SCID-5-RV (First et a., 2015). Alcohol use disorder, cannabis use disorder, stimulant use disorder, sedative/hypnotic/anxiolytic use disorder, opioid use disorder, and other substance use disorder was examined in the current

study. The SCID-I has moderate to excellent interrater reliability (Lobbestael et al., 2011) and is widely accepted as a valid measure of substance use (Kellogg et al., 2003; Lobbestael et al., 2011); to the author's knowledge, no reliability or validity data are currently available for the SCID-5-RV (American Psychiatric Association Publishing, n.d.; Columbia University Department of Psychiatry, n.d.).

Non-Psychopathic Personality Pathology

Given generally high levels of comorbidity between personality disorders, it is not surprising to find associations between psychopathy and other personality disorders, with particularly strong associations seen for antisocial, narcissistic, histrionic, and borderline personality disorders (Hare, 2003; Klipfel et al., 2017). Comorbid personality pathology in the current sample was assessed using the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II; First et al., 1994). All DSM-5 personality disorders with the exception of Unspecified Personality Disorder were coded as present or absent, and the number of criteria met for each disorder was provided for all personality disorders assessed with the exception of Other Specified Personality Disorder. A subset of participants was administered the Structured Clinical Interview for DSM-5 Personality Disorders (SCID-5-PD; First et al., 2016). As with the SCID-II data, all DSM-5 personality disorders with the exception of Unspecified Personality Disorder were assessed and were coded as to whether or not criteria had been met. Both the SCID-II and SCID-5-PD have exhibited fair to excellent inter-rater reliability (Lobbestael et al., 2011; Somma et al., 2017).

Victim Demographics

Offenders were also categorized based on victim age information for a subset of the sample (approximate $N = 360$). Offenders were categorized as either adult offenders, child

offenders, or both. An "adult offender" was defined as an offender whose sex offense conviction did not specify a child in the charge and for whom the file evidence indicated the victim was an adult. A "child offender" was defined as an offender whose charge specified a minor victim. Offenders who met criteria for both adult and child offender were categorized as "mixed."

Intelligence

Two subscales of the Wechsler Adult Intelligence Test (WAIS-III; Wechsler, 1997), Vocabulary and Matrix Reasoning, were administered to estimate full scale IQ. The WAIS is considered a valid measure of intellectual functioning (Silva, 2008), and the Vocabulary and Matrix Reasoning subscales have been shown to provide a reliable estimate of full scale IQ (Ryan et al., 1999).

Results

Preliminary Analyses

Preliminary data analyses indicated that the PCL-R item scores were significantly skewed. Three participants were identified as multivariate outliers and removed from the dataset. Due to continued significant skew, a robust estimator was used in all subsequent analyses. Due to low proportions of individuals in the sample with specific personality disorder diagnoses other than ASPD, this variable was condensed to represent ASPD diagnoses versus other personality disorder diagnoses. Similarly, substance use variables were condensed into alcohol use disorder, cannabis use disorder, and other substance use disorder due to low proportions of participants diagnosed with a specific substance use disorder other than alcohol or cannabis.

Primary Analyses

Analyses were conducted following a modified version of the recommendation of Clark et al. (2013) for how to formulate and evaluate an FMM. The first step was to conduct an

exploratory factor analysis (EFA) in Mplus (version 8.7) to evaluate the fit of models with one to four factors. In line with broader literature on the factor structure of the PCL-R, items 11 and 17 were excluded from all analyses. Due to the small number of participants who received a score of 1 on item 19 (N = 16), participants who received a score of either 0 or 1 on this item were combined into a single group to allow threshold estimation in later models. Results of the EFA indicated that a four factor solution was the best fitting model (CFI = 0.94, TLI = 0.90, RMSEA = 0.05). All EFA fit indices are reported in Table 1.

Of note, though the four factor model found was similar to the traditional four-factor structure of the PCL-R, there were several differences. Factor 1 (items 1, 2, 4, 5) aligns with the traditional interpersonal facet of the PCL-R and is referred to as INT. Factor 2 (items 6, 7, 16) appears to align with a truncated version of the traditional affective facet and will be referred to as AFF-. Factor 3 (items 3, 9, 13, 14, 15, 19) appears to align with the traditional lifestyle facet plus revocation of conditional release (CR), which traditionally loads onto the antisocial facet. This factor is referred to as LIF+CR. Factor 4 (items 8, 10, 12, 18, 20) largely aligns with the traditional antisocial facet, though with the above mentioned absence of revocation of conditional release and with the addition of callous/lack of empathy (CU). This factor is referred to as ANT+CU. Factor structure of the four-factor model is reported in Table 2.

A series of LPAs were conducted in Mplus using the four factor model identified in the EFA. Four different kinds of LPAs were conducted, each with varying constraints on model parameters. Specifically, the first model was a traditional LPA and the most constrained, with factor variances constrained to be equal across profiles and covariances across profiles set to zero. The second model set covariation to zero across profiles, but allowed variances to be freely estimated across profiles. The third model constrained the variances to be equal across profiles

but allowed the covariation to be freely estimated. The fourth model allowed both the variances and covariation to be freely estimated across profiles. The models were compared on the Consistent Akaike Information Criteria (CAIC; Bozdogan, 1987), Akaike's Information Criterion (AIC; Akaike, 1974), Bayesian Information Criterion (BIC; Schwarz, 1978), Correct Model Probability (CmP; Masyn, 2013), and the Bootstrapped Likelihood Ratio Test (McLachlan & Peel, 2000). When comparing information criteria within model nests, an elbow plot method of evaluation was utilized to determine the best fitting model (Masyn, 2013).

A two-class model was identified as the best fitting model for both Model Type 1 and Model Type 6. A one-class model was identified as the best fitting model for Model Type 5; all attempts to increase the number of latent classes in Model Type 5 resulted in classes with fewer participants than free parameters. Increasing the latent class count above one in Model Type 2 resulted in a model that would not terminate normally; attempts to address this through increasing model specifications resulted in a model that ran for an extended period of time without terminating. Following consultation with Mplus support, it was decided that issues with this particular model type were indicative that it was not a good fit for the current data and that a one-class solution was the best fitting model for Model Type 2. Fit indices for all LPA models are reported in Table 3. Graphical comparison of the information criteria for Model Types 1 and 6 can be found in Figures 1 – 6.

The best fitting models of the different model types were then compared on -2 log likelihood, AIC, BIC, CAIC, and CmP to determine the overall best fitting LPA. Given that an identical one-class solution was the best fitting model for both Model Types 2 and 5, only three models were compared in this step rather than four. Comparisons indicated that the two-class

Model Type 1 model was the best fitting solution. Fit indices for cross-model type comparisons can be found in Table 4.

Next, a series of FMMs were conducted. As the one-class models were captured by the factor analysis, only FMMs with two classes were conducted. Models were compared on AIC, BIC, CAIC, BLRT, and CmP. Given that the factor analysis identified four factors and the LPA identified two classes, FMMs were conducted examining 1 factor 2 classes (1F2C) through 4 factors 2 classes (4F2C); however, the three- and four-factor models returned a class with fewer participants than model parameters, indicating those models were not appropriate. Similarly, when the 1F2C model was tested, no participants were placed in Class 2, indicating this model was not appropriate either. As such, the 2F2C model was chosen as the best fitting FMM as it was the only appropriate model. Fit indices for the 2F2C model are reported in the cross-model comparisons tables (Table 6; see below).

To allow for cross analysis comparisons, four confirmatory factor analyses (CFAs) were conducted utilizing the factor structure determined in the EFA. As was expected, the four factor model was the best fitting (see Table 5). The fit indices for the four factor CFA were then compared to the fit indices for the best fitting LPA and FMM to determine which model had the best overall fit. Contrary to expectations, the CFA outperformed both the LPA and FMM, indicating psychopathy in the current sample was best represented by a single latent class with four dimensions as opposed to a multiple latent classes. Specifically, though the -2 log likelihood and AIC favoured the two class LPA, the BIC, CAIC, and CmP favoured the four factor CFA. Comparison of the three models can be found in Table 6.

External Validation

Due to the best fitting model being the four factor CFA model, the planned external validation analyses were no longer appropriate, and a structural equal model (SEM) was conducted instead to investigate. The SEM was estimated in Mplus (version 8.7). Centered factor scores were extracted from the previous CFA and were used as the model indicators, with age and IQ included as covariates. To account for shared variance, the estimates of the psychopathy factors were allowed to correlate with each other. The estimates of the factors were also allowed to correlate with age and IQ. Scores on the STAI were included as a continuous outcome, and ASPD diagnosis, other personality disorder diagnosis, alcohol use disorder, cannabis use disorder, and other substance use disorder were included as categorical outcomes. Due to the three categories of victim profile (e.g., child, adult, mixed) and the fact that these categories are likely not equidistant from each other, victim profile was included as a nominal variable; to allow for analysis of all three categories, the SEM was estimated three times, with victim profile coded in a different order in each analysis to allow each category to be held as the reference group.

All four factors were significantly correlated with each other (*r*s = 0.29 - 0.73, *p*s < .001). In regards to demographic variables, Both AFF- and LIF+CR were negatively correlated with age (r = -0.18, p < .001; r = -0.12, p = .008 respectively). Age and IQ were negatively correlated with each other (r = -0.12, p = .003). Results indicated a negative relationship between INT scores and anxiety (b = -0.26, p = .001). Scores on ANT+CU were positively associated with the presence of ASPD (OR = 3.19, p < .001). Age was positively associated with the presence of non-ASPD personality disorders (OR = 1.055, p < .001). Cannabis use disorder was positively predicted by scores on LIF+CR (OR = 1.74, p = .001) but negatively predicted by IQ (OR = 0.98, p = .005) and age (OR = 0.96, p < .001). Scores on ANT+CU were positively associated with

other drug use (*OR* = 1.41, *p* = .03); age was negatively associated with other drug use (*OR* = 0.97, *p* = .007). Increased scores on AFF- decreased the odds of the participant being a child offender compared to an adult offender (*OR* = 0.85, *p* = .002). All external validation results are reported in Tables 7 through 10.

Discussion

The current study aimed to examine subtypes of psychopathy within a sample of individuals with sexual offenses, a subset of offenders hitherto largely unexplored in the subtyping literature, through a comparison of statistical methods. Several unexpected results were observed. Though a four-factor model of PCL-R psychopathy was observed to be the best fitting factor model, the factor structure observed was somewhat different from the traditional factor structure. Furthermore, when compared to the best fitting LPA and FMM models, the four factor CFA model was the best fitting overall, indicating that psychopathy as measured by the PCL-R is best represented in the current sample by a single class with four dimensions. The implications of these findings are discussed below, followed by the implications of the external validation conducted on the four factor CFA model.

PCL-R Psychopathy Factor Structure

As previously mentioned, a four-factor structure was found to be the best fitting model for the PCL-R in the current sample. However, though the factor structure was similar enough to the traditional factor structure of the PCL-R to be largely recognizable, there were slight differences in the structure of all factors with the exception of INT. The traditional antisocial facet was the most affected, with the absence of one item (revocation of conditional release) and the addition of an item that traditionally loads on the affective facet (callous/lack of empathy). It should be noted that Item 19 (revocation of conditional release) did load significantly onto both

the traditional lifestyle and antisocial facets, but ultimately had a higher loading on the traditional lifestyle facet; the statistical significance of the difference was not tested. The presence of "revocation of conditional release" on what is traditionally considered the lifestyle facet, however, could make sense given the current understanding of psychopathy broadly and the PCL-R specifically. Though some probation violations (e.g., failure to report, re-arrest) align with the traditional antisocial facet, and previous criminal history negatively predicts success on probation (Olson & Lurigio, 2000), other factors such as employment, income, and both previous and continued substance use are also related to probation revocation (Olson & Lurigio, 2000; Gray et al., 2001). Such factors (e.g., employment history, substance use) are often used as information that contributes to ratings of items on the lifestyle facet (i.e., need for stimulation/proneness for boredom, parasitic lifestyle, impulsivity, irresponsibility; Hare, 2003; Walsh et al., 2007); as such, it makes sense that another item influenced by such factors may also load onto the lifestyle facet given the shared relevant criteria for both revocation of conditional release and traditionally lifestyle traits. A similar mix of aspects traditionally associated with the antisocial and lifestyle facets appear to be related to general probation violations (i.e., both sexual and non-sexual) among individuals convicted of a sexual offense (Meloy, 2005). As such, it is possible that, though revocation of conditional release appears on the surface to be an antisocial item, it may be at least partially driven by lifestyle factors. This association with lifestyle traits may in turn increase the chances that 'revocation of conditional release' loads more strongly onto the lifestyle rather than antisocial facet, at least in some populations.

The nature of the current sample may have also impacted Item 19 loading higher onto the traditional lifestyle facet compared to the traditional antisocial facet. A large portion of the current sample were individuals who had been indefinitely civilly committed following their

sexual offense. Indefinite commitment could impede these individuals' ability to score highly on this item as they may have never had the chance to be on conditional release in the first place, much less be revoked from conditional release. As such, scores on this item may have been restricted for these individuals and which may have subsequently impacted onto which facet the item loaded.

The reassignment of the "callous/lack of empathy" item from the affective facet to what is traditionally the antisocial facet is somewhat more perplexing. Similar to "revocation of conditional release," "callous/lack of empathy" cross-loaded onto two different factors: AFF-, where it would have traditionally loaded, and ANT+CU. Cross-loadings are not a new phenomenon in explorations of the factor structure of PCL psychopathy. As far back as Hare (1980)'s exploration of the original Psychopathy Checklist, which reported the loading of each item on every facet, "lack of affect and emotional depth" loaded similarly onto two different factors (loadings of .41 and .48, respectively); interestingly, though the difference in loadings for "callous/lack of empathy" on different factors in the Hare (1980) study was somewhat greater (.35 and .51, respectively) than that for "lack of affect and emotional depth", the second highest factor loading resided on the facet that would eventually become part of the traditional Factor 2. Across the five independent samples examined by Harpur et al. (1988), "callous/lack of empathy" cross-loaded across Factors 1 and 2 in two samples. When Salekin et al. (1996) examined the factor structure of the PCL-R in women inmates, the authors found cross-loadings for three different items (poor behavioural controls, impulsivity, and lack of realistic long-term goals). Furthermore, early exploratory analyses of the PCL and PCL-R factor structure did not always provide the same two factor structure put forth by Hare and colleagues (Neumann et al., 2017). Given the history of cross-loadings and alternate exploratory factor structures of the PCL

and PCL-R, it is possible that the details of the factor structure of this measure may be less solidified than they otherwise appear, at least in certain populations. While the traditional four-factor structure may provide adequate fit, the increasing use of confirmatory rather than exploratory analyses and adherence to the traditional structure may have resulted in a more unified picture than is necessarily accurate; the loading of Item 8 in the current study onto what is traditionally the antisocial facet may be reflective of this less unified picture, at least across different populations.

The factor structure of PCL-R psychopathy observed in the current study also raises the interesting possibility that, though psychopathy may function similarly in individuals with sex offenses as it does in general or violent offender samples, there may be enough differences to warrant a different factor structure. As noted earlier, mean total, factor, and facet scores in samples of individuals with sexual offenses have been observed to differ from the mean scores observed in general or violent offender samples. Specifically, individuals with child-only sex offenses tend to evidence lower total scores than general offenders (Olver & Wong, 2006), though these differences may be driven primarily by lower scores on the lifestyle and antisocial facets as opposed to lower scores across the board on all four facets (Porter et al., 2000; Olver & Wong, 2006; Sohn et al., 2020). Differences in mean scores do not necessarily imply a different PCL-R factor structure is present for individuals with a history of sexual offending; however, a different factor structure may be one possible aspect underlying the differences in facet scores observed in this population.

Latent Subtypes

Contrary to expectations, the results of the current study indicate that the most appropriate model was one that did not include latent subgroups. This finding is at odds with the

prior literature, which has consistently reported the presence of latent subgroups of psychopathy, even if the number and nature of those subtypes is not always agreed upon. This finding is also at odds with the Krstic et al. (2018) finding, who found four latent subgroups within their sample of individuals with sex offenses.

There are several differences between the current study and the Krstic et al. (2018) study that may be impacting the difference in findings. The first is the nature of the sample itself. Though the samples were extremely similar in terms of age (M = 37.93, SD = 10.01 current sample; M = 37.83, SD = 11.46 Krstic et al.), participants in the current sample had higher mean PCL-R scores (M = 22.14, SD = 6.71 current sample; M = 15.25, SD = 6.84 Krstic et al.). This difference in mean total scores appears somewhat paradoxical; it would seem that a higher prevalence of psychopathic traits would increase the likelihood of observing latent classes if they were present, but no such classes were observed in the current study. Furthermore, one of the two samples examined in the Krstic et al. (2018) study consisted of information from individuals civilly committed between the years 1959 to 1984. The retrospective nature of this sample may have introduced cohort effects into the Krstic et al. (2018) study that are not present in the current sample. Though the sample in the current study is ultimately broadly similar to the samples examined by Krstic et al. (2018), these differences may be one possible factor underlying the difference in results between the two studies.

A second, and perhaps more important, difference between the two samples is the way in which PCL-Rs were scored. The Krstic et al. (2018) study relied entirely on archival records, meaning all PCL-Rs were scored using files only. Though file-only ratings of the PCL-R are generally considered reliable and acceptable in situations in which a clinical interview is not feasible such as when using archival data or assessing a floridly psychotic individual (Serin,

1993; Grann et al., 1998; Hare, 2003), studies utilizing this method do come with limitations. File-only reviews are reliant entirely on the quality of the file material available, and the interpersonal and affective features of psychopathy may be harder to examine when the examiner does not have the opportunity to observe the individual's interaction style (Serin; 1993; Grann et al., 1998; Hare, 2003). The possible differences in the standard of recording information, the sort of information recorded, and differing clinical practices over the intervening 40 to 60 years may have impacted overall PCL-R scores in general and potentially ratings of interpersonal and affective features specifically in the Krstic et al. (2018) study. This, in turn, may have impacted the pattern of results regarding latent subgroups and thus may at least partially explain the discrepant findings between the Krstic et al. (2018) study and the current study.

It is also worth noting that, when examining the factor structure of the PCL-R, Krstic et al. (2018) conducted a confirmatory rather than exploratory factor analysis. Given the possibility raised by the current findings that the internal structure of the PCL-R may be somewhat different for individuals with a history of sexually offending as opposed to general or violent offender samples, it is possible that the traditional CFA structure examined by Krstic et al. (2018) provided adequate but not ideal fit. More specifically, it is possible that an EFA may have revealed a factor structure different from the traditional structure of the PCL-R, which may have then impacted the latent subgroups observed.

External Validation

External validation analyses revealed several relationships that make intuitive sense. Given the overlap between ASPD and Factor 2 traits of psychopathy (Patrick et al., 1997), the positive association between ANT+CU and the presence of ASPD is unsurprising; similarly, the positive relationship between ANT+CU and other drug (e.g., not alcohol or cannabis) use makes

sense given that the relationship between psychopathy and substance use appears driven at least in part by shared constructs underlying both ASPD traits and Factor 2 traits of psychopathy (Walsh et al., 2007). The positive relationship between LIF+CR and cannabis use disorder is also unsurprising given the previously discussed association between lifestyle traits and substance use (Hare, 2003; Walsh et al., 2007). The lack of a relationship between LIF+CR and other substance use disorders is interesting; however, this may be a byproduct of all other substance use disorders besides alcohol use disorder being collapsed into a single category due to low base rates. Though necessary for the analyses, collapsing multiple substance use disorders together may have obscured more specific relationships that might otherwise have been present.

Several interesting patterns were observed when examining the association between the facets and external variables. The negative relationships between age and both AFF- and LIF+CR, as well as the positive relationship between age and non-ASPD personality pathology, are interesting. Levels of Factor 2 traits have generally been observed to decrease over the lifespan whereas Factor 1 traits generally remain more stable, and non-psychopathic personality pathology has also been observed to decrease as individuals grow older (Huchzermeier et al., 2008). As such, the negative relationship between LIF+CR and age makes sense, though the negative relationship between age and AFF- and the positive relationship between age and non-ASPD personality pathology are more surprising and raise the interesting possibility that the lifespan course of psychopathy and personality pathology more generally may be somewhat different in individuals with a history of sexual offending compared with general or violent offender populations.

The negative relationship between INT and anxiety in the current sample aligns with many contemporary views of the relationship between psychopathy and anxiety. Though the

relationship between psychopathy and anxiety is still not well understood, interpersonal and affective traits are often posited to be associated with a lack of anxiety or fear and there is some evidence that lifestyle and antisocial traits are more likely to be positively predictive of anxiety and other internalizing symptoms as opposed to interpersonal and affective traits traits (Neumann & Pardini, 2014; Derefinko, 2015); there is some evidence that greater levels of lifestyle/antisocial traits compared to interpersonal/affective traits may be related to internalizing symptomatology in individuals with sexual offense histories as well (Stinson et al., 2005). Interpersonal and affective traits, on the other hand, appear to be negatively related to internalizing pathology (Blonigen et al, 2010; Willemsen & Verhaeghe, 2012).

The relationship between AFF- and odds of being a child offender compared to an adult offender was somewhat unexpected. Though child offenders generally have lower overall psychopathy scores than adult offenders, there is prior evidence that this difference appears to be driven primarily by lower lifestyle/antisocial facet scores as opposed to interpersonal/affective facet scores (Porter et al., 2000; Olver & Wong, 2006; Sohn et al., 2020). The current results, however, suggest that higher levels of affective traits resulted in lower odds of being a child offender compared to an adult offender; put another way, as affective traits of psychopathy increased, individuals were more likely to be classified as adult offenders rather than child offenders. This may have been influenced by the slightly different structure of the affective facet in the current study as opposed to the traditional facet structure, specifically the removal of "callous/lack of empathy" from this facet. This possibility is consistent with the findings of Sohn et al. (2020), which suggested that Item 8 was one of four items on which child offenders scored higher than individuals convicted of non-sexual offenses.

Limitations and Future Directions

The current study is not without limitations. The factor analysis in the current study was conducted excluding items 11 and 17. While this is in alignment with the general practice in the field, including these items may have impacted the factor structure observed. This is especially important given the possibility raised by the current findings that the internal structure of the PCL-R may be somewhat different for individuals with a history of sexual offending compared to other offender samples. Further replication in independent samples is necessary to determine the robustness of the factor structure observed in the current study, and studies examining this may benefit from including items 11 and 17 to obtain a fuller sense of the PCL-R's factor structure in this specific subpopulation. Subsequent comparisons of factor structures obtained with items 11 and 17 and factor structures obtained without those items may be beneficial in clarifying the added benefit, if any, of including the two items in factor analyses.

Future studies may also benefit from directly comparing a factor structure identified through an EFA to the traditional four-factor model of PCL-R-based psychopathy. Idiosyncrasies within a particular data set may result in the best fitting factor structure identified in an EFA being different from the traditional structure of the PCL-R. However, if both models result in similarly adequate fit, the clinical utility of the newly identified factor structure may be unclear. The current study did not compare the best fitting EFA model to the traditional four-factor model; future studies may benefit from doing so.

It is also important to keep in mind that individuals with sexual offenses are not a homogenous group, and there is significant variability within this population. The current sample included individuals who ranged from offending exclusively against adult victims to individuals who carried a diagnosis of pedophilia and offended exclusively against children. A number of other paraphilias were also present in the sample, including exhibitionism, sexual sadism,

voyeurism, and paraphilia not otherwise specified, whereas some individuals had no paraphilic diagnosis. Though individuals with sexual offenses are generally considered to constitute a specific subpopulation compared to general or violent offenders, there is still significant variability within this population, and such variability may impede the ability of researchers to observe distinct subtypes of psychopathy within this population. Future studies may benefit from examining specific populations (i.e., individuals with a pedophilic diagnosis, individuals with contact vs. non-contact offenses) within the broader category of individuals with sexual offenses.

It is also possible that the current findings may have been influenced by idiosyncrasies specific to the current data such as age or average level of psychopathic traits. As previously noted, the average total PCL-R score in the current sample was higher than that of the Krstic et al. (2018) sample. However, this higher average level of psychopathic traits is not necessarily unusual for studies examining individuals with sexual offense histories. Sohn et al. (2020) reported a total average PCL-R score of 20.26 (*SD* = 6.90) for offenders with child victims and 22.01 (*SD* = 7.67) for offenders with adult victims, Porter et al. (2000) reported a mean PCL-R score of 24.61 (*SD* = 6.80) for their sample, and Olver & Wong (2006) reported a mean PCL-R score of 20.20 (*SD* = 7.40) for their sample. Similarly, average age within these studies ranged from 32.80 (*SD* = 9.2; Olver & Wong, 2006) to 43.60 (*SD* = 11.62; Porter et al., 2000), suggesting that the average age of the current sample (*M* = 37.93, *SD* = 10.01) was not unusual either. Sample-specific factors may always impact results to at least some degree; however, the current sample appears to be broadly similar to other samples of individuals with histories of sexual offending.

The current study provides an examination of a hitherto underexplored aspect of psychopathy. Though subtypes of psychopathy and psychopathy in individuals with a history of

sexual offending are both areas that have long held the interest of the field, subtypes of psychopathy within individuals with a history of sexual offending has remained largely unexamined until recently, and the current study suggests that it may be a more complicated topic that previously thought. The finding of a slightly different factor structure of the PCL-R and a lack of latent subgroups raises the possibility that psychopathy as measured by the PCL-R may function somewhat differently in this specific population as opposed to general or violent offender samples. A somewhat different underlying structure may in turn impact how certain aspects of PCL-R psychopathy (i.e., facets) relate to both general and sexual offense-specific external factors. Though further research is needed to replicate and more fully understand the current findings and their implications, the current study nonetheless represents a step forward in advancing our understanding of psychopathy both specifically within individuals with sexual offense histories and as a construct more broadly.

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Table 1

Exploratory Factor Analysis Fit Indices

Number of Factors	CFI	TLI	RMSEA
1 Factor	0.54	0.479	0.113
2 Factor	0.80	0.74	0.08
3 Factor	0.90	0.85	0.06
4 Factor	**0.943**	**0.90**	**0.05**

Note: CFI = Comparative Fit Index. TLI = Tucker-Lewis Index. RMSEA = Root Mean Square Error of Approximation. Bolded cells indicate the best fit across models.

Table 2

Item Loading for the Four Factor Model

	INT	AFF-	LIF+CR	ANT+CU
Item 1	**0.975***	-0.078*	-0.010	-0.015
Item 2	**0.711***	0.154	-0.056	-0.021
Item 3	0.053	0.004	**0.580***	-0.003
Item 4	**0.474***	0.195*	0.184*	0.085
Item 5	**0.368***	0.110	0.241*	0.169*
Item 6	0.029	**0.865***	-0.042	0.013
Item 7	0.101	**0.485***	0.223*	-0.209*
Item 8	0.114*	0.431*	0.166*	**0.447***
Item 9	0.024	-0.133	**0.538***	0.113
Item 10	-0.017	0.324*	0.182*	**0.532***
Item 12	0.097	0.029	0.197*	**0.511***
Item 13	-0.005	0.390*	**0.417***	-.336*
Item 14	0.029	-0.070	**0.745***	0.066
Item 15	-0.088	0.020	**0.529***	0.025

(Table 2 continued)

(Table 2 continued)

Item 16	0.094	**0.694***	-0.069	-0.094
Item 18	-0.004	-0.140	-0.029	**0.780***
Item 19	-0.029	-0.083	**0.261***	0.243*
Item 20	-0.075	-0.092	0.075	**0.553***

Note: INT = Interpersonal Facet. AFF- = Affective Facet, minus Item 8 (Callous/Lack of Empathy). LIF+CR = Lifestyle Facet, plus Item 19 (Revocation of Conditional Release). ANT+CU = Antisocial Facet, minus Item 19 (Revocation of Conditional Release), plus Item 8 (Callous/Lack of Empathy). * = significant loading. Item Loadings are bolded to indicate the facet onto which they loaded most highly.

Table 3

Latent Profile Analysis Fit Indices

Model Type	Number of Classes	-2LL	AIC	BIC	CAIC	BLRT	BLRT p-value	CmP
Model 1								
	1 Class	17345.08	17463.08	17715.51	17564.96	N/A	N/A	< .001
	2 Class	17138.15	**17266.15**	**17539.98**	**17376.661**	87.53	0.17	0.31
	3 Class	**17105.14**	17243.14	17538.35	17362.28	34.02	0.13	**0.69**
Model 2								
	1 Class	17345.08	17463.08	17715.51	17564.96	N/A	N/A	N/A
Model 5								
	1 Class	17345.08	17463.08	17715.51	17564.96	N/A	N/A	N/A
Model 6								
	1 Class	17345.08	17463.08	17715.51	17564.96	N/A	N/A	< .001
	2 Class	17106.57	**17254.57**	**17571.18**	**17382.35**	**119.11**	**0.04**	**1**
	3 Class	**17058.86**	17236.86	17617.65	17390.54	49.92	1	< .001

Note: -2LL = -2 Log likelihood. AIC = Akaike Information Criterion; assessed using elbow plot method of evaluation. BIC = Bayesian Information Criterion; assessed using elbow plot method of evaluation. CAIC = Consistent Akaike Information Criterion; assessed using elbow plot method of evaluation. BLRT = Bootstrapped Likelihood Ratio Test. CmP = Correct Model Probability. Bolded cells indicate the best fit across models.

Table 4

Latent Profile Model Comparisons

Model Type	-2LL	AIC	BIC	CAIC	CmP
Model 1 (2 Class)	17138.15	17255.15	**17539.98**	**17376.66**	**1**
Model 6 (2 Class)	**17106.57**	**17254.57**	1757.18	17382.35	< .001
Models 5 and 2 (1 Class)	17345.08	17463.08	17715.51	17564.96	< .001

Note: -2LL = -2 Log likelihood. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. CAIC = Consistent Akaike Information Criterion. CmP = Correct Model Probability. Bolded cells indicate the best fit across models.

Table 5

Confirmatory Factor Analysis

Number of Factors	-2LL	AIC	BIC	CAIC	CmP
1 Factor	17564.83	17670.83	17897.60	17709.35	< .001
2 Factors	17263.77	17371.77	17602.81	17411.01	< .001
3 Factors	17191.508	17303.51	17543.11	17344.21	< .001
4 Factors	**17150.12**	**17268.12**	**17333.27**	**17311.00**	**1**

Note: -2LL = -2 Log likelihood. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. CAIC = Consistent Akaike Information Criterion. CmP = Correct Model Probability. Bolded cells indicate the best fit across models.

Table 6

Cross-Model Comparisons

Model Type	-2LL	AIC	BIC	CAIC	CmP
4 Factor CFA	17150.12	17268.12	**17333.27**	**17311.00**	**1**
2 Factor 2 Class FMM	17261.57	17379.58	17632.01	17422.45	< .001
2 Class LPA	**17138.15**	**17266.15**	17539.98	17376.66	< .001

Note: -2LL = -2 Log likelihood. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. CAIC = Consistent Akaike Information Criterion. CmP = Correct Model Probability. Bolded cells indicate the best fit across models.

Table 7

External Validation Correlations

	INT	AFF-	LIF+CR	ANT+CU	Age	IQ
INT	-	0.73***	0.59***	0.56***	-0.06	0.07
AFF-	0.73***	-	0.52***	0.29***	-0.18***	-0.001
LIF+CR	0.59***	0.52***	-	0.78***	-0.12**	-0.02
ANT+CU	0.56***	0.29***	0.78***	-	-0.03	-0.07
Age	-0.06	-0.18***	-0.12**	-0.03	-	-0.12**
IQ	0.07	-0.001	-0.02	-0.07	-0.12**	-

Note: INT = Interpersonal Facet. AFF- = Affective Facet, minus Item 8 (Callous/Lack of Empathy). LIF+CR = Lifestyle Facet, plus Item 19 (Revocation of Conditional Release). ANT+CU = Antisocial Facet, minus Item 19 (Revocation of Conditional Release), plus Item 8 (Callous/Lack of Empathy). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8

Relationship Between Psychopathy and Anxiety

	INT *b*	AFF- *b*	LIF+CR *b*	ANT+CU *b*	Age *b*	IQ *b*
STAI	-0.26**	0.06	0.10	0.05	-0.05	0.02

Note: STAI = State-Trait Anxiety Inventory. INT = Interpersonal Facet. AFF- = Affective Facet, minus Item 8 (Callous/Lack of Empathy). LIF+CR = Lifestyle Facet, plus Item 19 (Revocation of Conditional Release). ANT+CU = Antisocial Facet, minus Item 19 (Revocation of Conditional Release), plus Item 8 (Callous/Lack of Empathy). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 9

Relationships Between Psychopathy, Substance Use, and Non-Psychopathic Personality Pathology

	INT *OR*	AFF- *OR*	LIF+CR *OR*	ANT+CU *OR*	Age *OR*	IQ *OR*
ASPD	0.92	0.89	0.99	3.19***	0.99	1.00
Other PD	1.10	0.99	0.99	0.92	1.06***	1.01
Alcohol	0.86	1.04	1.43*	1.18	1.00	0.99
Cannabis	1.02	1.00	1.74**	1.09	0.96***	0.98**
Other Drug	0.89	1.04	1.20	1.41*	0.97**	1.01

Note: INT = Interpersonal Facet. AFF- = Affective Facet, minus Item 8 (Callous/Lack of Empathy). LIF+CR = Lifestyle Facet, plus Item 19 (Revocation of Conditional Release). ANT+CU = Antisocial Facet, minus Item 19 (Revocation of Conditional Release), plus Item 8 (Callous/Lack of Empathy). ASPD = Antisocial Personality Disorder. Other PD = non-ASPD personality disorders. Alcohol = Alcohol use disorder. Cannabis = cannabis use disorder. Other Drug = substance use disorders other than alcohol or cannabis use disorder. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 10

Odds Ratio Relationships Between Victim Profile and Psychopathy

Reference Group		INT	AFF-	LIF+CR	ANT+CU	Age	IQ
Adult							
	Child	1.02	0.85**	0.77	0.98	1.00	1.00
	Mixed	1.32	1.04	0.92	0.75	0.99	0.99
Mixed							
	Child	0.77	0.82	0.84	1.31	1.01	1.01
	Adult	0.76	0.97	1.09	1.33	1.01	1.01
Child							
	Mixed	1.30	1.23	1.20	0.77	0.99	0.99

Note: INT = Interpersonal Facet. AFF- = Affective Facet, minus Item 8 (Callous/Lack of Empathy). LIF+CR = Lifestyle Facet, plus Item 19 (Revocation of Conditional Release). ANT+CU = Antisocial Facet, minus Item 19 (Revocation of Conditional Release), plus Item 8 (Callous/Lack of Empathy). Adult = offenders with adult victims. Child = offenders with child victims. Mixed = offenders with both adult and child victims. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 1

Akaike Information Criterion Values for Latent Profile Analysis Model 1

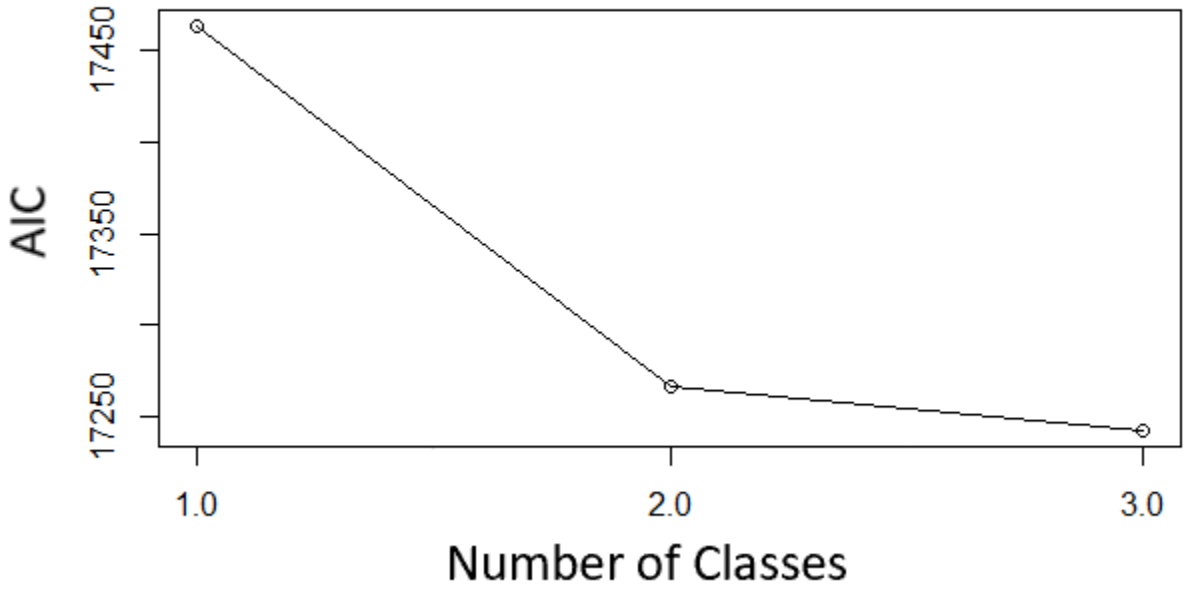

Figure 2

Bayesian Information Criterion Values for Latent Profile Analysis Model 1

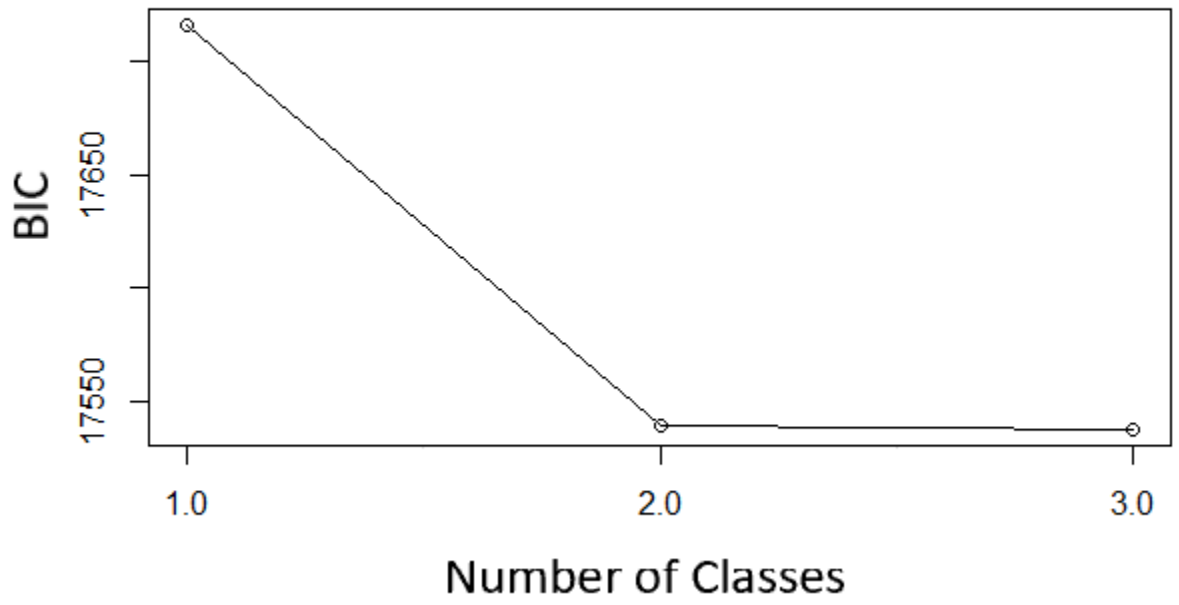

Figure 3

Consistent Akaike Information Criterion Values for Latent Profile Analysis Model 1

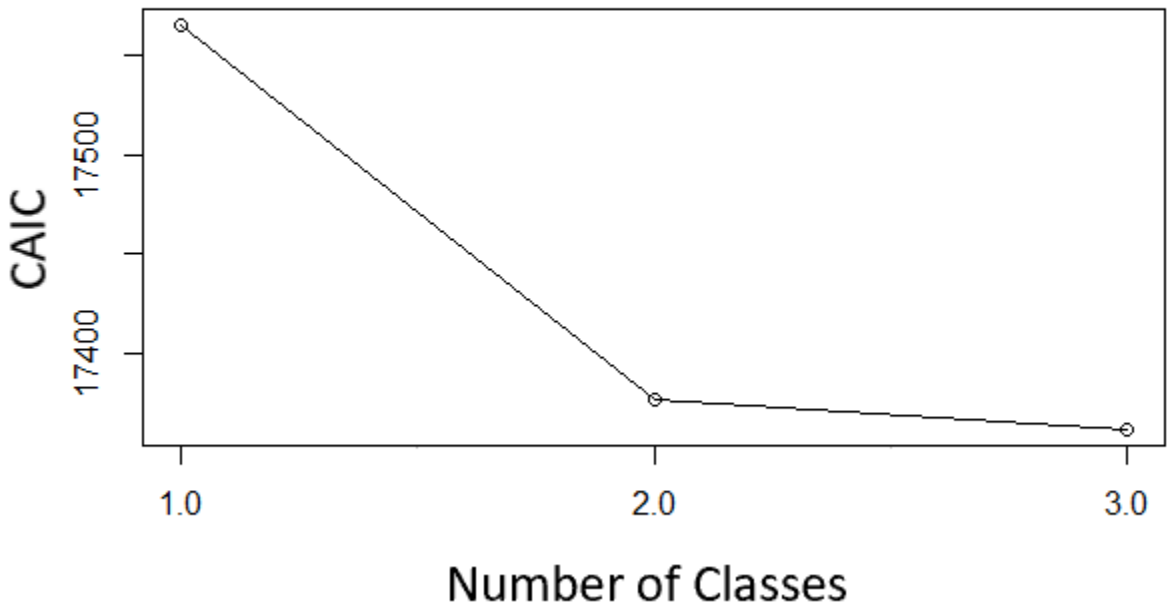

Figure 4

Akaike Information Criterion Values for Latent Profile Analysis Model 6

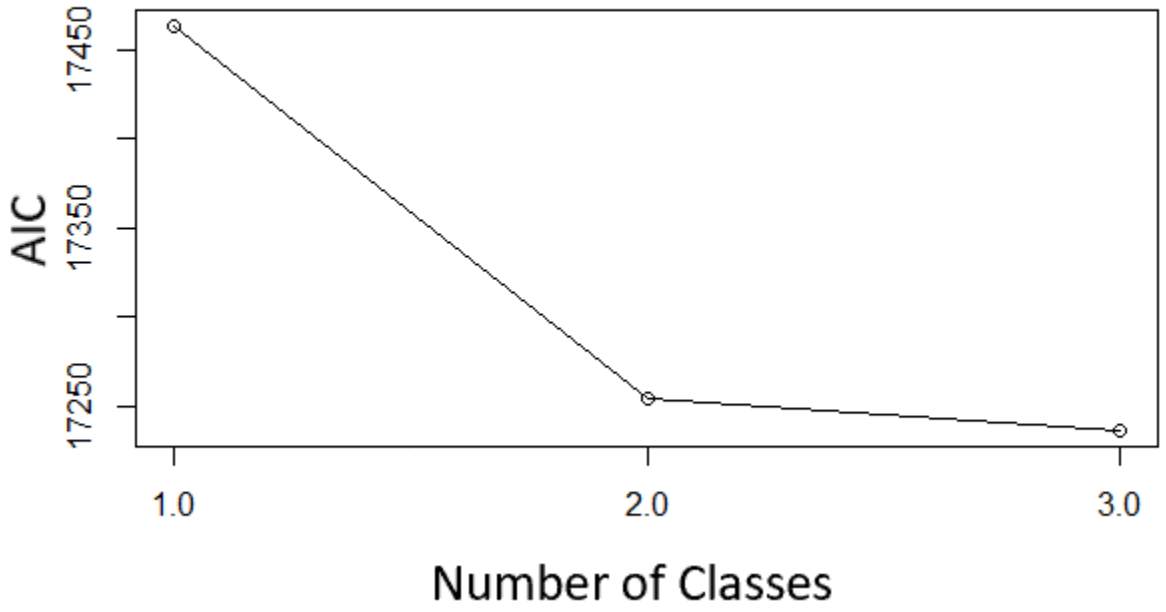

Figure 5

Bayesian Information Criterion Values for Latent Profile Analysis Model 6

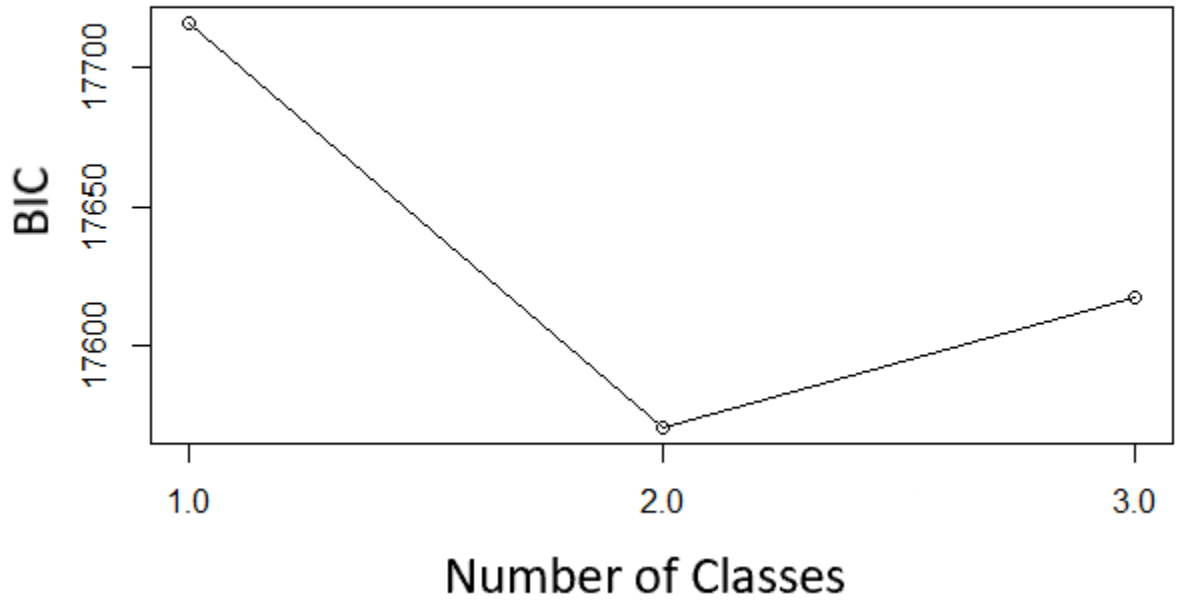

Figure 6

Consistent Akaike Information Criterion Values for Latent Profile Analysis Model 6