Master Thesis

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Personality disorders and comorbid substance use disorders in the prison population: A Norwegian cohort study

Abstract

Personality disorder (PD) and comorbid substance use disorder (SUD) is highly prevalent in the prison population and has been linked to various negative outcomes. Emotion dysregulation has been proposed as an underlying construct for psychopathology, including PD and SUD. This thesis aims to explore the relationship between emotionally unstable PD, dissocial PD, and comorbid SUD in the Norwegian prison population, based on emotion regulation theory. The aim will be explored in two parts; a theoretical part and a quantitative part based on national registry data.

The registry study part utilized data from the Norwegian Prison Release study linked with data from the National Patient Register. The cohort included 51250 individuals incarcerated in Norway between 2010 and 2019. Prevalence of PD and SUD was estimated, and logistic regression models were fitted for emotionally unstable PD and dissocial PD.

Prevalence of PD in the cohort was 8 % for PD, and of these 77 % also had SUD. The most common PDs were dissocial PD (2.6%) and emotionally unstable PD (2.7%). Being diagnosed with SUD, being male, older, convicted for homicide, violence and sexual offenses, drug and alcohol offenses or public order offenses, and having a history of multiple convictions was associated with being diagnosed with dissocial PD. Being diagnosed with emotionally unstable PD was associated with having SUD, being female, older, born in Norway, and convicted for violence and sexual offenses, public order offenses or drug and alcohol offenses.

Available treatment data indicates that PD and comorbid SUD are prevalent in the prison population. One possible explanatory mechanism for co-occurrence of criminal behaviour, PD and SUD is underlying emotion dysregulation. The association with SUD and violent behaviour among individuals with emotionally unstable PD and dissocial PD can be understood as an inflexible pattern of response-focused emotion regulation. Future studies should assess prevalence and explanatory mechanisms directly in the prison context. The prison setting can represent a unique opportunity for assessment and treatment of PD and SUD among individuals that tend not to seek treatment in public mental health care.

Keywords: Prison population, criminal behaviour, personality disorder, dissocial personality disorder, emotionally unstable personality disorder, substance use disorder, comorbidity, emotion regulation, emotion dysregulation

Preface

  The data in the current thesis is provided by the PriSUD project group, part of the Norwegian Centre for Addiction Research at the University of Oslo. It is the first research project to investigate the epidemiology and the lived experiences of people with SUD in the Nordic prison population.

  I would like to express my gratitude to Sara Kerstine Kaya Nielsen for providing invaluable feedback and giving me confidence in the writing process. This thesis would not have been possible without the generous support of Marianne Riksheim Stavseth, my external advisor at the PriSUD project, both in terms of help with statistical analysis, feedback, and interesting discussions of the material.

  I would like to thank my employer, TSB Enhet for utredning for their flexibility throughout the writing process. Special thanks also to the patients for inspiring the choice of research question, as well as making the problem statement tangible by showing me the real-life impact incarceration and comorbidity can have on one's life trajectory.

  Lastly, a huge thank you to family and friends for supporting me, both in terms of providing cookies and coffee, words of encouragement, proofreading and valuable breaks.

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1. Introduction

As of February 1st 2023, the Norwegian prison population consisted of 3045 individuals. Hereof 194 were female, 805 foreign citizens and 4 under the age of 18 years old (Kriminalomsorgsdirektoratet, 2023). Incarcerated individuals have the same legal rights as every other citizen to receive necessary health care, including psychiatric care, while serving their sentence (Pasient- og brukerrettighetsloven, 1999, § 2-1). Research indicates higher prevalence of both physical and mental health issues among incarcerated individuals compared to individuals of the same age in the general population (Binswanger et al., 2010). However, due to lack of resources both in the criminal justice system and within public mental health care, access to necessary treatment during incarceration is often limited (Hexeberg, 2023; Sivilombudet, 2023). Issues concerning mental health, including self-harm and suicidal behaviour in prison, has received increasing media attention in Norway the last couple of years (Andersen, 2023; Vevang, 2023). While the total number of persons incarcerated is falling, the proportion of individuals with a psychiatric disorder in prisons is rising (Gunter et al., 2008). According to Penrose's Law (1939), there is an inverse relationship between number of psychiatric beds and number of incarcerations, which is supported by research, although the causal pertinence has been questioned (Hartvig & Kjelsberg, 2009). The number of psychiatric hospital beds in Norway has been reduced from 5751 beds in 2002 to 3582 beds in 2020 due to a political shift towards increased utilization of psychiatric outpatient treatment (Drabløs & Trædal, 2022).

Psychiatric disorders, including personality disorders (PD) and substance use disorder (SUD), occur at higher rates among incarcerated individuals compared to in the general population (Butler et al., 2006; Butler et al., 2011; Cramer, 2014; Fazel et al., 2016; Tye & Mullen, 2006). Meta analytic findings indicate that the prevalence of comorbid psychosis and SUD is approximately 20-times, and of major depression and SUD two times, higher in prison populations (Baranyi et al., 2022). Further, the odds of having a PD or SUD are about 11 and 9 times higher in the prison population compared to the general community (Butler et al., 2006). Comorbidity between PD and SUD is associated with treatment complications for both conditions, higher drug consumption, increased risk of violent behaviour and decreased functional ability (Arefjord, 2021; Fridell et al., 2007; Scott et al., 2015). PD and SUD are associated with increased risk of incarceration, recidivism, and longer sentences compared to other psychiatric difficulties (e.g., anxiety, depression, and psychosis) (Howard et al., 2013; O'Driscoll et al., 2012; Walsh et al., 2020; Yukhnenko et al., 2023). However, the experience of incarceration and factors related to the prison setting, can also serve as independent risk

factors for developing mental health problems, irrespective of predisposing individual vulnerabilities (Walsh et al., 2020).

Emotionally unstable PD is characterized by lack of impulse control, emotional instability, violent and threatening behaviour, disturbed sense of self, uncertainty regarding values and goals, enduring sense of emptiness, self-destructive behaviour, and intense and unstable interpersonal relationships (Wilberg et al., 2020; World Health Organization [WHO], 1992). Prevalence og emotionally unstable PD is higher in the prison population compared to the general population, with estimates ranging from 5-50 % depending on assessment method and sample characteristics (e.g., Mundt & Baranyi, 2020; van den Brink et al., 2018; Wetterborg et al., 2015). Dissocial PD is characterized by a pervasive pattern of callousness, irresponsibility, dysphoria, disregard for norms and rules, relational difficulties, violent behaviour, and tendency towards rationalizing and externalizing problems, typically persisting from childhood (American Psychiatric Association [APA], 2013; WHO, 1992). Dissocial PD is estimated to be ten times as prevalent in a correctional setting compared to a community setting (Fazel & Danesh, 2002), and is associated with increased risk of violent behaviour during incarceration (Friedman et al., 2008). Co-occurring emotionally unstable PD and dissocial PD are associated with increased prevalence of comorbid SUD, more frequent criminal justice contact, and increased risk of recidivism (Howard et al., 2013; Howard et al., 2021). Further, dissocial PD and emotionally unstable PD are associated with increased risk of suicidal behaviour among incarcerated individuals (Yang et al., 2022).

SUD involves continued substance consumption, irrespective of cognitive, behavioral, and physiological symptoms causing varying degrees of social, physical, and psychological harm, and can be categorized into different clinical conditions based on severity of symptoms and type of substance (APA, 2013; WHO, 1992). Previous studies conducted in the Norwegian prison population indicates that only 35 % of incarcerated individuals do not have a SUD (Cramer, 2014), and that about 50 % consumed drugs daily in the six months prior to incarceration (Bukten et al., 2020). The high prevalence of SUD in the prison population is also reflected in statistics regarding causes for conviction. Drug related crime was the second most frequent category of criminal offences following traffic related offences in Norway in 2021 (Statistisk Sentralbyrå [SSB], 2023). A written report from the Center for drug and addiction research (SERAF), indicates that 40 % of all sentences served in a Norwegian prison between 2000 and 2019 were related to individual drug consumption (Bukten et al., 2021). SUD is associated with around 20 years shorter life expectancy due to increased mortality due to increased risk of diseases, and accidents (Nordentoft et al., 2013). Mortality

risk related to SUD is particularly high post incarceration (Chang et al., 2015$_b$). Further, SUD is associated with increased risk of psychiatric disorders and criminal behaviour (Teigland, 2021), including recidivism and violent offending (Yukhnenko et al., 2023).

The negative consequences associated with PD and SUD highlight the need for research examining the prevalence and implications of comorbidity specific to the prison context (Fovet et al., 2023; Mundt & Baranyi, 2020; Wetterborg et al., 2015). Being incarcerated can provide a situational change with reduced access to substances and a chance to reach individuals that often do not seek treatment (Fovet et al., 2023; Mundt & Baranyi, 2020). Especially men with emotional unstable personality disorder, dissocial PD and SUD are overrepresented in correctional settings and underrepresented in psychiatric settings (Arefjord, 2021; Karterud et al., 2017). Thus, the correctional setting can constitute a unique opportunity to initiate integrated interventional programs that address comorbid PD and SUD (Berto et al., 2005; Butler et al., 2011), which can mitigate individual difficulties and have positive ramifications on a societal level (McGonigal & Dixon-Gordon, 2020; O'Driscoll et al., 2012).

Emotion dysregulation has been identified as a core feature of dissocial PD, emotionally unstable PD and SUD (Sebastian et al., 2019). Further, it has been proposed as a core explanatory mechanism regarding the association between psychiatric disorders and violent offending (Chang et al., 2015$_a$). The focus of the current thesis is on how emotion dysregulation as a transdiagnostic concept, and emotion regulation as a goal-oriented process involving various possible strategies can elucidate the relationship between criminal behaviour, PD, and SUD. The role of emotion dysregulation in psychopathology can also be examined from a neurobiological perspective (e.g., heartrate variability and neurotransmitter systems) (Aldao et al., 2015; Beauchaine & McNulty, 2013; Beauchaine & Zisner, 2017). Due to the scope of the thesis, this is not explored in depth.

Despite the negative consequences associated with PD, both on an individual and societal level, epidemiological data is scarce and characterized by heterogeneity both regarding design and results (Volkert et al., 2018). Further, there is a lack of literature assessing the prevalence of PD and comorbid SUD in representative prison samples. To the best of my knowledge, the current thesis is the first study to explore comorbidity between PD and SUD in a large and representative sample of incarcerated individuals.

1.1 Problem statement

The objective of the current thesis is twofold. The first is to analyze the relationship between PD (i.e., emotionally unstable, and dissocial PD) and comorbid SUD in the prison

population, based on emotion regulation theory. The second objective is to investigate the prevalence of PD in the Norwegian prison population, based on available treatment data from a national registry, and describe characteristics of these individuals, including comorbidity with SUD.

Thus, the following research question is explored:

What is the relationship between incarceration and emotionally unstable and dissocial personality disorder comorbid with substance use disorders? An investigation in the Norwegian prison population from 2010 to 2019.

1.2 Research approach

According to Creswell and Creswell (2018), the fundamental research approach of a study is best understood as an interaction between the underlying broader philosophical worldview, research design and the specific research methods applied to explore the research question. Both the theoretical part of this thesis and the registry study are founded on a quantitative research approach. This approach enables an epidemiological exploration of the relationship between comorbid PD and SUD in the prison population through statistical analysis of quantified variables (Creswell & Creswell, 2018; Coolican, 2014; Tufte, 2018).

Qualitative research, in contrast to quantitative, typically explores the meanings, descriptions and experiences of individuals based on interpretation of text material stemming from interviews or written records (Coolican, 2014). Even though quantitative and qualitative approaches are typically presented as opposites, most research questions lie somewhere on a continuum between the two (Creswell & Creswell, 2018). As is the case in this study, quantitative psychological research often explores qualitative categories and aspects of social phenomena and the human experience (e.g., comorbid psychiatric disorders in a prison context) (Tufte, 2018).

Regarding underlying philosophical worldview, quantitative research is traditionally linked to positivism (Coolican, 2014; Tufte, 2018). Creswell and Creswell (2018) distinguish between positivism and post-positivism. The latter represents the approach in the current registry study where the relationship between complex phenomena is reduced to observable and measurable variables, with emphasis on highlighting potential bias and limitations associated with the specific research methods applied.

To some extent it can be argued that the research question also encompasses some aspects of the transformative worldview based on the prison population being a marginalized group. The high prevalence of psychiatric disorders among incarcerated individuals, and limited access to psychiatric inpatient treatment, represents a current social issue in Norway

(Creswell & Creswell, 2018). The theoretical perspective and research approach chosen for the current exploration of the relationship between criminality, PD and SUD does not align with the transformative worldview.

Emotion regulation as a theoretical concept is based on a functional understanding of emotions as potentially adaptive or maladaptive, based in part on efficiency of regulatory processes (Gross, 1999; Gross, 2013; Johnstone & Walter, 2013). Considerations pertaining to emotions as something that can and should be regulated has a rich history, tracing back to ancient Greek philosophers (Beauchaine & Zisner, 2017; Gross, 1999). Emotion regulation as a research domain as it appears today emerged in developmental psychology in the 1980s (Gross, 1999), and has since experienced rapid growth (Gross, 2013). According to Gross (1999), modern conceptualizations of emotion regulation are based on the psychoanalytic tradition of exploring interactions between biological impulses and internal or external constraints, as well as the stress and coping tradition with special emphasis on emotion-focused coping. Further, psychodynamic defenses and the coping traditions differentiation between adaptive and maladaptive strategies, are precursors to current research regarding the role of emotion regulation flexibility in psychopathology (Aldao et al., 2015). Inhibitory control, or lack thereof, represent essential features of PD, SUD, and criminal behaviour (APA, 2013; WHO, 1992).

1.3 Disposition

The thesis is divided into eight chapters. The first chapter entails the introduction, including problem statement, research approach, and disposition of the thesis. The second chapter gives an account of the search process and findings from the systematic literature search. Chapter three presents diagnostic criteria for dissocial PD, emotionally unstable PD, and SUD. The fourth chapter introduces emotion regulation and emotion dysregulation as the theoretical framework of this thesis, including accounts of specific models. Chapter five presents the methods and results section of the register study investigating the prevalence of PD and comorbid SUD in the Norwegian prison population. In the first section of chapter six the findings from the register study, including associated strengths and limitations are discussed. The second section of chapter six provides a broader discussion of the results based on emotion regulation theory including strengths and limitations, considerations regarding future research, and practical implications. Chapter seven presents the conclusion of the thesis, and chapter eight places the problem statement in a broader perspective.

2. Literature review

As a part of this thesis, a systematic literature search was conducted to identify empirical studies investigating the relationship between comorbid personality disorders and substance use disorders among prisoners. The aim of the literature review was to establish the prevalence found in other studies, and to identify relevant theoretical perspectives and methodological approaches to elucidate the problem statement. To get an initial overview of the research topic and identify relevant search terms, initial unstructured searches were conducted in PsychInfo during January 2023.

Systematic searches to identify relevant empirical studies were conducted in PsychInfo, EMBASE and PubMed from 10th of February to the 4th of April 2023. The different databases' thesaurus was applied to select search terms in three blocks containing Boolean operators and truncations, with the goal of encompassing all relevant literature. Resulting in a total of 631 hits. Search terms and number of hits per database are displayed in Table 1.

Titles and abstracts were reviewed and assessed according to the following inclusion criteria: the sample consisted of individuals over the age of 18 years serving a prison sentence (including remand and detention prisoners), published after 2000, investigating the prevalence of PD and SUD. After excluding duplicates, dissertations, conference abstracts, reviews, articles focusing solely on psychopathy, and written in other languages than English, Scandinavian or German, 40 articles were read in their entirety. Based on the following exclusion criteria, 35 articles were excluded. The sample consisting of individuals not currently serving a prison sentence, individuals on parole or probation, and individuals serving their sentence in an inpatient secure psychiatric facility, or being highly selected (i.e., only participants with receiving treatment for a known drug problem), the authors not reporting prevalence of personality disorders, or only reporting prevalence of PD and SUD in the same sample, but not comorbidity between the two. An additional non-structured search limited to the identification of additional relevant empirical studies published in 2022 and 2023 was conducted in Google Scholar on the 15th of April. Further, reference lists of identified articles were scanned. No further articles meeting the inclusion criteria not already included based on the structured search process were identified. A total of five articles were included in the final review.

Table 1 *Overview of search terms and number of hits per database searched in the systematic literature search*

Database	Search term	Number of hits
PsychInfo	"personality disorder AND (substance abuse or substance use or drug abuse or drug addiction or drug use) AND (prison or jail or incarceration or imprisonment or correction facilities)	416
PubMed	(("personality disorder" [Title/Abstract]) AND ("substance use disorder" OR "substance depend*" OR alcohol [Title/Abstract]) AND (prison* OR correction* OR penal*[Title/Abstract])	130
EMBASE	("personality disorder" and "substance use" and (inmate or prison* or correction*)).ab.	85

The primary and secondary literature for the theoretical part of the thesis is based on unstructured searches in the University of Copenhagen Library database, Google Scholar, Oxford Handbook, and scanning of reference lists. Studies excluded from the final review based on for example presenting prevalence of PD and SUD, but not comorbidity, were still included throughout the thesis, including in the theoretical and empirical background chapter.

Table 2: *Findings regarding comorbidity between personality disorder and substance use disorder from the studies included in the final selection of the literature review.*

Main findings	ASPD + SUD = 39.7 % (male) and 10.1 % (female); BPD + SUD = 56.8 % (male) and 20.2 % (female).	PD + SUD = 20.1 %.	AD + BPD = 24.1 %; AD + ASPD = 51.7 %; DD + BPD = 28.8 %; DD + ASPD = 54.8 %.	SUD + PD = 47 %; SUD + ASPD = 38 %; SUD + BPD = 17 %.	paranoid PD = 33 %; BPD = 26 %; histrionic PD = 6 %; ASPD = 30 %; narcissistic PD = 12 %; PD + SUD = 71 %.
Comorbidity	Between PD, ASPD or BPD and SUD as proportion in the total sample and per gender.	Of PD with SUD as proportion of total sample.	Proportion of participants with BPD or ASPD among those with AD or DD.	Proportion with PD, ASPD or BPD among participants with SUD.	Comorbid SUD in participants with PD.
Substance use disorder	Aggregate of alcohol and /or drug abuse and dependence.	Aggregate of dependence/abuse/ intoxication/withdrawal of alcohol, amphetamine, cannabis, cocaine, hallucinogen, inhalant, opioid, sedative-hypnotic or anxiolytic, and polysubstance.	Drug and alcohol dependence separately, and as an aggregate.	SUD in general as well as drug and alcohol abuse and dependence separately, including prevalence for several specific drugs.	SUD in general, alcohol dependence, alcohol harmful use and drug use disorder.
Personality disorder	BPD and ASPD for the total sample and based on gender.	Aggregate of avoidant, dependent, obsessive–compulsive, paranoid, schizotypal, schizoid, narcissistic, borderline, antisocial, passive– aggressive and depressive PD.	Reported prevalence of BPD and ASPD among participants with SUD.	Reported prevalence of PD including participants with either BPD or ASPD, and both, as well as for BPD and ASPD separately.	BPD, ASPD, paranoid, histrionic and narcissistic PD.
Sample	$N = 427$ ($n_{female} = 198$) participants, currently on remand.	$N = 526$ male participants serving various sentences.	$N = 105$ female participants serving various sentences.	$N = 139$ female participants, including individuals serving on remand and detention.	$N = 103$ female participants serving various sentences.
Study and country	Mundt & Baranyi (2020), Chile	Piselli et al. (2015), Italy	Chapman & Cellucci (2007), United States	Mir et al. (2015), Germany	Tye & Mullen (2006), Australia

Notes: All studies applied DSM-IV diagnostic criteria and based diagnostic assessments on structured or semi-structured interviews conducted by health professionals. Main findings column reports prevalence rates. PD = personality disorder; ASPD = antisocial PD; BPD = borderline PD; SUD = substance use disorder; AD = alcohol dependence; DD = drug dependence.

3.   Personality disorder and substance use disorder

This chapter begins with a brief introduction of PD, followed by a presentation of the diagnostic criteria and symptoms of emotionally unstable PD and dissocial PD. Secondly, SUD is presented with emphasis on the ICD-10 Classification of Mental and Behavioural Disorders (ICD-10) conceptualization (WHO, 1992). The chapter ends with an introduction of comorbidity between PD and SUD, including a presentation of the findings from the systematic literature search.

3.1 Personality disorder

Personality can be defined as a person's individual and unique pattern of thoughts, feelings, and behaviour. It develops through a bidirectional interaction between genetic factors such as temperament and environmental factors (e.g., parenting style, life events) throughout childhood, and is usually well established by young adulthood, but can also change later in life (Oldham, 2021). Most personality traits are present to some extent in most individuals (Karterud et al., 2017), and can be assessed along a continuum from healthy to unhealthy, and adaptive to maladaptive (Skodol & Oldham, 2021).

Even though stability of PD from adolescence or young adulthood is a central element in diagnostic criteria, studies indicate that whether an individual meets the clinical threshold fluctuates as indicated by a lifetime prevalence of any personality disorder of 30 % and 3-4 % for the specific subcategories (Torgersen, 2021). According to a national report, prevalence of PD in Norway is estimated to be between 5.5 % and 13.4 %. The span of in estimation of prevalence is in part attributable to differing assessment methods and characteristics of the sample (e.g., rural versus urban citizens) in assessment (Mykletun & Knudsen, 2009).

The ICD-10 categorizes personality disorders into subtypes, based on the individuals predominant enduring and inflexible patterns of behaviour and psychological functioning (WHO, 1992). The symptoms are interpreted based on to what extent they represent a deviation from how individuals in the given culture on average are expected to think, feel, and relate to others. They become apparent across various personal and social situations and cause differing degrees of subjective distress and impaired functioning. Personality disorders are considered developmental conditions, that develop through an interaction between genetic predispositions and environmental factors during childhood and adolescence and continue to manifest themselves into adulthood (Skodol & Oldham, 2021; WHO, 1992). Usually, a diagnosis of PD is based on the clear presence of minimum three of the characteristic traits or behaviours specified for each subtype in the clinical description guidelines (WHO, 1992).

PDs are associated with varying degrees of reduced quality of life, based on the severity of personality pathology (Torgersen, 2021), with impairment in social functioning and ability to maintain relationships being especially difficult (Trull et al., 2010). Life expectancy is around 15-20 years shorter due to increased mortality related to higher occurrence of medical conditions, and suicide (Nordentoft et al., 2013). The term personality disorder is often perceived with a negative connotation, partly due to the misconception of it being a treatment resistant and enduring condition (Skodol & Oldham, 2021; Tyrer et al., 2015).

3.1.1 Transition from ICD-10 to ICD-11.

The World Health Organization released the final version of the International Classification of Diseases Version 11 (ICD-11) in 2022. One of the most anticipated changes is the abolishment of PD subcategories. Instead, an individual case description based on the severity (i.e., mild, moderate, severe) and a listing of as many of the following five traits that are considered predominant and central to the individual's disturbance; negative affectivity, detachment, dissociality, disinhibition, and anankastia is conducted (WHO, 2023$_b$). This attenuates the issue of extensive criterium overlap resulting in diagnoses of multiple comorbid PDs (Morey & Bender, 2021; Paris, 1997), and accommodates the growing consensus regarding PD being a dimensional construct (Tyrer et al., 2015). Due to emotionally unstable PD borderline type being the ICD-10 PD category that received the most research attention, ICD-11 includes a specifier for borderline pattern to enhance the clinical utility (WHO, 2023$_b$).

3.1.2 Emotionally unstable personality disorder.

Emotionally unstable PD is characterized by impulsivity, emotion dysregulation, rapidly shifting affective states and interpersonal difficulties (Beauchaine et al., 2009; Trull et al., 2000; WHO, 1992).

The ICD-10 describes F60.3 emotionally unstable PD as:

> A personality disorder in which there is a marked tendency to act impulsively without consideration of the consequences, together with affective instability. The ability to plan ahead may be minimal, and outbursts of intense anger may often lead to violence or "behavioural explosions"; these are easily precipitated when impulsive acts are criticized or thwarted by others. Two variants of this personality disorder are specified, and both share this general theme of impulsiveness and lack of self-control (WHO, 1992, p. 204).

Individuals with the impulsive variant predominantly display emotional instability and lack of impulse control, often in the form of violence or threatening behaviour in response to criticism. The borderline type additionally typically is marked by frequent self-harm or suicidal behaviour, unclear or disturbed self-image, aims, and internal preferences (including sexual), as well as a chronic feeling of emptiness. Further, a tendency to be involved in intense and unstable relationships associated with repeated emotional crises and excessive efforts to avoid abandonment is common (WHO, 1992).

According to the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-V), borderline PD is characterized by "… a pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity that begins by early adulthood and is present in a variety of contexts" (APA, 2013). The DSM-V does not distinguish between borderline and impulsive subtypes.

Emotionally unstable personality disorder is associated with increased mortality due to suicidal behaviour (Wilberg et al., 2020). As reflected in the diagnostic criteria, potentially harmful and maladaptive regulating strategies such as physical self-harm, explosive anger, eating problems, impulsive buying, and substance use is common among individuals with emotionally unstable PD (Beauchaine et al., 2009; Carpenter & Trull, 2013; Trull et al., 2000). Experimental research indicates that individuals with emotionally unstable PD show a tendency towards avoiding distressing situations and negative emotions, even when this interferes with goal-attainment, but do not show greater difficulties regarding maintaining goal-directed behaviour during distress (Gratz et al., 2006). Comorbidity with other psychiatric disorders such as SUD, dissocial PD, major depressive disorder, ADHD, and anxiety disorders is common (Mundt & Baranyi, 2020; Trull et al., 2010; Wetterborg et al., 2015). Further, such comorbidity is associated with increased risk of recidivism (Wetterborg et al., 2015).

The borderline subtype is the most extensively researched PD (WHO, 2023$_b$), whereas the impulsive subtype has received considerably less attention. Due to this, and the nature of the registry data (i.e., not possible to distinguish between the two variants), this thesis uses the term emotionally unstable PD to encompass both variants. Due to the impulsive subtype rarely being specified in the literature, the term emotionally unstable PD, will mainly refer to the borderline subtype.

3.1.3 Dissocial personality disorder.

The diagnosis of dissocial PD and term antisocial are highly debated, both in terms of negative consequences on an individual and societal level, and regarding the validity of diagnostic criteria and treatability (Karterud et al., 2017; Teigland, 2021). The ICD-10 proposes the following diagnostic guidelines for F60.2 dissocial PD:

> Personality disorder, usually coming to attention because of a gross disparity between behaviour and the prevailing social norms, and characterized by: (a) callous unconcern for the feelings of others; (b) gross and persistent attitude of irresponsibility and disregard for social norms, rules and obligations; (c) incapacity to maintain enduring relationships, though having no difficulty in establishing them; (d) very low tolerance to frustration and a low threshold for discharge of aggression, including violence; (e) incapacity to experience guilt or to profit from experience, particularly punishment; (f) marked proneness to blame others, or to offer plausible rationalizations, for the behaviour that has brought the patient into conflict with society. There may also be persistent irritability as an associated feature. Conduct disorder during childhood and adolescence, though not invariably present, may further support the diagnosis. (WHO, 1992, p. 204).

According to the DSM-V "The essential feature of antisocial personality disorder is a pervasive pattern of disregard for, and violation of, the rights of others that begins in childhood or early adolescence and continues into adulthood." (APA, 2013). Irresponsibility across various life domains, a pattern of criminal or rule-breaking behaviour (regardless of criminal record), a tendency to experience dysphoria (e.g., persistent tension and depressed mood) and aggression, and limited access to positive emotions, are common features of dissocial PD (APA, 2013; Karterud et al., 2017). Research indicates an association between dissocial PD and violent crime, including higher occurrence of premeditated violent crimes than among individuals without dissocial PD (Azevedo et al., 2020). Dissocial PD is associated with increased risk of incarceration and a tendency not to seek psychiatric treatment (Arefjord, 2021).

One concept closely related to dissocial PD that is often studied in a correctional context is psychopathy. Research indicates considerable overlap (e.g., impulsivity, irresponsibility, and rule-breaking), and the terms are sometimes used interchangeably (Beauchaine et al., 2009; Paris, 1997; Venables et al., 2014). However, dissociality is not

synonymous with psychopathy, with the latter being characterized by more pronounced callousness, aggressive-exploitativness and boldness (Beauchaine et al., 2009; Blair, 2001; Venables et al., 2014). In addition to dissociality, psychopathy also encompasses traits considered symptomatic of narcissistic PD and paranoid PD (Teigland, 2021). Psychopathic PD is not a separate category in the ICD-10 but is included under F60.2 dissocial PD. Because of this, psychopathy can to some extent be part of the latter data analysis.

3.2 Substance use disorder

In the ICD-10 substance use disorders are categorized under F10-F19 Mental and behavioural disorders due to psychoactive substance use, based on the type of substance in question (e.g., F10 alcohol and F12 cannabinoids). In cases where more than one substance is used, it is recommended that categorization is based on the substance causing the presenting disorder, or alternatively the one most frequently used. Further specifiers are applied to differentiate between different clinical conditions such as dependence syndrome (F1x.2), harmful use (F1x.1), dependence syndrome currently on a clinically supervised maintenance or replacement regime [controlled dependence] (F1x.22), and psychotic disorder (i.e., drug induced psychosis [F1x.5]) (WHO, 1992). These are four of the diagnoses most relevant in a mental health care setting. This thesis will predominantly apply the term SUD, encompassing all diagnosis and clinical conditions categorized under F10-19.

According to the ICD-10 F1x.1 Harmful use is applicable when there is a pattern of substance use causing physical or mental damage to the consumer. It is often associated with averse interpersonal and social consequences, this is however not sufficient to fill the diagnostic criteria without actual physical or mental damage (WHO, 1992).

The ICD-10 gives the following definition of F1x.2 Dependence syndrome:

> A cluster of physiological, behavioural, and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than other behaviours that once had greater value. A central descriptive characteristic of the dependence syndrome is the desire (often strong, sometimes overpowering) to take psychoactive drugs (which may or may not have been medically prescribed), alcohol, or tobacco. There may be evidence that return to substance use after a period of abstinence leads to a more rapid reappearance of other features of the syndrome than occurs with nondependent individuals (WHO, 1992, p. 75).

According to the DSM-V, SUD is categorized based on the specific substance consumed and severity of the disorder from mild to severe, and involves "…a cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems" (APA, 2013, p. 483). Persistent use of high dosages is associated with potentially persisting changes in underlying brain circuits, affecting craving, risk of relapse, and emotion regulation (APA, 2013; Beauchaine & McNulty, 2013). Diagnostic classifications (i.e., ICD-10 and DSM-V) emphasize intrapersonal problems associated with SUD, however, for clinical purposes interpersonal problems and consequences for significant relationships are often more pertinent (Lossius, 2021).

Heredity (40-60 % of variability in SUD is attributable to genetics), availability of substances, ability to cope with stress, impulsivity, and emotion dysregulation are some of the identified risk factors of SUD (APA, 2013; Karterud, 2021; Lossius, 2021). Due to the scope of the thesis, etiological aspects of SUD are not further elucidated. Emotion dysregulation and beliefs about substance consumption as emotion regulation are central to the understanding of and treatment of SUD, both as etiological and perpetuating factors (Cooper et al., 1995; Weiss et al., 2022$_a$). This relationship will be addressed more in depth in chapter four of the thesis. Further motives include social and cultural norms, and their influence vary depending on individual and situational characteristics (Cooper et al., 1995).

3.2.1 Comorbidity between personality disorders and substance use disorders.

Traditionally personality disorders and substance use have been closely interrelated. The first edition of the DSM presented drug addiction as a common symptom of PD (Smith & Cottler, 2020). PD and SUD share common features and underlying risk factors such as impulsivity, emotion dysregulation, and low socioeconomic status (APA, 2013; Hall et al., 2018; Tully & Iacono, 2014). A national representative study with interviews based on DSM-IV criteria conducted in the US, indicates a significantly higher prevalence of comorbid alcohol and drug disorders respectively of around 50 % and 30 % among individuals diagnosed with a PD, compared to the general population (Trull et al., 2010). Typically, the highest comorbidity rates are found among individuals diagnosed with emotionally unstable PD or dissocial PD (Arefjord, 2021; Beauchaine et al., 2009).

The interrelation between criminality, substance use, and personality pathology becomes apparent in the assessment of dissocial personality disorder, where norm-breaking and criminal behaviour make up a central element of the diagnostic criteria (APA, 2013; Teigland, 2021; WHO, 1992). In addition, failure to meet obligations in various life domains

is a symptom of both SUD and dissocial PD and conduct disorder in childhood and adolescence constitutes a common risk factor (APA, 2013; WHO, 1992). Further illustrating the complexity of the relationship, is the difficult clinical task of differentiating between primarily dissocial personality pathology and secondary dissociality due to efforts to sustain a drug habit (Arefjord, 2021). As for emotionally unstable PD, substance use both with the aim of altering and regulating intense and fluctuating emotions, as well as suicide attempts by overdose, are common (Wilberg et al., 2020).

Dual diagnosis of PD and SUD is associated with complex symptomatology which can complicate treatment and lead to lower recovery rates for both disorders (Ogloff et al., 2015). A Danish large-scale population-based study found an association between comorbid PD and SUD, and an increase in number of psychiatric hospitalizations, number of days hospitalized, and number of psychiatric emergency contacts, except for opioid related disorders where the results indicated a decrease (Jørgensen et al., 2018). Further, comorbid emotionally unstable PD is associated with poorer clinical presentation and outcome for SUD, but not the reverse (Lee et al., 2010).

Prevalence of comorbidity based on findings from literature review.

In the following section, results regarding prevalence of comorbid PD and SUD in the prison population based on findings from the five studies included in the previously described systematic literature search are presented.

All included studies were conducted in different countries and published between 2006 and 2020. Due to multiple studies meeting exclusion criteria, the final selection only included selected samples. The majority was selected based on gender, with one study including remand prisoners of both genders (Mundt & Baranyi, 2020). Sample size varied from 103 (Tye & Mullen, 2006) to 526 participants (Piselli et al., 2015). Mean age ranged from 29.6 years (Tye & Mullen, 2006) to 40.7 years (Piselli et al., 2015). Ten percent of participants in the study conducted by Chapman and Cellucci (2007), had completed primary school as the highest education level, whereas this was the case for around half the participants in the four other studies (Mir et al., 2015; Mundt & Baranyi, 2020; Piselli et al., 2015; Tye & Mullen, 2006). All studies based diagnostic decisions of PD and SUD on DSM-IV criteria, assessed with structured or semi-structured clinical interviews carried out by health care professionals.

Dissocial and emotionally unstable PD (corresponding to antisocial PD [ASPD] and borderline PD [BPD] in DSM-IV), were the PDs most frequently investigated. Chapman & Cellucci (2007) only reported prevalence of PD for individuals with a SUD, and not for the

entire sample. Piselli et al. (2015) reported prevalence for PD in general, and not for the specific categories. The three remaining studies indicate a prevalence of dissocial PD and emotionally unstable PD respectively of 15.2-30 % and 15-31.3 % among female prisoners, and 41.9 % and 67.2 % among male prisoners (Mir et al., 2015; Mundt & Baranyi et al., 2020; Tye & Mullen, 2006).

Regarding SUD, all five studies reported prevalence of SUD in general, two additionally reported prevalence separate for alcohol and drugs (Chapman & Cellucci, 2007; Tye & Allen, 2006), and one reported prevalence for multiple specific substances (Mir et al., 2015). Prevalence of SUD in general ranged from 10.1 % at the lowest (Mundt & Baranyi, 2020) to 63 % at the highest (Tye & Mullen, 2006) among female prisoners, and from 24.9 % (Piselli et al., 2015) to 39.7 % (Mundt & Baranyi, 2020) among male prisoners.

The definition of comorbidity varied across studies, with some reporting comorbid SUD in participants with PD, and others comorbid PD in participants with SUD or as the proportion of the total sample, as well as differences in whether comorbidity was reported separately based on categories of PD and SUD. The only study assessing comorbidity with SUD in individuals with PD, reported a prevalence of 71 % in female prisoners (Tye & Mullen, 2006). The only study including both genders reported a prevalence of comorbid ASPD and SUD of 26 %, and BPD and SUD of 39.8 % (Mundt & Baranyi, 2020; Piselli et al., 2015). Thus, most studies reported high comorbidity rates. Prevalence of PD, SUD and comorbidity reported in the individual studies are shown in Table 2.

4. Theory and empirical background

This chapter begins with an account of the definition of emotions, emotion regulation and emotion dysregulation as they apply in this thesis. Following, the process model of emotion regulation, inflexible application of emotion regulation strategies, a developmental model of dissocial PD and emotionally unstable PD, and motivational models of SUD are presented. The chapter concludes with a section presenting considerations regarding the role of emotion dysregulation in co-occurring criminal behaviour, PD and SUD.

4.1 Emotions, emotion regulation and emotion dysregulation

Emotions are a complex phenomenon encompassing cognitive, physiological, neurological, attentional, behavioural, and social aspects (Gross, 1999; Thompson, 1994). Various definitions, conceptualizations and operationalizations have been proposed in scientific writing. According to Gross (2013; 2015[a]) emotions are characterized by specific negative or positive subjective experiences and behavioural tendencies that arise temporary in reaction to specific stimuli or events. The tendency towards rapid onset and short duration of

emotions can contribute to their sense of at times being uncontrollable (Gross & Muñoz, 1995). This differentiates emotions from stress and mood, which are less specific, typically arises due to overwhelming environmental demands, and are of a longer duration (Gross, 1999, 2015$_a$).

Emotions provide guidance for how to assess and react in different situations, and thus influence social and personal functioning (Gross 1999; Gross & Muñoz, 1995; Johnstone & Walter, 2013; Thompson, 1994; Tull & Aldao, 2015). Based on the circumstances, emotions can be deemed adaptive or maladaptive (Johnstone & Walter, 2013). Research indicates a high degree of individual variability in intensity, lability, duration, and expression of emotional responses of discrete emotions (Thompson, 1994). These interindividual variations and the degree of adaptiveness, is partially dependent on the degree of flexibility in the individual's ability to regulate their emotional response according to the circumstances (Gross, 2013; Thompson, 1994). Emotion regulation can be defined as heterogeneous and functional goal-oriented process, with varying degree of explicit intent, aimed at modifying the intensity, duration, or quality of an emotional response (Gratz & Roemer, 2004; Gross, 1998, 1999, 2015$_b$; Gyurak & Etkin, 2013; Thompson, 1994).

Emotion regulation has been proposed as a transdiagnostic core concept for psychopathology (Beauchaine & Zisner, 2017; Gratz & Roemer, 2004; Sloan et al., 2017). Impaired emotion regulation is symptomatic for multiple psychiatric disorders and is often referred to as emotion dysregulation in literature addressing psychopathology (Aldao et al., 2016; Beauchaine & McNulty, 2013; McGonigal & Dixon-Gordon, 2020; Rodrik et al., 2022; Trull et al., 2000). Emotion dysregulation can be defined as the absence of, or impairments in, the ability to detect, interpret or accept emotions, or the ability to flexibly apply regulatory strategies aligning with situational demands and goal attainment, including controlling behavioural impulses when experiencing negative emotions (Bornovalova et al., 2008; Gratz & Roemer, 2004). Findings indicate that treatments producing change in emotion dysregulation and emotion regulation strategies are efficient across a variety of psychiatric disorders, including emotionally unstable PD and SUD (Sloan et al., 2017).

As reflected in the above definitions of emotion regulation and dysregulation, the terms are often applied synonymous in the literature. In this thesis the distinction proposed by Tull and Aldao (2015) will be applied. Thus, emotion regulation will primarily refer to application of specific emotion regulation strategies in line with Gross' definition (2015$_a$), whereas emotion dysregulation will primarily refer to a dispositional tendency of difficulties in the ability to understand, regard, and flexibly respond to emotions in line with Gratz and

Roemer's (2004), and Thompson's (1994) definitions (Tull & Aldao, 2015; Weiss et al., 2022$_b$).

Whether emotion generation and emotion regulation are two separate concepts, or if they er inextricably intertwined, is an ongoing debate (Crowell et al., 2020). Adults tend to display a wider repertoire of emotion regulation strategies compared to children and adolescents that develop through an interaction between biological and environmental factors (Aldao et al., 2016; Thompson, 1994). According to Crowell and colleagues (2020), applying developmental and biological perspectives highlights how emotion regulation abilities are constantly evolving and can thus be separated from emotion generation. For example a genetically predisposed vulnerability towards impulsivity can develop into ADHD persisting into adulthood among children reared in a stable environment, whereas the same genetic predisposition paired with a maladaptive environment increases the likelihood of emotion dysregulation manifesting as dissocial personality disorder (Beauchaine et al., 2009; Beauchaine & McNulty, 2013; Shader & Beauchaine, 2020). As such, emotion dysregulation represents a risk factor for psychopathology through gene x environment interactions (Crowell et al., 2020).

4.3.1 Process model of emotion regulation.

The process model of emotion regulation accounts for both hedonistic (i.e., enhancing positive and minimizing negative emotions) and instrumental goals (e.g., capitalizing on negative emotions to act assertive) (Gross, 2015$_a$; Kashdan & Rottenberg, 2010; Kobylinska & Kusev, 2019; Thompson, 1994).

People apply a myriad of different strategies that consciously or unconsciously serve the purpose of regulating emotions. According to Gross (2013), these strategies alle have three factors in common, a goal of altering an emotional state, a particular strategy or process to achieve the goal, and the outcome of achieving the goal through the chosen process. Some strategies involve a conscious shift of cognitive focus to something internal (e.g., anticipation or memory of an event) or external (e.g., listening to music), physical distractions altering the current level of arousal (e.g., running, or physical contact), cognitive reappraisal, or consumption of food or drugs (Gross, 2013, 2015$_a$; Gyurak & Etkin, 2013). Analogous to emotions, these strategies can be adaptive or maladaptive based on the intensity of the emotion to be regulated (Sheppes et al., 2015), and past, current, or future contextual and personal factors (Aldao et al., 2016; Gross, 2015$_a$).

Five steps of emotion regulation process.

The process model posits that emotion regulation strategies can be categorized into five steps analogues to the process of emotion generation: situation selection, situation modification, attentional deployment, cognitive change, or response modulation situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross, 1998, 2015ₐ). The first four are antecedent-focused, and generally deemed more effective, whereas the last is response-focused and aims to alter the actual emotion (Aldao, 2013). The timing of emotion regulation during the emotion generation process can thus not only alter the intensity and duration of the emotional response, but also the type of emotion (Gross, 1998). The model represents a simplification of highly complex, dynamic, and often parallel bidirectional processes where emotional responses influence the situation (e.g., due to interpersonal dynamics), as well as cognitive and attentional capacities (Gross, 1998).

Situation selection.

According to Gross (1998), the opportunity to regulate or change the emotional trajectory in the first two steps of situation selection and modification are limited by situational demands. In some cases, regulation can be readily achieved through leaving the situation. For instance, if interacting with certain people tends to provoke anger, situations requiring interaction can be avoided. This can however be difficult if the anger provoking person is someone where interaction is necessary, such as a social case manager. Emotion regulation can also be achieved by approaching a specific situation, such as seeking out a comforting friend when feeling distressed (Gross, 2015_b). Selection strategies require knowledge about the complexities of different situations and their emotional consequences, as well as available alternatives (Gross, 1998, 2015ₐ). One potential pitfall when applying strategies in this category could be the prioritization of short-term stress relief over long-term goal achievement characteristic of individuals with PD and SUD (Gross, 1998; Trull et al., 2000).

Situation modification.

Differentiating between situation selection and modification is an example of the aforementioned complexity of the regulatory processes. Situation modification encompasses strategies that actively change external aspects of the situation to influence the emotional impact (Gross, 2015ₐ). In some cases, modification of the situation can lead to creation of a new situation. Further, Gross (1998) highlights how the mere expression of emotion can change the situation. This can happen both due to a conscious choice of modifying the

situation by provoking an emotional response in others, or through spontaneous emotional expressions without a regulatory intent (Gross, 1998; Thompson, 1994).

Attentional deployment.

Attentional deployment, the third step, encompasses cognitive strategies such as distraction and concentration, as well as ruminating about past and future possible consequences of feelings (Gross, 1998). Strategies aimed at changing the internal situation (e.g., recalling happy memories to counteract sadness) are subsumed in this step (Gross, 2015_a; Thompson, 1994), further illustrating the permeable boundaries between the various steps in the process model (Gross, 1998). Similarly, emotions can be regulated by concentrating on specific aspects of the situation. Distraction and concentration are among the first emotion regulation strategies to be adopted from a developmental perspective (Rothbart et al., 1992, cited in Thompson, 1994).

Cognitive change.

The fourth step, cognitive change, is characterized by the process of ascribing meaning to the situation (Gross, 1998). This can pertain both to external and internal stimuli (e.g., a scary task or physiological responses) (Gross, 2015_a; Thompson, 1994). The regulatory potential is based on altering the meaning of the situation and thus the emotional response. This encompasses strategies such as reframing, social comparisons, denial, intellectualization, and reappraisal (e.g., interpreting a seemingly negative event as growth opportunity) (Gross, 1998, 2015_a).

Response modulation.

Lastly, response modulation represents what might immediately be considered stereotypical emotion regulation. As this is the only step where an effort is made to alter the actual physiological, behavioural, and experiential aspects of the emotional response. This includes strategies such as substance consumption, exercising and suppression (Gross, 1998, 2015_a). The regulatory effect of alcohol consumption aimed at enhancing positive emotions (e.g., a celebratory toast) or regulating negative emotions (e.g., drownings one's sorrows), is well established in both colloquial language and scientific research (Cooper et al., 1995). Inhibitory strategies with the goal for downregulating, such as suppression of negative emotions, are traditionally valued in modern western culture (Thompson, 1994). Whether mere suppression of an emotional expression should be considered an emotion regulation strategy is debated, based on to what extent it changes the emotion, in contrast to suppressing the emotional experience itself (Berking & Wupperman, 2012).

4.3.2 The role of flexibility in emotion regulation.

To what extent an emotion regulation strategy is deemed effective, depends on whether the goal (i.e., the intended affective change) is accomplished (Aldao & Christensen, 2015; Thompson, 1994). Strategies involving reappraisal, problem solving, and acceptance are generally considered adaptive. Whereas strategies involving suppression (including both expressive suppression and thought suppression), avoidance (including both experiential avoidance and behavioral avoidance), and rumination are generally considered maladaptive, especially with regards to being associated with decreased and increased risk of psychopathology (Aldao, 2013; Aldao et al., 2010). Both reappraisal and suppression can be equally effective in achieving momentary regulation. In some cases, especially when experiencing strong negative emotions, maladaptive strategies are prioritized over adaptive ones, based on immediate efficiency, regardless of long-term negative consequences (Carpenter & Trull, 2013). Multiple and conflicting coexisting goals are common, which complicates regulation and assessment of the adaptability of the strategies (Aldao & Christensen, 2015; Thompson, 1994). The effectiveness of a regulatory strategy depends on the particular goal, as well as individual and situational characteristics and demands (Thompson, 1994), including controllability of the situation (Kobylinska & Kusev, 2019). Thus, effectiveness and adaptability cannot be evaluated irrespective of contextual factors or other alternative strategies (Aldao, 2013; Aldao et al., 2015; Kashdan & Rottenberg, 2010). Rather, it is the flexibility permitted by the application of various effective strategies in fostering the achievement of short- and long-term goals that can be deemed adaptive (Gross & Muñoz, 1995; Gyurak & Etkin, 2013; Kobylinska & Kusev, 2019; Thompson, 1994).

Aldao et al. (2015), define emotion regulation flexibility as the ability to, deliberately or automatically, implement various emotion regulation strategies that are synchronized with contextual demands, as well as appraisals thereof. Context dependent flexibility in the application of emotion regulation strategies is paramount from a mental health perspective (Aldao et al., 2015; Gratz & Roemer, 2004; Gross & Muñoz, 1995; Kashdan & Rottenberg, 2010). For example, overregulation in the form of habitually suppressing emotions can be maladaptive, compared to sufficient downregulation to achieve control over the behavioural response (Gratz & Roemer, 2004; Gross & Muñoz, 1995; Tull & Aldao, 2015). In high stress situations (e.g., war or natural disasters), temporarily suppressing emotions might momentarily be the most adaptive strategy (Tull & Aldao, 2015). This exemplifies the interconnectedness of emotions dysregulation and emotion regulation strategies, where the effectiveness of the latter is restricted by dispositional inflexibility (Tull & Aldao, 2015).

Such dispositional inflexibility with regards to responding to a broad range of personal and social situations that elicit emotional reactions is characteristic of PD (WHO, 1992). Individuals with emotionally unstable PD tend to lack flexibility regarding application of adaptive emotion regulation, and often resort to maladaptive external response modulation strategies such as substances, food, or physical self-harm (Carpenter & Trull, 2013).

4.3.3 Developmental model of dissocial PD and emotionally unstable PD.

Dissocial PD and emotionally unstable PD both share common externalizing core features such as impulsivity, emotion dysregulation and interpersonal difficulties, which manifest in characteristic ways for each disorder (Krueger et al., 2007; McGonigal & Dixon-Gordon, 2020; Paris, 1997; Sebastian et al., 2019). For example, emotion dysregulation commonly manifests as heightened reactivity to emotional stimuli often leading to rapid shifts into negative affect, a tendency towards resorting to maladaptive over adaptive emotion regulation strategies (e.g., self-harm), and unstable relationships in individuals with emotionally unstable PD (Carpenter & Trull, 2013; Lyons-Ruth et al., 2007). Whereas criminal behaviour, aggressiveness, and recklessness is more pronounced among individuals with dissocial PD (Lyons-Ruth et al., 2007).

Beauchaine et al. (2009) propose a common developmental model of dissocial PD and emotionally unstable PD, based on interactions between genetic and environmental factors. The model posits that genetic functional patterns in neurotransmitter systems (i.e., dopamine and serotonin) affects dispositional impulsivity, which represents the core underlying vulnerability for the development of dissocial PD and emotionally unstable PD. Through interactions with maladaptive environmental factors (e.g., family environment and trauma), dispositional impulsivity develops into emotion dysregulation (Beauchaine et al., 2009; Beauchaine & McNulty, 2013). Reactive and oppositional behaviour associated with impulsivity and emotion dysregulation among children, develops intro enduring patterns manifesting in weak emotion regulation skills, that are negatively reinforced through co-occurring and mutually reinforcing factors such as parental excessive control, aggression, and coercion (Beauchaine et al., 2009; Beauchaine & Zisner, 2017). Based on high concentration of criminal behaviour within families, genetic factors are presumably etiologically important for the development of dissocial PD, both as genetic heredity, as well as through genetic factors predisposing parents to utilizing maladaptive parenting strategies and providing environments that condone and reinforce dissociality (Moffitt, 2005). Research in the prison population supports the role of maladaptive childhood environment in the development of emotion dysregulation, dissocial PD, and emotionally unstable PD, with childhood trauma

being identified as a risk factor for PD (Yang et al, 2022). The gene x environment interactions become increasingly complex throughout the lifespan (Beauchaine & McNulty, 2013). This is supported by research indicating that adolescent maltreatment is associated with more persistent increased risk of subsequent early adulthood general offending, arrest, violent offending, and substance use, compared to childhood maltreatment (Smith et al., 2005).

Maladaptive gene x environment interaction predisposes and perpetuates oppositional defiant disorder and emotion dysregulation which further predisposes the individual to subsequent, SUD, dissocial PD, and emotionally unstable PD (Beauchaine et al., 2009; Beauchaine & McNulty, 2013). In line with this way of understanding co-occurring externalizing disorders, comorbidity is presumably better understood as developmentally conditioned expressions of the same underlying genetic vulnerabilities (Beauchaine & McNulty, 2013; Forbes et al., 2016). A study by Konstenius et al. (2015), partially supported the developmental externalizing trajectory with ADHD being associated dissocial PD via SUD among incarcerated women. However, in this exclusively female sample, ADHD was not significantly associated with emotionally unstable PD.

The developmental trajectory from externalizing behaviour during childhood to PD in adulthood, is in part assumed to be moderated by sex. This can explain why dissocial PD tends to be overrepresented among men, and emotionally unstable PD among women (Beauchaine et al., 2009; Lyons-Ruth et al., 2007; Trull et al., 2010). The model posits that the gender differences predispose to differing deviant peer environments, with females being exposed to self-harm, relational aggression and substance use, and males to violence, criminal behaviour, and substance use (Beauchaine et al., 2009). Whether gender differences regarding prevalence of emotionally unstable PD reflect actual differences or differences in treatment-seeking has been questioned (Karterud et al., 2017).

4.3.4 Substance use as emotion regulation.

Various psychiatric disorders are characterized by a tendency to prioritize short-term over long-term goals (Aldao, 2013; Aldao et al., 2015). An initially effective emotion regulation strategy can over time prove maladaptive due to long-term negative consequences that outweigh the immediate goal attainment (Aldao & Christensen, 2015). For instance, substance use disorder is characterized by a tendency to prioritize the immediate rewards following consumption over potential long-term negative health and social consequences (Baker et al., 2004; Weiss et al., 2022[a]; WHO, 1992). Further, individuals diagnosed with cocaine dependency display increased levels of emotion dysregulation compared to non-

dependent controls. Findings indicate reduced flexibility in applying various emotion regulation strategies and inhibition of impulsive behaviour in stressful situations among individuals with SUD (Fox et al., 2007).

Affective processing model of negative reinforcement.

Negative reinforcement as a core explanatory mechanism for maintaining substance dependence has a long history. Originally it was presumed that drug consumption was primarily motivated by a drive to alleviate negative consequences of physiological withdrawal symptoms (Wikler, 1948, cited in Baker et al., 2004). Over time, this approach to understanding substance use has lost traction. Research indicates other contraindicatory motives for consumption. One example is the observation of cravings being experienced as stronger during and immediately after drug consumption, compared to during withdrawal. Further, relapse often occurs after the physiological withdrawal symptoms have seized (Baker et al., 2004).

Baker and colleagues (2004) posit that negative reinforcement is a core, but not sole, explanatory mechanism for substance use. Their affective processing model of negative reinforcement highlights the affective aspect (i.e., regulation of negative emotions) of negative reinforcement as a motivational factor for consumption and relapse. According to the model, increased negative affect is a common and immediate symptom during withdrawal across various substances. Further, they argue that this negative shift in emotional state is not always conscious, but regardless serves as a cue to resume consumption when drugs are available. This routine is enforced through efficient amelioration of negative affect (Baker et al., 2004). In situations where substances are not immediately available, it is assumed that the negative emotions are consciously registered and activate a tendency towards negatively biased information processing. This attentional bias further increases negative affectivity, thus overriding the focus on long-term goals and serves as a strong motivation for short-term relief through consumption, based on prior positive experiences due to negative reinforcement (Baker et al., 2004). Research supports the role of negative emotions in alcohol consumption and relapse after achieving abstinence (Berking et al., 2011; Weiss et al., 2022[a], 2022[b]).

According to the affective processing model of negative reinforcement, other factors such as social context and positive expectations related to effect of the substance, primarily influence consumption during moderate levels of negative affect (Baker et al., 2004). In line with the trajectory from pre-conscious to strong negative affect due to attentional bias, consideration of long-term consequences is difficult during the first stage due to consumption

as a reflexive action and in the latter due to strong negative emotions hindering access to other regulatory strategies (Baker et al., 2004). The lack of other effective emotion regulation strategies could explain why individuals with substance use disorder continue consumption at moderate levels of negative affect, regardless of aversive consequences (Aldao & Christensen, 2015; Baker et al., 2004; Cooper et al., 1995; Weiss et al., 2022[a]). Further, emotion dysregulation appears to increase the risk of relapse through a limited number of other available effective emotion regulation strategies besides alcohol consumption (Berking et al., 2011).

Motivational model of alcohol use.

In line with the affective processing model of negative reinforcement establishing substance use as an emotion regulation strategy (Baker et al., 2004), Cooper et al. (1995), in their motivational model of alcohol use, propose avoidance of negative emotions as a central motive for alcohol consumption. The combination of experiencing negative emotions and beliefs regarding the effectiveness of alcohol in ameliorating these is associated with increased risk of developing alcohol use disorders (Cooper et al., 1995). Metanalytic findings indicate that negative emotions are associated with increased substance use through difficulties maintaining goal directed behaviour, controlling impulsive behaviour, and applying alternative emotion regulation strategies when experiencing negative emotions, as well as accepting these (Weiss et al., 2022[a]). Emotion dysregulation of both positive and negative emotions is related to increased alcohol consumption, with the strongest association with negative emotions (Weiss et al, 2022[b]). This appears especially pronounced among individuals with emotionally unstable PD (Trull et al., 2000). Research by Reardon et al. (2002) indicates a significantly stronger relationship between regulation of negative emotions through alcohol consumption amongst prisoners with dissocial PD compared to without.

According to Cooper et al. (1995) positive emotions are also implicated in motivation for alcohol consumption. They propose enhancing positive emotions as a distinct motivational process from avoidance of negative emotions, associated with distinct antecedents and consequences. The model posits, that expectations of alcohol enhancing social and emotional experiences, and a tendency towards sensation seeking lead to increased consumption and risk of developing alcohol problems (Cooper et al., 1995). Such enhancement motives (i.e., drinking to achieve a "high" or feel good) have been found to be more prevalent among prisoners with dissocial PD compared to prisoners without (Reardon et al., 2002). Weiss et al. (2022[a]) found a relationship between the ability to regulate positive emotions and increased substance use, through difficulties with emotional acceptance,

controlling impulsive behaviour, and maintaining goal directed behaviour. Enhancement motives have also been found to be associated with increased risk of opiate misuse among individuals with emotionally unstable PD (Scamaldo et al., 2021).

4.4.2 Co-occurring criminal behaviour, PD, and SUD.

Dissocial PD, emotionally unstable PD and SUD are characterized by common externalizing features (Krueger et al., 2007), and often co-occur with criminal behaviour. PD, SUD, and criminality are inextricably and bidirectionally linked, making it difficult to discern which phenomena affects the others in what way and order (Teigland, 2021; Trull et al., 2000). For instance, recklessness and criminal behaviour are considered symptomatic of dissocial PD, and at the same time strongly associated with SUD (Chapman & Cellucci, 2007). Further, childhood conduct disorder, early SUD onset (i.e., teenage years) and comorbid dissocial PD and emotionally unstable PD represents a developmental trajectory with high risk for repetitive criminal behaviour (Howard et al., 2013).

According to White (2014), the relationship between SUD and criminal behaviour can be understood based on three different explanatory pathways. The first being that SUD leads to criminal behaviour. One possible mechanism in this pathway is, that persistent drug consumption or withdrawal states increases negative affectivity, and thus aggressive behaviour (Dugre et al., 2017; Rossow, 2001). A further mechanism in this pathway is engaging in criminal activities to secure the necessary financial means to uphold access to substances (Galea et al., 2004; White, 2014). The second pathway posits that criminal behaviour increases the risk of substance use due to exposure to an environment condoning substance use and providing economical funding (Galea et al., 2004; White, 2014). Longitudinal research indicates that early onset criminal behaviour is associated with increased risk of subsequent SUD and mental health difficulties, and social marginalization serves to maintain both criminal behaviour and psychiatric disorders (Kim et al., 2019). One environmental risk factor is family history of SUD, which at the same time represents a hereditary risk factor (Galea et al., 2004; Moffitt, 2005). The last suggested pathway posits that criminal behaviour and substance use share common risk factors such as hyperactivity, impulsivity, trauma, maladaptive family and community environment, and dissocial PD (White, 2014).

One model that has been developed to explain the high comorbidity between SUD and other psychiatric disorders, including dissocial PD, is the common liabilities model. The core principle for the model is that high comorbidity rates between various psychiatric disorders are partially accounted for based on a common genetic predisposition (Tully &

Iacono, 2014). Based on hereditary studies, the model groups externalizing disorders, such as dissocial PD, conduct disorder and SUD characterized by disinhibition and behavioural dyscontrol at one end of a continuous spectrum and internalizing disorders such as depression and anxiety characterized by distress and negative affect at the other end (Forbes et al., 2016). Both externalizing and internalizing disorders share common genetic risk factors, that predispose the individual to maladaptive environmental factors that interact with the genetic predisposition, further driving the development of psychopathology (Caspi et al., 2014; Forbes et al., 2016; Tully & Iacono, 2014). One of the proposed risk factors is emotion dysregulation characterized by a tendency towards frequently experiencing negative emotions and stress and responding with maladaptive emotion regulation (Hall et al., 2018; Tully & Iacono, 2014). Such bidirectional interactions between hereditary emotion dysregulation and impulsivity, and maladaptive childhood experiences have also been proposed as a driving mechanism behind comorbid emotionally unstable PD and SUD (Beauchaine et al., 2009; Trull et al., 2000).

5. Norwegian register study

This chapter begins with the methods section of the cohort study based on registry data from the Norwegian prison population between 2010-2019. Firstly, the Norwegian prison system is presented as the setting of the study, followed by a description of the study population, inclusion and exclusion criteria, data sources, and measures applied to operationalize study variables followed by the statistical analysis. The section concludes with ethical considerations. The second section presents descriptive results regarding sociodemographic and conviction characteristics, prevalence of ICD-10 categories of PD, and comorbidity rates of emotionally unstable PD and dissocial PD with SUD and other PDs. Lastly, results from the fitting of logistic regression models for dissocial PD and emotionally unstable PD are presented.

5.1 Methods

5.1.1 Setting.

Inmates have the same rights to receive immediate and necessary healthcare services in line with all other citizens. Upon being arrested the police assess whether it is necessary for the detainee to be examined by a medical professional. When the prisoner arrives at the correctional facility, everyone is subjected to a mandatory assessment of their current and former somatic and psychiatric health history conducted by a correctional officer, followed by a more thorough examination by a prison nurse. This includes assessing the need to see a

doctor, who then, if deemed necessary, can make a referral to the public mental health care system (Teigland, 2021).

The Norwegian correctional system ("Kriminalomsorgen") applies the import model. Healthcare services are provided by the public healthcare system to ensure that adequate services are provided independent of the correctional system (Teigland, 2021). The correctional facility is bound by law to ensure that the inmates are able to attend necessary hospital appointments (Straffegjennomføringsloven, 2001, § 4).

The municipality where the prison is located is responsible for the provision based on individual assessment, including ensuring that the employees in the prison health center have the necessary competencies. This right is an important aspect of the rehabilitative goal of Norwegian prisons, where one assumes that it is in the individuals and societies best interest that prisoners upon release are prepared for reintegration into society (Lundeberg, 2017). The goal of rehabilitation will however always be secondary to the prevailing goal of security (Falck, 2015). In case of PD and SUD, this mandates the right to an assessment determining if they require remedial action from the public mental health services or community level care (Pasient- og brukerrettighetsloven, 1999, § 2-1). Despite implementation of various measures addressing SUD constituting an important aspect of the rehabilitative goal of incarceration, only a select few have access to these measures (Falck, 2015).

5.1.2 Study population.

The study population included all individuals aged 18 years or older with a 11-digit Norwegian Personal Identification Number (PIN) serving a prison sentence in a Norwegian prison during the observation period from 2010 to 2019 ($N = 51250$). To obtain a PIN, one must either be born in Norway, hold a valid residence permit with a minimum duration of six months or have officially immigrated.

5.1.3 Inclusion and exclusion criteria.

The sample comprises those serving sentences in low- and high-security correctional facilities, including individuals on remand awaiting trial and those sentenced to detention. Individuals serving alternative forms of restricted personal freedom due to criminal offenses, such as serving in substance treatment facilities or home detention, and those sentenced to involuntary psychiatric treatment were not included.

5.1.4 Data sources.

The data for this thesis were provided by the PriSUD research project, developed at the Norwegian Centre for Addiction Research at the University of Oslo (PriSUD, 2023). The data stemmed from The Norwegian Prison Release Study (nPRIS); a cohort based on

administrative data from all inmates in all Norwegian prisons. Using the PIN it was possible to link together individual-level information from the Norwegian Prison Registry, Statistics Norway and the National Patient Register (NPR).

The Norwegian Prison Registry and Statistics Norway provided information regarding prisoner demographics, conviction and sentencing characteristics, and socioeconomic factors respectively (Kriminalomsorgen, 2023; SSB, 2023). The NPR is a national register containing information about all individuals who have received, or are waiting to receive, treatment within the Norwegian specialist health services, including public psychiatric in- and outpatient hospitals, as well as private practitioners, hospitals and treatment providers receiving public reimbursement (Helsedirektoratet, 2023[a]). The registration of psychiatric disorders in NPR began in 2008, but the quality of the registration the first year was low. Hence, only psychiatric disorders registered in NPR during the study period from 2009 to 2019 were included.

5.1.5 Measures.

In the following section the operationalizations of the study variables regarding sociodemographic characteristics psychiatric disorders, comorbidity, prevalence, and conviction and sentencing characteristics are presented. This includes an account of the assessment process pertaining to being diagnosed with a personality disorder or substance use disorder in Norway.

Sociodemographic variables.

Sociodemographic variables, based on data from Statistics Norway and the Norwegian Prison registry, included age, gender, immigration background and educational level. Age was defined based on the how old the individual was when entering prison for the first time during the observation period from 2010 to 2019. The definition of immigration background was based on being born outside Norway or not. Education level was operationalized based on the highest level of education attained by the individual. Primary school was defined as having completed 10 years of Norwegian Grunnskole or less. High school was defined as having attained a high school diploma through regular school attendance or subsequent adult education programs. Lastly, higher education was defined as having completed college or university level education.

Psychiatric disorders.

PD and SUD were defined based on whether the participant was diagnosed with a PD (ICD-10 F60.0-60.9) or SUD (ICD-10 F10-19, excluding F17. Mental and behavioural disorders due to use of tobacco) registered in the NPR during the study period between 2009

and 2019. The variable representing having any PD was not adjusted for comorbidity between PDs. Thus, the total number of PDs registered in the NPR during the study period, and not the total number of individuals registered with any PD is reported. Meaning that the total number of PDs exceeds the total number of individuals diagnosed with a PD.

In Norway, psychiatric disorders are diagnosed based on whether the individual meets the diagnostic criteria of the specific disorder as defined in the ICD-10 (WHO, 1992; see chapter three for specific diagnostic criteria), assessed through standardized testing, clinical interviews and observations, and supplemental third-party information. Having a PD or SUD was defined as meeting the diagnostic criteria for F60.0-60.9 or F10-19 as assessed and registered by an authorized and qualified medical health professional.

The Norwegian Health Directorate has developed National Professional Directives regarding assessment and treatment of some psychiatric disorders (e.g., addiction and concurrent mental disorders and substance use disorders) (Helsedirektoratet, 2017; 2022). These guidelines recommend unstructured and structured interviews, behavioural observations, anamnestic information, standardized tests, and interdisciplinary clinical assessments of the patient to form the basis of differential diagnostic evaluations. Such standardized guidelines are lacking for PD. The lack of National Professional Directives for the assessment and treatment of PD has been criticized for contributing to maintaining differences in the access to qualified treatment based on gender and geographical location (Eikenæs et al., 2021).

Comorbidity.

Comorbidity between PD in general, and dissocial PD, emotionally unstable PD in specific, with SUD, was defined based on whether the participant was diagnosed with one or multiple F60.0-60.9 diagnoses and one or more F10-19 registered in the NPR during the study period. Comorbidity between PDs was defined as being registered with either dissocial PD or emotionally unstable PD and one or multiple concurrent F60.0-F60.9 diagnoses in the NPR in during the study period.

Conviction and sentencing characteristics.

Data describing main offense leading to conviction, and number of incarcerations was obtained from the Norwegian Prison Registry.

Main offense was collapsed into five categories and defined as the most severe offense that was part of the conviction leading to incarceration during the observation period from 2010 to 2019. The variable is defined at an individual level and indicates the proportion of individuals in the defined groups that served a sentence for the specific offense during the

observation period from 2010-2019. The five categories were drug and alcohol offenses; violence and sexual offenses (including sexual offenses, and violence and maltreatment); homicide; public order (including traffic offences, public order and integrity violations, criminal damage, and other offenses); offenses for profit (including property theft and other acquisitive crimes).

Number of incarcerations was defined at the individual level and categorized into five separate categories from one to four, and five or more in the descriptive analysis. The categorization was based on the number of separate convictions leading to incarceration during the observation period. To ease interpretation, number of incarcerations was defined as into three separate categories (one, two, and three or more incarcerations) for the logistic regression.

5.1.6 Prevalence.

Prevalence in general.

Prevalence is a parameter characterized by high heterogeneity with regards to how it is estimated. It can be defined as "the proportion of a population who have a specific characteristic in a given time period" (National Institute of Mental Health [NIMH], 2023). The given time-period can vary. Common time-periods are point-prevalence (i.e., single specific point in time), period-prevalence (e.g., last 12-months), and lifetime-prevalence (i.e., the proportion who had the characteristic at any point during their life) (NIMH, 2023).

In addition to actual differences in prevalence, estimates are affected by various study design characteristics such as use of self-report measures, the profession of the person conducting the assessment, participation rate, sample characteristics (e.g., gender, and selection based on type of offense or prison security level), and estimation methods (Fazel & Seewald, 2012; Fazel et al., 2017). Caution is also advised when comparing prevalence in the prison population across countries, as there are considerable differences in incarceration rates, attitudes toward mental illness and availability of psychiatric treatment (Fazel & Seewald, 2012; Greenberg & Rosenheck, 2014).

Prevalence in the current study.

Prevalence was defined as the proportion of individuals in the cohort, or defined subgroups, who received a psychiatric diagnosis registered in the NPR during the study period. Meaning all primary and secondary diagnoses registered between 2009 and 2019, irrespective of being registered before, during or after incarceration were included. Psychiatric diagnosis received before 2009 were not included unless they were registered post hoc during the study period. Based on diagnoses being registered in the NPR upon actual or

planned contact with the public mental health care system or affiliated treatment providers, the current prevalence is inextricably linked to treatment-seeking behaviour.

5.1.7 Statistical analysis.

All analysis were conducted using IBM SPSS Statistics version 29.0. Due to the size and nature of the sample and data, power and missing data were not an issue of concern. Categorical variables included in the descriptive analysis were summarized as percentage of cases within the defined groups, and age (the only continuous variable) was summarized with mean and standard deviation. Two separate logistic regression models were fitted to estimate factors associated dissocial PD and emotionally unstable PD respectively. The process is described in further detail below.

Descriptive procedure.

In the first step all participants were stratified into groups based on being diagnosed with any PD or not, and dissocial PD or emotionally unstable PD or not. The next step explored various characteristics within these groups. In the third step, prevalence of the ten PD categories distinguished in ICD-10 (WHO, 1992) were calculated. The prevalence of SUD was calculated for each of the groups defined in the first step.

Logistic regression.

Logistic regression is a model for identifying predictors of, and factors associated with, a categorical outcome, such as presence or absence of a psychiatric disorder, based on both categorical and continuous variables (Field, 2018; Stavseth et al., 2020). Logistic regression is interpreted based on odds ratio (OR), which represents the change in the odds for the outcome based on a one-unit change in the predictor (Field, 2018).

Covariate selection for the univariate analysis was based on a combination of expert selection and data availability, whereas selection for the multivariate models was based on purposeful selection. With this approach, all covariates were first tested univariately, and included in the subsequent multivariate analysis if significant with the alpha level set at .25 (Stavseth et al., 2020). Two separate full models, including all significant covariates from the univariate analysis, were fitted with dissocial PD and emotionally unstable PD as the outcome. Lastly, two final models, consisting of all covariates with a significant OR based on an alpha level of .05 in the full model, were fitted. The *p*-value cutoff of .05 instead of .25 was chosen based on the large *N* reducing the risk of important variables not being identified (Bursac et al., 2008). All models were fitted using the *Enter* method Unadjusted and adjusted OR, 95 % confidence interval (CI) and, *p*-value were reported for all univariate and multivariate analysis respectively. In general, the conventional alpha-level of .05 was applied.

5.1.8 Ethics.

In the following specific ethical approvals regarding provision and use of data in the current study are briefly stated, followed by a presentation of ethical considerations pertaining to research based on registry data an in a prison context more broadly.

Ethics approval.

As previously mentioned, the data in this study was provided by the PriSUD project based at the University of Oslo. Accordingly, the necessary ethical approvals were obtained:

> The Norwegian registry linkage has been approved by the Regional Committees for Medical and Health Research Ethics (REC id 2012/1401, 29513), the Norwegian Centre for Research Data (NSD id 847562) and the Data Protection Officer in the Faculty of Medicine at the University of Oslo. (Bukten et al., 2022, p. 5)

To ensure protection of privacy and confidentiality, all data provided by the PriSUD project for the purpose of this thesis is de-identified, anonymized, and securely stored within the Services for Sensitive Data (Bukten et al., 2022; PriSUD, 2023). The author applied for access to the secure server and was granted limited access to only data necessary for the writing of this thesis. A third-party contract, provided by the University of Copenhagen, between the author, the external project partner and the internal thesis adviser was signed. Additionally, a contract was drawn up between a representative of the University of Oslo/the project and the author, specifying what data were made available based on necessity and relevancy related to the current research objective.

Ethical considerations regarding use of registry data.

Health research based on registry data requires ethical approval by REC but is exempt from the ethical principal of informed consent (Bukten et al., 2022; Helseforskningsloven, 2008; Regjeringen, 2022). Informed consent is an important tenet in the Nuremberg Code and Declaration of Helsinki. According to Backe-Hansen (2012), the following three prerequisites must be met for true informed consent to be given: 1) the participant must have sufficient information on the risks of participation, research purpose and methods. 2) The participant must have the competency to consent (i.e., aged over 18 years and absence of medical conditions requiring legal guardianship). 3) Participation must be voluntary and not based on coercion, manipulation, or wrongful information. The opportunity to withdraw consent without questioning or repercussions throughout the entire research process is an important aspect of informed consent and voluntariness (Backe-Hansen, 2012).

Due to registration in NPR being mandatory, reservation against health information being stored is not possible, nor against data being applied for research purposes. However, everyone has the right to access information registered about oneself in NPR, and information on research projects where such information is analyzed (Helsedirektoratet, 2023[b]). The Law on Medical and Health Research (Helseforskningsloven, 2008), states that access only be granted to data that are relevant and necessary to obtain the research objective. The exemption of obtaining consent to conduct research is founded on an assumption that health research with registry data can have great benefits for the individual citizens as well as on a societal level (Regjeringen, 2022).

Ethical considerations regarding research with vulnerable groups.

The Declaration of Helsinki states that research conducted in vulnerable groups is permissible if it cannot be conducted using non-vulnerable groups (National Research Ethics Committees, 2020). Prisoners are considered a vulnerable group, at least during imprisonment based on lack of freedom and correspondingly dependency, but also potentially in a longer perspective due risk of institutionalization and stigmatization (Arboleds-Flórez & Weisstub, 2013). Thus, being imprisoned alone represents belonging to a stigmatized and disadvantaged group, which presumably can be further amplified through having a simultaneous psychiatric disorder (Arboleda-Flóres & Weisstub, 2013; Bukten et al., 2022). It is important to ensure scientific knowledge specific to the unique situation and needs of the prison population (Bukten et al., 2022).

One central principal when conducting research is that participation must be voluntary. This is of particular importance in a prison setting, where confinement can increase the risk of coercion due to fear of repercussions by appearing non cooperative (Arboleds-Flórez & Weisstub, 2013; Backe-Hansen, 2012). Registry data does not require direct contact between researcher and participants, thus minimizing the risk of coercion. However, as elaborated on in the previous section, the principal of voluntary participation was violated due to use of registry data.

Historically, extensive research has been conducted using prison populations, in many instances causing varying degrees of harmful consequences for the participants (Arboleda-Flóres & Weisstub, 2013). When conducting research with vulnerable groups, it is especially important to maintain that the results should be beneficial to the study population (Arboleds-Flórez & Weisstub, 2013; Creswell & Creswell, 2018; National Research Ethics Committees, 2020). One way to promote this is through user involvement, which is an integral part of the PriSUD project (Bukten et al., 2022). All information regarding diagnoses of psychiatric

disorders, sociodemographic data and criminal records were collected irrespective of the research project and current thesis. Further, if the research objectives are achieved, insights from the project can provide evidence for policy change and implementation of interventions to the benefit of the Norwegian prison population (Bukten et al., 2022).

5.2 Results

5.2.1 Sample characteristics.

Table 3 displays basic sociodemographic information based on presence or absence of a registered PD. A total of 51250 people served a prison sentence in Norway during the observation period from 2010 to 2019. Of those, 4041 (7.9 %) were registered with a PD (ICD-10 F60.0-60.9) during the study period from 2009 to 2019. The results indicate large differences regarding the gender distribution within different groups. The proportion of women in the group diagnosed with a PD was twice as big as the proportion of women in the group not diagnosed with a PD. Of prisoners diagnosed with emotionally unstable PD, 38.6 % were female compared to only 10.6 % of the total sample and 6.2 % of those diagnosed with dissocial PD.

Table 3: *Sociodemographic characteristics of the Norwegian prison population 2010-2019, stratified by personality disorder (PD), not having a PD (Non-PD), dissocial PD and emotionally unstable PD*

	Total sample	Non-PD	PD	Dissocial PD	Emotionally unstable PD
Gender[1] (%)					
Female	5450 (10.6)	4662 (9.9)	788 (19.5)	81 (6.2)	530 (38.6)
Male	45785 (89.4)	42532 (90.1)	3253 (80.5)	1236 (93.8)	844 (61.4)
Mean age at first incarceration (*SD*)	35.95 (*12.50*)	36.15 (*12.66*)	33.60 (*12.66*)	31.86 (*9.79*)	32.86 (*9.92*)
Education level (%)					
Primary school	21.6	21.4	25.1	28.1	26
High school	68.4	68.4	67.7	66.2	67.8
Higher education	7.9	8	6.6	3.4	5
Immigration background (%)	24.3	25.1	14.6	17.2	13.1

Note: % = proportion of the group defined in the column heading, not of the total sample.
[1] 15 persons had missing gender information

Individuals not diagnosed with a PD tended to be older, especially compared to those diagnosed with emotionally unstable and dissocial PD (Table 3). Individuals with dissocial PD had the lowest education level with 3.4 % having higher education compared to 5 % of individual diagnosed with emotionally unstable PD, and 8 % of those not diagnosed with a

PD. Immigration background was less frequent among individual in the PD groups compared to among individuals without a PD.

5.2.2 Conviction and sentencing characteristics.

Table 4 displays conviction and sentencing characteristics based on stratification into the defined groups. The proportion of individuals diagnosed with a PD, that had been incarcerated three or four times was approximately twice as big, and three times as big for having been incarcerated five times or more as compared to among those not diagnosed with a PD. Multiple convictions were most frequent among individuals diagnosed with dissocial PD. In this group, 16.6 % served five or more sentences during the observation period, compared to 2.8 % of individuals without a PD and 6.3 % of individuals diagnosed with emotionally unstable PD.

Table 4: *Conviction and sentencing characteristics of the Norwegian prison population 2010-2019, stratified by personality disorder (PD), not having a PD (Non-PD), dissocial PD and emotionally unstable PD*

	PD	Non-PD	Dissocial PD	Emotionally unstable PD
	n (%)	n (%)	n (%)	n (%)
Number of incarcerations				
One	2282 (56.5)	34093 (72.2)	488 (37.1)	859 (62.5)
Two	801 (19.8)	7754 (16.4)	300 (22.8)	242 (17.6)
Three	399 (9.9)	2807 (5.9)	189 (14.4)	121 (8.8)
Four	214 (5.3)	1319 (2.8)	120 (9.1)	66 (4.8)
Five or more	345 (8.5)	1236 (2.8)	220 (16.6)	86 (6.3)
Main offense				
Drug and alcohol offenses	1392 (34.4)	17499 (37.1)	436 (33.1)	479 (34.9)
Violence and sexual offenses	1977 (48.9)	17542 (37.2)	837 (63.6)	623 (45.3)
Homicide	59 (1.5)	290 (0.6)	39 (3.0)	8 (0.6)
Public order	842 (20.8)	7652 (16.2)	338 (25.7)	273 (19.9)
Offenses for profit	814 (20.1)	8555 (18.1)	338 (25.7)	223 (16.2)

Note: % = proportion of the group defined in the column heading, not of the total sample.

Regarding type of main offense, the results indicate a trend towards individuals with dissocial PD committing more serious offenses such as homicide and violence and sexual offences. Of the 349 individuals commencing a prison sentence based on being convicted for homicide during the observation period, 39 were diagnosed with dissocial PD. Three percent of those diagnosed with dissocial PD were registered with homicide as the main offense, compared to 1.5 % among those with any PD, and 0.6 % of those diagnosed with emotionally

unstable PD or not diagnosed with a PD. The proportion of individuals convicted for violence and sexual offenses, and public order offenses was bigger among individuals diagnosed with PD, especially dissocial PD (Table 4).

5.2.3 Prevalence of personality disorder categories and substance use disorder.

Table 5 displays the number and proportion of individuals that were registered to have a PD in NPR during the study period. The most prevalent PDs in the prison cohort were dissocial PD and emotionally unstable PD, followed by unspecified PD and anxious [avoidant] PD.

Table 5: *Prevalence of ICD-10 personality disorders (PD) in the Norwegian prison population 2010-2019*

Personality disorder	ICD-10 code	*n*	%
Paranoid	60.0	486	0.9
Schizoid	60.1	127	0.2
Dissocial	60.2	1317	2.6
Emotionally unstable	60.3	1374	2.7
Histrionic	60.4	33	0.1
Anankastic	60.5	89	0.2
Anxious [avoidant]	60.6	599	1.2
Dependent	60.7	123	0.2
Other specific	60.8	217	0.4
Unspecified	60.9	971	1.9

Note: Based on diagnosis registered in NPR during the study period from 2009 to 2019. Not adjusted for comorbidity between multiple PDs.

Table 6 displays prevalence of substance use disorder (SUD) (ICD-10 F10-19). The prevalence of SUD was higher among individuals diagnosed with a PD (77.3 %), compared to individuals who were not registered with a PD in NPR (41 %). Prevalence rates of comorbid SUD was approximately equal among individuals with dissocial PD and emotionally unstable PD, both being higher than among individuals with any PD or without a PD (Table 6). Further, more than one third of individuals diagnosed with either dissocial PD or emotionally unstable PD were registered with a comorbid PD.

Table 6: *Prevalence of substance use disorder (SUD) and comorbid personality disorder (PD) in the Norwegian prison population 2010-2019, stratified by PD, not having a PD (Non-PD), dissocial PD and emotionally unstable PD*

	Dissocial PD	Emotionally unstable PD	PD	Non-PD
Prevalence of SUD (%)	83.7	82.1	77.3	41
Comorbid PD (%)	36.2	38.8		

5.2.4 Logistic regression.

The adjusted full model of dissocial PD indicated that being diagnosed with SUD (OR 5.57, 95 % CI 4.77-6.50) and being male (OR 1.61, 95 % CI 1.27-2.03) was associated with increased risk of being diagnosed with dissocial PD (Table 7). Whereas being older at the time for the first incarceration (OR 0.99, 95 % CI 0.98-0.99) was associated with decreased risk. Regarding crime related factors, homicide (OR 4.38, 95 % CI 3.03-6.33), violence and sexual offenses (OR 2.19, 95 % CI 1.91-2.50), and public order offenses (OR 1.34, 95 % CI 1.16-1.54), and having commenced more than one incarceration (two incarcerations: OR 1.67, 95 % CI 1.43-1.95; three or more incarcerations: OR 2.78, 95 % CI 2.38-3.25) during the observation period was associated with increased risk of being diagnosed with dissocial PD during the study period. Being sentenced based on drug and alcohol offenses as the main offense (OR 0.72, 95 % CI 0.63-0.83) was associated with decreased risk of being diagnosed with dissocial PD during the study period from 2009 to 2019.

Table 7: *Factors associated with being diagnosed with dissocial personality disorder. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) from logistic regression.*

| | Unadjusted | | Adjusted | | | |
| | Univariate | | Full multivariate model | | Final multivariate model | |
Risk factor	OR (CI)	*p*	OR (CI)	*p*	OR (CI)	*p*
Sociodemographics						
Male	1.84 (1.47-2.31)	< .001	1.64 (1.29-2.07)	< .001	1.61 (1.27-2.03)	< .001
Non-immigration	1.56 (1.35-1.80)	< .001	1.05 (.90-1.22)	.540		
Age (continuous)	0.97 (0.97-0.98)	< .001	0.99 (0.98-0.99)	< .001	0.99 (0.98-0.99)	< .001
Education: High (ref)						
Primary school	3.02 (2.21-4.13)	< .001	1.16 (.83-1.60)	.385		
High school	2.27 (1.67-3.08)	< .001	1.21 (.88-1.65)	.244		
Conviction characteristics						
N. of incarcerations: One (ref)						
Two incarcerations	2.67 (2.31-3.09)	< .001	1.61 (1.37-1.89)	< .001	1.67 (1.43-1.95)	< .001
Three or more incarcerations	6.72 (5.92-7.62)	< .001	2.54 (2.12-3.04)	< .001	2.78 (2.38-3.25)	< .001
Main offense						
Drug and alcohol offenses	0.84 (0.75-0.95)	.004	0.76 (0.66-0.88)	< .001	0.72 (0.63-0.83)	< .001
Violence and sexual offenses	2.92 (2.60-3.27)	< .001	2.33 (2.02-2.69)	< .001	2.19 (1.91-2.50)	< .001
Homicide	4.89 (3.49-6.85)	< .001	4.65 (3.21-6.74)	< .001	4.38 (3.03-6.33)	< .001
Public order	1.77 (1.56-2.01)	< .001	1.39 (1.20-1.61)	< .001	1.34 (1.16-1.54)	< .001
Offenses for profit	1.56 (1.38-1.77)	< .001	1.16 (1.00-1.35)	.054		
Substance use disorder	6.84 (5.90-7.92)	< .001	5.34 (4.55-6.26)	< .001	5.57 (4.77-6.50)	< .001

The adjusted full model for emotionally unstable PD indicates that there are some common risk factors across PDs, but generally shows a differing pattern of associated risk factors compared to the model for dissocial PD. Being diagnosed with SUD (OR 5.36, 95 % CI 4.64-6.20), female (OR 5.58, 95 % CI 4.95-6.29), and born in Norway (OR 1.36, 95 % CI 1.15-1.60) was associated with increased risk of being diagnosed with emotionally unstable PD, whereas being older at the time of the first incarceration (OR 0.98, 95 % CI 0.98-0.99) was associated with decreased risk (Table 8). Regarding crime related factors, violence, and sexual offenses (OR 1.61, 95 % CI 1.41-1.83), and public order offenses (OR 1.37 95 % CI 1.19-1.59) were associated with increased risk, and drug and alcohol offenses (OR 0.81, 95 % CI 0.71-0.92) as the main offense during the observation period was associated with decreased risk of being diagnosed with emotionally unstable PD during the study period.

Table 8: *Factors associated with being diagnosed with emotionally unstable personality disorder. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) from logistic regression*

| | Unadjusted | | Adjusted | | | |
| | Univariate | | Full multivariate model | | Final multivariate model | |
Risk factor	OR (CI)	p	OR (CI)	p	OR (CI)	p
Sociodemographics						
Female	5.74 (5.13-6.42)	< .001	5.56 (4.93-6.23)	< .001	5.58 (4.95-6.29)	< .001
Non-immigration	2.16 (1.85-2.54)	< .001	1.31 (1.11-1.55)	.002	1.36 (1.15-1.60)	< .001
Age (continuous)	0.98 (0.97-0.98)	< .001	0.95 (0.94-0.97)	< .001	0.98 (0.98-0.99)	< .001
Education: High (ref)						
Primary school	1.81 (1.40-2.36)	< .001	1.18 (.90-1.55)	.231		
High school	1.56 (1.22-2.00)	< .001	1.91 (.92-1.54)	.182		
Conviction characteristics						
N. of incarcerations: One (ref)						
Two incarcerations	1.20 (1.04-1.39)	.012	0.91 (0.78-1.07)	.269		
Three or more incarcerations	1.87 (1.63-2.15)	< .001	1.19 (.98-1.45)	.078		
Main offense						
Drug and alcohol offenses	0.92 (0.82-1.02)	.120	0.75 (0.65-0.87)	< .001	0.81 (0.71-0.92)	.001
Violence and sexual offenses	1.36 (1.22-1.52)	< .001	1.62 (1.39-1.88)	< .001	1.61 (1.41-1.83)	< .001
Homicide	0.85 (0.42-1.72)	.652				
Public order	1.26 (1.10-1.44)	< .001	1.33 (1.13-1.56)	< .001	1.37 (1.19-1.59)	< .001
Offenses for profit	0.86 (0.75-1.00)	.046	0.76 (0.64-0.91)	.003		
Substance use disorder	6.12 (5.32-7.03)	< .001	5.06 (4.36-5.90)	< .001	5.36 (4.64-6.20)	< .001

6. Discussion

The following chapter first discusses the main results from the register study based on prior empirical findings, including strengths and limitations. In the second part, findings from the registry study and prior empirical studies are discussed in a theoretical perspective based on emotion regulation and emotion dysregulation. This includes strengths and limitations of the thesis, practical implications, and recommendations regarding future research.

6.1 Discussion of registry study findings

6.1.1 Main findings.

The register study aimed at investigating the prevalence of PD and comorbid SUD, as well as factors associated with being diagnosed with dissocial PD of emotionally unstable PD based on a sample consisting of 51250 individuals commencing a prison sentence in Norway between 2010 and 2019. Findings indicate that a prevalence for any PD (ICD-10 F60.0-60.9; WHO, 1992) of 7.9 % in the Norwegian prison population. The prevalence of SUD (ICD-10 F10-19, WHO, 1992) was high, both among those who were not registered with a PD (41 %) and those who were registered with a PD (77.3 %) in NPR. Further, over 80 % with either dissocial PD or emotionally unstable PD had a comorbid SUD, and close to 40 % had a comorbid PD. Increased risk of being diagnosed with dissocial PD was associated with the following factors: being diagnosed with SUD, male, convicted for homicide, violence and sexual offenses, or public order offenses, and having a history of multiple convictions. Contrary, older age and being convicted for drug and alcohol offenses were associated with decreased risk of being diagnosed with dissocial PD. As for being diagnosed with emotionally unstable PD the following factors were associated with increased risk: being diagnosed with SUD, female, born in Norway, and convicted for violence and sexual offenses, or public order offenses. Older age and drug and alcohol offenses were associated with decreased risk of being diagnosed with emotionally unstable PD.

6.1.2 Factors associated with having dissocial PD and emotionally unstable PD.

SUD was the identified risk factor most strongly associated with being diagnosed with either dissocial PD or emotionally unstable PD. One possible interpretation of this association is overlap in diagnostic criteria. The mere fact that consumption of many substances in themselves, or in combination with certain activities, are illegal can appear especially appealing to individuals diagnosed with dissocial PD, based on their tendency towards norm breaking behaviour (Vergés & Sher, 2016). In addition, recklessness in the form of harmful substance use is considered symptomatic of dissocial PD (APA, 2013). Emotion dysregulation, impulsivity, and relational difficulties are symptomatic of both SUD and

emotionally unstable PD (Trull et al., 2000), and impulsive substance use is a diagnostic criterion for emotionally unstable PD (APA, 2013).

   Conviction and sentencing characteristics.

   Being convicted for violence and sexual offenses was significantly associated with increased risk of being diagnosed with dissocial PD or emotionally unstable PD. For dissocial PD, having committed homicide constituted a further risk factor. This is in concordance with prior research indicating that having a PD is a risk factor for sexual and violent reoffending after controlling for sociodemographic factors (Långström et al., 2004), and that dissocial PD is more prevalent among violent compared to non-violent offenders (Proctor et al., 2017). Due to aggression and violent behaviour being part of diagnostic criteria for both PDs (McGonigal & Dixon-Gordon, 2020), the association could simply be a reflection hereof. One possible explanation is that the association between violence and PD reflects a tendency towards inflexibly resorting to outward aggression to regulate emotions. Depending on contextual factors capitalizing on anger can be effective in terms of goal-attainment, especially short term in confrontational setting (Kashdan & Rottenberg, 2010; Tamir et al., 2008). In harsh environments where criminality and violence frequently occur, confrontations are common and refraining from aggressing can have detrimental consequences, above being incarcerated for a violent crime. Such harsh environments condoning, and over time desensitizing towards violent behaviour, can also potentially explain the significant association between homicide and dissocial PD. However, based on the absence of an association with emotionally unstable PD, it could also be understood as a reflection of the lack of empathy, and contempt for other people common among individuals diagnosed with dissocial PD (APA, 2013).

   A different possible explanation for the association of violent and sexual offending with being diagnosed with a PD, is the high prevalence of comorbid SUD (app. 80 %) among those with dissocial PD or emotionally unstable PD. Research indicates that homicide rates increase when alcohol consumption increases, and that this association is stronger in Nordic countries where heavy drinking episodes are more common, compared to other European countries (Rossow, 2001). Having dissocial PD is associated with more frequent episodes of heavy drinking (Reardon et al., 2002). Alcohol influence is common on the part of the perpetrator, but also in victims of violence, causality is however difficult to establish (Rossow, 2001). Correspondingly, a Swedish study based on registry data found that most cases of violent reoffending among those serving community sentences was committed by individuals with SUD (Yukhnenko et al., 2023). A prospective study involving individuals

discharged from acute hospitalization due to psychiatric disorders indicates that persistent cannabis use among individuals moderately increases the risk of various forms of violent behaviour (Dugre et al., 2017). Thus, SUD could act as a mediator between PDs and violent offending. However, research indicates that the association between PD and violent reoffending cannot be explained by SUD alone (Chang et al., 2015$_a$). This is also reflected in findings from a previous study, where being diagnosed with dissocial PD in addition to SUD was associated with increased risk of violent behaviour during incarceration (Friedmann et al., 2008).

Drug and alcohol related offenses as the main conviction was associated with reduced risk of both PDs. One possible explanation for this relationship is, that this offense category likely represents more serious crimes related to importation and distribution of drugs, and not primarily less serious offenses such as possession and use, due to the definition of the variable (Falck, 2015). Presumably individuals in this conviction category belong to a different environment than those committing violent or public order offences.

In line with previous research, having served more than one prison sentence was significantly associated with dissocial PD (Fridell et al., 2007; Mundt & Baranyi, 2020), but not emotionally unstable PD. A history of three or more sentences was associated with an almost three-fold increase in the risk of being diagnosed with dissocial PD. Based on previous research and theoretical considerations, this can be understood as the prison setting representing a maladaptive and harsh environment that precipitates and perpetuates dissociality (Beauchaine et al., 2009; Moffitt, 2005; Smith et al., 2005; Walsh et al., 2020). Other possible explanatory mechanisms could include model learning and reinforcement, where violent behaviour ensures safety and elicits respect from fellow inmates. Maladaptive model learning can presumably become an increasingly pertinent issue due to the rising proportion of incarcerated individuals with psychiatric disorders (Gunter et al., 2008). Increased utilization of alternative sentencing (e.g., electronic monitoring) tends to displace individuals with higher functional ability out of prisons.

Sociodemographic characteristics.

Being male was identified as a risk factor for being diagnosed with dissocial PD. This is in line with findings from a previous review where overall 47 % of male and 21 % of female incarcerated individuals met diagnostic criteria for dissocial PD (Fazel & Danesh, 2002). Gender was also highly associated with being diagnosed with emotionally unstable PD, with being female representing an almost six-fold increase in the odds of being diagnosed. The proportion of women among those diagnosed with emotionally unstable PD

in the current sample was noticeably larger than the proportion of women in the total prison population. This could be explained by the prevalence being based on treatment data, as females with emotionally unstable PD are more prone to treatment-seeking behaviour compared to men (Karterud et al., 2017; Wilberg et al., 2020).

Also consistent with previous research, being older at the time of commencing the first prison sentence during the observation period was associated with decreased risk of being diagnosed with dissocial PD or emotionally unstable PD (e.g., Chapman & Cellucci, 2007; Fridell et al., 2007). This could be due to the definition of psychiatric disorders, as only diagnoses registered in NPR between 2009 and 2019 were included. Older individuals are more likely to have been diagnosed prior to 2009 compared to younger individuals. Hence, the likelihood of having a PD that is not registered in NPR presumably increases with age. A different explanation is that the severity of symptoms of both dissocial PD and emotionally unstable PD tends to reduce with age and treatment, and remit to an extent where diagnostic criteria are no longer met (APA, 2013; Karterud et al., 2017). Lastly, the association with age can be explained by an increase in treatment options for PD (Wilberg et al., 2020), which potentially also can have led to an increase in diagnoses of PD in clinical practice.

In the current study, immigration appeared to act as a protective factor for emotionally unstable PD, and was non-significant for dissocial PD. This could be due to fewer immigrants receiving a correct diagnosis, or due to less frequent contact with the public mental health system. Cultural differences regarding the understanding of mental health, and lack of knowledge about the opportunities to receive help in the public mental health system among immigrants can explain a reduced tendency towards help-seeking behaviour (Hauff et al., 2020). Further, considering how deviation from cultural norm constitutes a central aspect of diagnostic criteria for PD, lack of cultural sensitivity in public mental health care can contribute to mental health professionals misinterpreting presenting symptoms among immigrants (WHO, 1992). Additionally, not having a PIN being an exclusion criterion could also be a contributing factor with regards to immigration appearing to be a protective factor for being diagnosed with emotionally unstable PD, as it to some extent restricts the diversity of the cohort regarding nationality.

6.1.3 Prevalence of PD and comorbid SUD.

Prevalence of PD in general in the current sample compared to previous studies.

The prevalence of PD of 8 % in the Norwegian prison population in the current study is substantially lower than the prevalence of around 42 % for women and 65 % for men reported in multiple previous international studies (e.g., Fazel & Danesh, 2002). The current

prevalence is also low compared to previous Norwegian findings, indicating that 73-80 % of incarcerated individuals meet diagnostic criteria for a PD (Cramer, 2014; Langeveld & Melhus, 2004). One possible explanation for the diverging prevalence rates is that a limited number of studies applied comparable measures of psychiatric disorders. Prior studies predominantly assessed the prevalence of PD through interviewing individuals while incarcerated, whereas the current prevalence is based on diagnoses received through contact with the public mental health care system. Two Swedish studies based on registry data found a prevalence of PD among individuals convicted for sexual offenses of 1.8 % (based only on inpatient data: Långström et al., 2004), and 5 % among men (n_{male} = 43840) and 10 % among women (n_{female} = 3486) in a general prison population (Chang et al., 2015$_a$). Whereas meta-analytic findings based solely on expert-rated measures in the assessment of PD indicate a prevalence of 7.74 % in the general population (Volkert et al., 2018). The studies reporting prevalence of PD of around 50 % are all based on assessment during incarceration (e.g., Chapman & Cellucci, 2007; Eher et al., 2019; Mir et al., 2015). The current study, and other studies reporting substantially lower prevalence numbers, are based on assessment not entirely restricted to the prison setting (e.g., Långström et al., 2004; van den Brink et al., 2018; Zwemstra et al., 2009). The high prevalence numbers could potentially reflect circumstances pertaining to the prison context inflating current symptoms (Teigland, 2021). Further, most studies only reported the prevalence of dissocial PD and emotionally unstable PD, which could also have contributed to the difference in prevalence of PD in general, as they have been identified as the most prevalent PDs in the prison population.

Prevalence of specific PD categories.

Similar to PD in general, many previous studies found considerably higher prevalence of dissocial PD and emotionally unstable PD among prisoners than indicated by the current study (e.g., Langeveld & Melhus, 2004; Mundt & Baranyi, 2020; Piselli et al., 2015; Tye & Mullen, 2006). Some studies also report prevalence more in concordance with the current findings. Van den Brink et al. (2018) found a prevalence of emotionally unstable PD of 5 % among 2324 men and 30 % among 203 women in a psychiatric prison unit. In an American National representative sample (N = 36309), 5.9 % of those who reported contact with the criminal justice system in the past year met DSM-IV diagnostic criteria for dissocial PD, 4.6 % for emotionally unstable PD, and 10.4 % for both types of PD (Howard et al., 2021).

Comorbidity rates of dissocial PD or emotionally unstable PD with other PDs, corresponds to previous comorbidity rates of 40-50 % (Fridell et al., 2007; O'Driscoll et al., 2012) in correctional samples. However, prevalence of comorbidity between PDs varied from

17 % (van den Brink et al., 2018), up to 90 % for comorbidity between dissocial PD and emotionally unstable PD (Wetterborg et al., 2015).

The prevalence of the remaining specific ICD-10 PD categories in the current study is lower compared to prior findings in the Norwegian prison population (Cramer, 2014). However, prevalence varies substantially across previous studies conducted in a correctional setting; paranoid PD (1.4-21 %), schizoid PD (7 %), histrionic PD (0.9-7 %), anankastic PD (4.2-30 %), anxious [avoidant] PD (2.8-20 %), dependent PD (1.4-6 %), narcissistic PD (corresponding to ICD-10 F60.9 other specific; 1.4-13.8 %), and unspecified PD (15.8-26.8 %) (Cramer, 2014; Eher et al., 2019; Zwemstra et al., 2009). This could be due to the definition of PD in the current study requiring contact with the public mental health care system, and corresponding different characteristics of the sample or comprehensiveness of the assessment process. When compared to findings from a meta-analysis of Western prevalence studies in the general population (Volkert et al., 2018), the prevalence of PD is more similar. Some personality disorders, such as anxious [avoidant] PD (1.2 % vs 2.8 %), paranoid PD (0.9 % vs 3 %), anankastic PD (0.2 % vs 2.8 %), and unspecified PD (1.9 % vs 1.6 %) appear lower in the prison population compared to the general population (Volkert et al., 2018).

Prevalence of SUD.

Consistent with research from other countries, the prevalence of SUD in the Norwegian prison population was high (Fazel et al., 2017), especially among individuals diagnosed with PD (Chang et al., 2015). The comorbidity rate between PD and SUD in the Norwegian prison population (77.3 %) was similar to what is reported in international correctional samples ([71-80 %] Bennett & Johnson, 2017; Tye & Mullen, 2006), and previous Norwegian studies ([51.3-95 %] Cramer, 2014; Langeveld & Melhus). Regarding the high prevalence of SUD, it is worth noting that the diagnosis should be regularly reassessed based on change in consumption pattern and removed if the diagnostic criteria have not been met the last 12 months. Assuming that such reassessments are not done regularly, this could inflate the prevalence rate.

Comorbidity with SUD was prevalent, not only among individuals with dissocial PD or emotionally unstable PD, but also among those with PD in general. Trull et al. (2016) proposes SUD as a regulatory strategy when experiencing negative emotions as an explanatory mechanism, as both paranoid PD, anxious [avoidant] PD, and anankastic PD are characterized by negative affectivity. This further highlights the overlap between different personality disorders, and the importance of research aimed at identifying common

underlying factors. This will presumably become even more relevant when the dimensional approach to PD in ICD-11 is implemented in clinical practice.

6.1.4 Strengths and limitations of the national register study.

The current definition of psychiatric disorders of having a diagnosis registered in the NPR is associated with strengths and limitations. One limitation of the study is that the reported prevalence might be restricted to predominantly severe cases, as the individuals in the current study identified as having a psychiatric disorder represent a treatment-seeking sample (Yukhnenko et al., 2023). Whereas individuals who are less impacted by underlying personality pathology might not seek treatment. This is especially problematic considering how individuals with dissocial PD tend not to seek treatment, as the symptoms are often primarily perceived as problematic by the surroundings (Arefjord, 2021; Wilberg et al., 2020). At the same time, the current sample could also be restricted regarding the most severe and debilitating cases, as some individuals might not be able to seek treatment.

To receive a diagnosis in NPR, one must first come in to contact with the health care system. Considering how particularly men with emotionally unstable PD, dissocial PD and SUD are assumed to be overrepresented in correctional settings and underrepresented in psychiatric settings (Arefjord, 2021; Karterud et al., 2017), and not all diagnoses are registered in NPR. For example, not all individuals included in opioid agonist treatment prior to 2009 are registered with a F11.22 Opioid dependence currently on a clinically supervised maintenance or replacement regime in NPR (Edland-Gryt & Christiansen, 2022). In general, the quality of NPR data pertaining to psychiatric disorders is uncertain (Helsedirektoratet, 2009). This is partially due to lack of resources in clinical settings, where correct registration is not always prioritized. Hence the current prevalence presumably reflects an underestimation of the actual prevalence of PD and SUD in the prison population. The utilization of registry data instead of direct assessment during incarceration can potentially limit bias related to the prison context exacerbating symptoms. Although this is not guaranteed as the current study does not distinguish between diagnoses received during or prior to incarceration.

As stated in the methods section of the thesis, registration in NPR is done based on comprehensive diagnostic assessment by health care professionals working in public mental health care, or private institutions receiving public reimbursement. This represents a strength compared to studies relying on assessment based on self-report or non-professional interviewers, which is associated with overestimation of prevalence (Fazel & Danesh, 2002; Fazel et al., 2016; Volkert et al., 2018). Even though all final diagnostic decisions are based

on whether the diagnostic criteria in the ICD-10 (WHO, 1992) are met, the assessment practice and clinical evaluations of symptoms are based on the clinician's expert judgement. As previously stated, there is concern that the lack of National Professional Directives might contribute to differences regarding the quality of available mental health care services (Eikenæs et al., 2021). This can impact the reliability and validity of the psychiatric diagnoses, for example based on whether assessment is based solely on unstructured interviews, or also encompasses structured clinical interviews and comprehensive differential diagnostic considerations. The reliability and validity of the diagnoses could also be influenced by whether the diagnostic decision is based on an inpatient stay lasting up to multiple months, versus on one or two outpatient consultations.

The current study has some further limitations pertaining to the definition of the included variables. Immigration was defined based on being born in Norway or not, without controlling for age at and time since immigration, or country of origin. For instance, it can be assumed that individuals that immigrated from a Nordic country differ from individuals that immigrated from an African or Asian as adults regarding knowledge about the Norwegian public health system. Anyone who resides in Norway for more than six months or is granted residency must register with the Tax Administration to receive a PIN. Thus, the current sample includes all individuals who upon conviction were planning to stay in Norway for a longer time period. The findings are however not generalizable to those convicted during shorter stays in Norway, or where the PIN has not been granted prior to incarceration.

All categories of Mental and behavioural disorders due to psychoactive substance use (F10-19 [except F17]) in the ICD-10 were collapsed into one single variable, representing either having a SUD or not. Thus, differences between individuals diagnosed with for example harmful use versus dependency, or between solely alcohol related disorders or drug and polysubstance disorders were not detectable in the current study. Prior research indicates that there are differences in prevalence regarding both harmful use versus dependence, and drug use versus alcohol use or both (e.g., Butler et al., 2006; Chapman & Cellucci, 2007; Cramer, 2014; Langeveld & Melhus, 2004). Such a differentiation could be theoretically and practically valuable, as research indicates that drug and alcohol use disorders are not significantly associated (Chapman & Cellucci, 2007), and show significantly different underlying factor loadings (Ignatyev et al., 2019). Alcohol use disorder compared to drug use disorder, appears more strongly associated with increased risk for sexual and violent reoffending (Chang et al., 2015a; Långström et al., 2004).

The use of registry data is also associated with several strengths and limitations. One limitation associated with conducting research based on registry data is the restricted opportunity to explore demographic and sociocultural factors (Tverborgvik et al., 2023). For example, ethnicity and cultural background is in the current study limited to whether one was born in Norway. This definition limits the opportunity to analyze how such factors are potentially related to criminal behaviour and psychiatric disorders. One further limitation pertains to the research design not allowing for inferences regarding causality between incarceration, and PD and SUD, or how this interacts and influences each other (Chapman & Cellucci, 2007). The results from the literature review highlight the lack of studies investigating the prevalence of comorbid PD and SUD in the prison population. One major strength of the current study compared to previous studies, is the availability of data from an entire cohort. Prior studies tend to be conducted using highly selected and restricted samples (e.g., Mir et al., 2015; Tye & Mullen, 2006). A further strength is that the prevalence of all ICD-10 F60.0-60.9 categories was reported separately. Most previous studies focused solely on emotionally unstable PD and dissocial PD, with a few exceptions (e.g., Tye & Mullen, 2006).

6.2 General discussion

6.2.1 The role of symptom-overlap in co-occurring criminal behaviour, PD, and SUD.

The relationship between dissocial PD, emotionally unstable PD, SUD, and criminal behaviour is complex. There is considerable symptom-overlap such as emotion dysregulation, impulsivity, and interpersonal difficulties (Krueger et al., 2007; Paris, 1997; Sebastian et al., 2019; Trull et al., 2000). In addition, criminal behaviour and substance use represent diagnostic criteria for dissocial PD and emotionally unstable PD (WHO, 1992), as well as common emotion regulation strategies in this group (Beauchaine et al., 2009; Vik, 2023). The interrelatedness is also reflected in the role of intoxication regarding increase of violent behaviour, as well as in engaging in criminal activities to sustain substance consumption (Rossow, 2001; Gjersing, 2018; Greenberg & Rosenheck, 2014). Hence, higher prevalence of PD in the prison population could possibly in part be attributable to confounding between features of criminality, SUD, and PD (Fazel et al., 2016; Trull et al., 2000).

The considerable symptom-overlap and difficulty determining what is attributable to PD versus SUD, in part due to SUD being associated with maladaptive life circumstances, and the substance itself potentially causing personality changes, complicates assessment (WHO, 1992). Considering contextual social and economic factors is important when

assessing dissocial PD to distinguish between adaptive survival strategies and underlying personality pathology (APA, 2013). This is especially challenging when differentiating between primary dissociality indicative of personality pathology and secondary dissociality because of SUD (Arefjord, 2021; Wilberg et al., 2020). Based on clinical experience, such confounding can contribute to an underestimation of PD due to mental health professionals' apprehension towards diagnosing PD in cases of SUD. It is also worth noting that SUD and incarceration potentially create stressful circumstances which accentuates emotional dysregulation, which can be mistaken for emotionally unstable PD.

6.2.2 The role of emotion dysregulation in the development of PD and SUD.

Based on theoretical and empirical literature reviewed in the current thesis, the high co-occurrence of criminal behaviour, PD and SUD could be attributable to an underlying shared psychopathology factor, such as emotion dysregulation (e.g., Beauchaine et al., 2009; Ignatyev et al., 2019; Sebastian et al., 2019).

The logistic regression model indicated that both emotionally unstable PD and dissocial PD are highly associated with SUD. This was supported by high rates of comorbidity found both in the current study and in findings from the literature review. Results from the registry study indicate that emotionally unstable PD and dissocial PD share multiple common risk factors. However, there were also some marked differences. For instance, being female was highly associated with emotionally unstable PD, whereas being male increased the risk of being diagnosed with dissocial PD. These results can be interpreted to support the notion in the developmental model proposed by Beauchaine et al. (2009), that both PDs share common underlying vulnerabilities that are differently expressed moderated by gender (Lyons-Ruth et al., 2007). Further in line with the model, the results indicating a higher number of incarcerations being a risk factor for dissocial PD could be interpreted as support for maladaptive environments, in this case prison, acting as a perpetuating factor for dissocial PD.

Factors related to the development of emotion dysregulation were not explored in depth int the current thesis, due to the nature of the registry data and the scope of the thesis. Based on prior research, trauma constitutes a central factor in terms of predisposing, precipitating and perpetuating emotion dysregulation, as well as criminal behaviour, PD and SUD (e.g., Beauchaine & McNulty, 2013; Galea et al., 2004; Smith et al., 2005; Trull et al., 2000). Various types of traumatic experiences, common in maladaptive family environments and harsh criminal subcultures, constitute explanatory mechanisms in development of PD, and comorbid SUD, based on gene x environment interactions (Beauchaine et al., 2009;

Lyons-Ruth et al., 2007; Tully & Iacono, 2014; White, 2014). Prior research indicates that exposure to traumatic experiences is common in the prison population (van den Brink et al., 2018), especially among females with comorbid psychiatric disorders (Scott et al., 2015; Scott et al., 2017), and is associated with increased risk of incarceration (Greenberg & Rosenheck, 2014). A study with incarcerated males indicates a higher prevalence of post-traumatic stress disorder (PTSD) and complex PTSD (cPTSD) than in the general population, and that cPTSD is associated with comorbid SUD (Facer-Irwin et al., 2022). The relationship between trauma and SUD was also apparent in a qualitive study with incarcerated females, where utilizing substances to regulate negative emotions often related to traumatic experiences were a recurrent theme (Vilhjalmsdottir et al., 2023).

6.2.3 SUD and violent behaviour as emotion regulation strategies.

The association of SUD and violence and sexual offences with dissocial PD and emotionally unstable PD found in the current study could be interpreted to reflect a maladaptive tendency to inflexibly rely on response modulation strategies (i.e., substance consumption and violent behaviour) for emotion regulation (Carpenter & Trull, 2013). Lack of flexibility regarding emotion regulation strategies in individuals with PD can for instance manifest as difficulties with situation selection (e.g., seeking out criminal environments), or a marked preference for response modulation (e.g., violent behaviour and substance use). One possible explanation for this lack of flexibility is interactions between genetic factors and reinforcing environmental factors (Beauchaine et al., 2009), as well as previous adaptiveness of the strategy contingent on contextual factors (Tull & Aldao, 2015). For example, situation selection or modification might not be possible for a child growing up in a violent family environment. Response modulation in the form of suppression, at least of the emotional expression (Berking & Wupperman, 2012), could be the most adaptive strategy to prevent further escalating the situation. This could develop into a maladaptive pattern of habitually suppressing strong negative emotions through substance consumption later in life (Baker et al., 2004).

Previous research indicates that an inflexible pattern of using alcohol to regulate negative and positive emotions is more common among individuals with dissocial PD (Reardon et al., 2002), and comorbid emotionally unstable PD and opioid disorders (Scamaldo et al., 2021). The strong association between SUD and emotionally unstable PD, characterized by marked emotion dysregulation (Carpenter & Trull, 2013), can be interpreted as support for motivational models proposition of regulation of negative emotions as a key explanatory mechanism for SUD (Baker et al., 2004; Cooper et al., 1995). However,

Chapman and Cellucci (2007), found that symptoms (i.e., emotion dysregulation and impulsivity) of emotionally unstable PD were only associated with drug dependence as an emotion regulation strategy through their association with comorbid dissocial PD among incarcerated females. This indicates that emotion dysregulation in the form of inflexible and maladaptive responding to emotions is central to the understanding of dissocial PD in the prison population. The tendency to regulate utilize substances to regulate emotion dysregulation associated with underlying psychopathology, is also supported by clinical experience regarding how patients understand SUD themselves.

Understanding factors associated with violent offenses is important in terms of prevention to reduce negative personal and societal consequences of victimization (Senior et al., 2020). Research indicates that overt aggression can serve as an emotion regulation strategy, especially in situations where anger is expected to be instrumental for goal-attainment (Bushman et al., 2001; Tamir et al., 2008). Growing up in an environment with frequent confrontations (e.g., punitive parenting style, intrafamilial conflicts, impulsivity and emotion dysregulation causing frequent altercations with teachers and peers) can build an expectation of confrontations, which is associated with increased risk of aggressing to regulate emotions (Tamir et al., 2008). Corresponding to the assumption of the process model of emotion regulation that individuals capitalize on negative emotions to reach instrumental goals (Gross, 2015$_a$), the tendency to aggress to regulate negative emotions is partially contingent on beliefs about the efficiency of the strategy (Bushman et al., 2001). Thus, emotion dysregulation expressed as an inflexible pattern of utilizing violent behaviour as an effective, but maladaptive, emotion regulation strategy, as well as reduced impulse control in aggression provoking situations, could possibly explain the association between violent offending and being diagnosed with dissocial PD or emotionally unstable PD.

6.2.4 Causality between incarceration and psychopathology.

A pertinent issue for research in the prison context is establishing causality regarding whether the high occurrence of psychiatric disorders is attributable to increased risk of being incarcerated due to preexisting psychopathology, or whether the prison context causes psychopathology (Fazel et al., 2016). The current study, as well as most previous studies, are not designed in a way that allows for inferences regarding the role of psychiatric disorders in increasing the risk of subsequent incarceration versus how the prison setting influences the development of, or expression of preexisting, psychopathology.

A prospective study by Walsh et al. (2020), indicates that some disorders, such as dissocial PD and SUD increase the risk of incarceration, whereas the higher prevalence of

anxiety and mood disorders in the prison population appears to develop subsequently and is in part attributable to circumstances related to the experience of being incarcerated. This is further supported by longitudinal research by Kim et al. (2019) indicating early onset criminal behaviour and subsequent social marginalization as the main driving mechanism for psychiatric disorders among crime involved men. Whereas a combination of prior crime involvement and SUD appear to be the driving mechanism among crime involved women (Kim et al., 2019). Illegal and prescription drugs are usually easily accessible in prison, which can contribute to the escalation of an existing SUD during incarceration (Fazel et al., 2016). At the same time, research also indicates that the prison setting, to some extent, can represent a protective environment, for example by reducing substance use (Bukten et al., 2020). A Dutch study also indicates that quality of life is higher among incarcerated individuals with psychiatric disorders compared to psychiatric outpatients with comparable or less severe disorders, but lower than among incarcerated individuals without psychiatric disorders and the general population (Zwemstra et al., 2009).

6.2.5 Strengths and limitations of the theoretical and empirical background.

The current thesis has several strengths and limitations. The literature review revealed that there is a lack of epidemiological studies regarding prevalence of PD, both in the general population (Volkert et al., 2018), and in the prison population. The literature addressing correctional samples is further characterized by heterogeneity regarding sample characteristics (e.g., gender, type of sentencing, community SUD treatment samples, forensic psychiatric hospital patients, selected for specific psychiatric disorders or type of offense), definitions of psychiatric disorders (e.g., register data, self-report, meeting cut-off on interviews, comprehensive clinical assessment), and definition of prevalence (e.g., lifetime versus point-prevalence). Prior research indicates that the prevalence of at least dissocial PD is significantly different across various selected prison populations (Harsch et al., 2006). Many of the studies identified during the literature search that were not included in the final review reported prevalence of PD and SUD separately but did not include prevalence of comorbidity. This complicated comparison of current prevalence rates to prevalence in other countries. The heterogeneity of prior research and differing design in the current study can also be considered a strength. Current and past research indicates that psychiatric disorders, and especially SUD, are highly prevalent in the prison population, stressing the importance of implementing preventative and interventional measures in the prison population.

Emotion regulation, and emotion dysregulation, are phenomena that have been the objective of extensive research, still the literature is characterized by a lack of clear

definitions (Aldao, 2013; Gross, 2013; Thompson, 1994). The tendency for emotion regulation research to focus on consciously chosen strategies above spontaneously chosen or automatically implemented strategies constitutes an especially relevant limitation in the context of psychopathology, where such processes can tend to be automatic (Aldao, 2013). As highlighted by Gross (1999), research encompassing interindividual differences regarding emotion regulation is marked by overlap with adjacent constructs, such as delay of gratification, rumination, alexithymia, emotional control, and impulsivity, that are difficult to differentiate from the strictly emotion regulation-based literature. This construct heterogeneity and overlap constitutes a potential limitation of the current thesis. Research regarding these constructs were mostly excluded, and consequently also knowledge that could potentially have contributed to a better understanding of comorbidity in the prison population.

The literature on emotion regulation can refer both to processes aimed at regulating one's own emotions, but also attempting to regulate the emotional responses of others. This distinction can potentially be especially relevant in the context of PDs and SUD (Aldao, 2013; Gross, 1999). Dissocial PD is characterized by a tendency to manipulate others (APA, 2013), and emotionally unstable PD by a tendency to act in ways that evoke strong emotional responses in others (WHO, 1992). Whereas SUD from an emotion regulatory perspective is primarily aimed at the enhancement or minimization of one's own positive or negative emotions (Baker et al., 2004; Cooper et al., 1995). Substance consumption can have indirect effects on interpersonal emotions and relationships through shifting priorities and negative consequences of SUD affecting others (APA, 2013; WHO, 1992). The importance of relational factors in understanding PD, SUD and criminal behaviour was not explored in depth in the current thesis, which represents a limitation.

The quantitative nature of the prior and current empirical studies presented in this thesis is also associated with limitations. For instance, how incarcerated individuals themselves experience and ascribe meaning to their criminal behaviour, SUD and other strategies for emotion regulation is not addressed. Qualitative research would be better suited to provide rich subjective descriptions of how comorbidity and emotion regulation in the prison population can be understood. The quantitative approach is also associated with strengths, as it allows for inferences to be drawn about tendencies in the prison population at large.

6.2.6 Practical implications.

Findings from the registry study and literature review indicate that dissocial PD, emotionally unstable PD, and comorbid SUD are prevalent in the Norwegian prison population. There was a discrepancy between prevalence based on assessment conducted directly in the prison setting, and indirect assessment based on diagnosis received through public mental health care, especially for PD and partially also for SUD. The higher prevalence of emotionally unstable PD among men in previous studies supports the assumption that these individuals tend to not show the same rate of treatment-seeking behavior, and more often encounter the criminal justice system (Arefjord, 2021; Karterud et al., 2017; Mundt & Baranyi, 2020). Confirming that the prison context can serve as a unique opportunity to provide mental health care services to individuals that are typically difficult to access (Fovet et al., 2023; Mundt & Baranyi, 2020). This indicates that many incarcerated individuals in Norwegian prisons presumably have an undiagnosed PD and potentially undiagnosed SUD. These findings highlight the need for better access to psychiatric assessment in Norwegian prisons. One possibility is routine screening for SUD using screening tools such as Alcohol Use Disorder Identification Test (AUDIT) and Drug Use Disorder Identification Test (DUDIT) upon incarceration, both with regards to assessing whether diagnostic criteria are still met in those already diagnosed and to identify those not yet diagnosed. Four-item short versions such as AUDIT-4 and DUDIT consumption have proven effective in detecting harmful alcohol use and possible alcohol dependence (Pape et al., 2021), and likely drug dependence (Pape et al., 2022). Based on the current findings, more comprehensive assessment of PD is particularly relevant among repeat offenders, individuals who are young when first incarcerated, are convicted for violence and sexual offences or public order offences and have a known SUD.

Prevalence of SUD was high in the current study and in previous studies, both among those with and those without a comorbid diagnosis of PD. Treating SUD is important to reduce the risk of recidivism, including violent reoffending, and to enhance the possibility of coming into position to treat comorbid or underlying psychopathology (Ogloff et al., 2015; Yukhnenko et al., 2023). A Swedish longitudinal cohort study indicates an about 60 % increase of mortality post incarceration, controlling for sociodemographic, conviction and family characteristics (Chang et al., 2015$_b$). Abstinence is associated with decreased risk of recidivism among individuals diagnosed with dissocial PD (Fridell et al., 2007). A cross-sectional Norwegian study, indicates that even though substance use is common during incarceration, the proportion of incarcerated individuals using during (35 %), is lower

compared to the proportion using in the six months prior to imprisonment (54 %) (Bukten et al., 2020). Further, drug and alcohol related crimes are common, and SUD is often directly or indirectly a component in convictions leading to prison sentences (SERAF, 2021; SSB, 2023). This highlights the necessity of addressing SUD during incarceration, both from an individual and societal perspective with regards to utilizing a unique treatment opportunity and preventing crime (Tverborgvik et al., 2023).

Early interventions are important for prevention, as PD, SUD, and criminal behaviour represent continuous difficulties that develop and fortify over time (Beauchaine et al., 2009; Smith, 2005). Identifying potential underlying mechanisms is crucial to reduce negative consequences such as risk of recidivism and exposure to traumatic experiences due to being part of a harsh criminal environment (Butler et al., 2006; Kim et al., 2019). Based on theoretical and empirical findings presented in the current thesis, treatment programs targeting emotion regulation could be beneficial with regards to reducing PD symptoms, substance consumption, and criminal behaviour, including recidivism, both through change in emotion dysregulation and general psychopathology. Research in community samples indicate that interventions which increase the repertoire of available emotion regulation strategies can be beneficial for comorbid PD and SUD, in terms of substituting substance consumption when experiencing negative emotions (Berking et al., 2011; Hall et al., 2018). Further, it has been suggested that emotion regulation skill training for incarcerated individuals, especially those with PD, can contribute to reduction of suicide behaviour (Yang et al., 2022), which currently is an issue of high pertinence in Norwegian prisons (Andersen, 2023).

6.2.7 Future research.

Relationship between PD, SUD, and other psychiatric disorders.

Previous research indicates high prevalence of psychiatric disorders in the prison population, including high rates of comorbidity between three or more psychiatric disorders (Gunter et al., 2008; Ignatyev et al., 2019; Wetterborg et al., 2015). Comorbidity between multiple psychiatric disorders is associated with increased risk of violent reoffending compared to having one or two disorders (Chang et al., 2015[a]). Assessing patterns of comorbidity is of both clinical and theoretical relevance. Research examining comorbidity between ADHD, SUD, and PD can for instance contribute to a better understanding of the development of externalizing psychopathology. Theoretical knowledge regarding factors associated with this developmental trajectory is important with regards to identifying

potential preventative measures to reduce the risk of criminal behaviour, as early criminal debut is associated with persistent criminal involvement (Moffitt, 2005; Smith et al., 2005).

The anticipated implementation of ICD-11 will likely have implications for the understanding of and research regarding comorbidity in the prison context. Especially the change from a categorical to a dimensional understanding, which eliminates comorbidity between PDs. According to Howard et al. (2021), individuals with comorbid dissocial PD and emotionally PD, will likely be categorized as high-severe, and be characterized by high scores on the dissociality and negative affectivity domains.

A second change in diagnostic categories in the ICD-11 of relevance to the prison context is the implementation of cPTSD as a diagnosis. More pronounced emotion dysregulation, relational difficulties and more emphasis on early and chronic traumatic experiences differentiates cPTSD from PTSD (Karatzias et al., 2017; WHO, 2023$_a$). Considering the role of maladaptive childhood environments in the development of emotion dysregulation, PD and SUD through interactions with genetic factors, investigating the comorbidity between PD, SUD and cPTSD can be particularly relevant in the prison population (e.g., Beauchaine & Zisner; Lyons-Ruth et al., 2007).

As previously stated, research indicates differences between alcohol and drug related disorders, which were not accounted for by the current definition of SUD. Future research could explore if there are different patterns regarding criminal characteristics and comorbid psychiatric disorders based on different types of SUD (e.g., alcohol versus illegal drugs or illicit use of prescription drugs). According to Karterud (2021), preference for specific substances varies based on dysregulation of certain emotions associated with specific PDs. For instance, individuals with dissocial PD appear to prefer opioids to regulate dysphoria, and individuals with anxious [avoidant] PD prefer benzodiazepines to regulate anxiety. With the increasing number of sentences being served in inpatient substance treatment facilities instead of in prison, future research could address how these individuals differ regarding psychiatric disorders criminological factors over time.

Exploring gender differences in the prison population.

In line with previous research, both the descriptive analysis and the logistic regression in the current study indicate gender differences regarding the prevalence of PD in the prison population. Previous research indicates that that female prisoners experience more mental and physical health difficulties than male prisoners (Binswanger et al., 2010; Fazel et al., 2016; Zlotnick et al., 2008). Having a psychiatric disorder (excluding SUD) significantly increased risk of recidivism within one year among males, but not females on remand (Dalbir et al.,

2022). Future research should explore gender differences pertaining to PD and comorbid SUD in the Norwegian prison population in greater detail, including differing patterns in the externalizing trajectory proposed in Beauchaine and colleagues (2009) developmental model.

Suggestions regarding methodology and design of future research.

To elucidate causality between criminal behaviour, incarceration, and psychiatric disorders, there is a need for prospective studies, as well as designs assessing how psychopathology develops pre-, during, and post-incarceration. The prison context can provide a good opportunity for abstinence (Bukten et al., 2020). At the same time, drug trading and exchanging various types of prescription medication is common within prisons. Thus, pre-, and post-designs can be of special relevance to assess how SUD changes during incarceration (Fazel et al., 2016).

The current thesis relied on the indirect interpretation of variables such as SUD and violence and sexual offences as proxies for emotion regulation strategies. Future studies should assess various aspects of emotion regulation and emotion dysregulation and their role in comorbid PD and SUD in the prison population. For example, by comparing specific steps in Gross' process model (1998, 2015$_a$), or by including Gratz & Roemer's (2004) Difficulties in Emotion Regulation Scale (DERS) as a measure of emotion dysregulation. By elucidating how these concepts contribute to co-occurrence of criminal behaviour, PD, and SUD, the knowledge base regarding treatments and preventive measures based on emotion regulation can be expanded.

The current study did not include length of sentencing, or the timing of receiving the diagnosis in relation to commencement of the sentencing. Including this, as well as motivation for seeking treatment in future studies could potentially help elucidate the causal relationship between incarceration and psychiatric disorders. Prior research indicates a tendency towards individuals with PD serving longer sentences (Cramer, 2014). Further, whether the psychiatric disorder is diagnosed during incarceration or at a different timepoint is of relevance for whether remedial action within the prison is necessary (Gunter et al., 2008).

As previously mentioned, the use of registry data limits the opportunity to explore sociocultural factors (Tverborgvik et al., 2023). Based on theoretical and empirical literature presented in this thesis, environmental factors are central to the development of PD and SUD. The current results indicate that immigration background is associated with PD, and that the relationship warrants further research. Future studies should apply cross-sectional and prospective designs to elucidate the role of factors such as SES, immigration and family

history of criminal justice involvement and psychiatric disorders, both in increasing and decreasing the risk of PD, SUD, and incarceration.

Lastly, it would be interesting to address comorbidity based on a qualitive approach to capture the experience of incarcerated individuals. This could contribute to a better understanding of motives for substance use, for example based on motivational models (Baker et al., 2004; Cooper et al., 1995). Findings from a qualitative study by Vilhjamsdottir et al., (2023) among incarcerated Icelandic females, supported the assumption that regulating negative emotions is a strong motive for substance use. The study further provided insights into the women's experience of how the prison context exacerbated SUD and lead to the development or maintenance of eating problems. Future studies could explore if similar themes occur in the Norwegian prison population, and whether it differs contingent on for instance PD and gender.

7. Conclusion

This thesis aimed to explore and analyze the relationship between emotionally unstable PD, dissocial PD, and comorbid SUD in the prison population, based on emotion regulation theory. As an element in this the prevalence of PD and comorbid SUD in the Norwegian prison population was estimated based on registry data, and risk factors associated with being diagnosed with emotionally unstable PD and dissocial PD were identified.

The current findings indicate that PDs, and comorbid SUDs are prevalent in the Norwegian prison population. Dissocial PD and emotionally unstable PD occur at higher rates in the prison population, whereas other categories of PDs are less common. It is important to note that the definition of prevalence in the registry study reflects treatment-seeking behaviour, and not the actual prevalence of PD and SUD in the prison population. This limits the possibility to compare the current prevalence with findings from previous studies, as prevalence rates are highly sensitive to influence from aspects of the research design. Despite this limitation, based on the cohort design, the current results indicate that PD and SUD is a pertinent issue in the prison context, that warrants preventative measures and tailored interventions.

Several risk and protective factors associated with being diagnosed with emotionally unstable PD and dissocial PD were identified. Being diagnosed with SUD and incarcerated for violence and sexual offenses as the main offense were associated with increased risk for both PDs. There were also some differences, where being female was associated with an about six-fold increased odds of being diagnosed with emotionally unstable PD, likely

reflecting more prevalent treatment-seeking behaviour compared to men. Further, a history of more than three incarcerations and having committed homicide was associated with increased risk of being diagnosed with dissocial PD. These findings could be used as a basis for selection for more comprehensive psychiatric assessment during incarceration.

The association of SUD and violence and sexual offenses, with emotionally unstable and dissocial PD, can be understood as an inflexible pattern of relying on response-focused emotion regulation strategies. This pattern can be understood as a consequence of genetically predisposed, and environmentally precipitated and perpetuated emotion dysregulation. As such, emotion dysregulation and preferences or learnt patterns regarding emotion regulation can contribute to a better understanding of the relationship between PD and SUD in the prison population.

Further research is needed to improve the understanding of causality and interactions between criminal behaviour and psychiatric disorders. Findings from the current thesis highlight the need for assessment of, and implementation of treatment programs for PD and SUD in the prison population. Prioritizing this could be beneficial both from an individual and societal perspective, especially with regards of reducing criminality related to SUD and negative consequences of violent behaviour. To better understand the implications of the current findings, future research could address long-term outcomes of interventions incorporating aspects of emotion (dys)regulation in the prison population.

8. Broader perspective

One level of analysis or methodological approach will never be sufficient, nor superior, in explaining such a complex and multifaceted phenomenon as comorbidity in the prison population (Beauchaine & Zisner, 2017). The choice to apply theoretical considerations regarding emotion dysregulation and emotion regulation reflects the tradition of understanding criminal behaviour and psychopathology as caused by individual psychological liability factors, which can be contrasted to a sociological understanding of crime caused by factors at the community level (Klyve, 2016; Lynam et al., 2000). Individual perspectives contribute to responsibility of difficulties being placed on the individual. Contrarily, structural perspectives place responsibility on factors such as inequality regarding education, and socio-economic status (SES) leading to marginalization and giving rise to anger (Klyve, 2016).

Research indicates that dispositional impulsivity and emotion dysregulation (i.e., interindividual differences), drives criminal behaviour through interactions with maladaptive environmental factors that are overrepresented in neighborhoods with low SES (Aldao et al.,

2016; Lynam et al., 2000). Low SES and homelessness are associated with increased risk of incarceration (Greenberg & Rosenheck, 2014). Consumption and distribution of illegal drugs are considered criminal offenses. Consequentially, high prevalence of SUD in the prison population can in part be understood as caused by legislation and judicial practice (Greenberg & Rosenheck, 2014). This can also influence how SUD is perceived in the society and what kind of treatment is provided. Community level and societal preventive measures can for example address legislation regarding incarceration or alternative reaction forms evoked by criminal offenses related to having a SUD (i.e., property theft or violence directly related to sustaining the drug habit), or by ensuring early assessment and intervention of ADHD or teenage substance use, as well as providing support to families with low SES and history of parental SUD, PD and incarceration to prevent externalizing developmental trajectories (Beauchaine et al., 2009).

Violent offenses, including homicide, are associated with numerous negative consequences on an individual and societal level, including high financial costs (Senior et al., 2020). Individuals with comorbidity between psychotic disorders, SUD and dissocial PD are overrepresented among perpetrators and victims (e.g., KRIPOS, 2023; Mundt & Baranyi, 2020; Senior et al., 2020). The recent increase in the proportion of psychiatric hospitals beds in Norway occupied by individuals convicted to involuntary psychiatric treatment (Guttormsen & Martinsen, 2023), highlights the need for political interventions ensuring access to treatment for individuals with severe comorbidity to prevent severe crimes.

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