Intellectual Disability among in-patients with Substance Use Disorders

Kirsten Braatveit

Avhandling for graden philosophiae doctor (ph.d.)
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SCIENTIFIC ENVIRONMENT

From 2011 to 2018, the research and writing of this thesis were carried out in collaboration with the Department of Research and Innovation, Helse Fonna HF, Norway, and the Department of Psychosocial Science, Faculty of Psychology, University of Bergen, Norway. The research and thesis were supervised by Oddbjørn Hove, Helse Fonna HF and Torbjørn Torsheim at the University of Bergen.

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ABBREVIATIONS

AAIDD	American Association on Intellectual and Developmental Disabilities
A/H	Attention Deficit/Hyperactivity
ADL	Daily Living
AF	Affective Problems
ANOVA	Analysis of Variance
APA	American Psychiatric Association
BID	Borderline Intellectual Disability
BIF	Borderline Intellectual Functioning
CF	Communication
CP	Conduct Problems
DSM	Diagnostic and Statistical Manual of Mental Disorders
DSM-III	Diagnostic and Statistical Manual of Mental Disorders – 3rd Version
DSM-5	Diagnostic and Statistical Manual of Mental Disorders – 5th Version
FSIQ	Full Scale IQ
HASI	Hayes Ability Screening Index
ICC	Intraclass Correlation
ICD	International Classification of Diseases
ICD-10	International Classification of Diseases – 10th Version
ID	Intellectual Disability
IQ	Intelligence Quotient

LD	Learning Difficulties
LDSQ	Learning Disability Screening Questionnaire
M.I.N.I	Mini-International Neuropsychiatric Interview
PRI	Perceptual Reasoning Index
PSI	Processing Speed Index
RAPID	Rapid Assessment of Potential Intellectual Disability
ROC	Receiver Operating Characteristics
SCID	Structured Clinical Interview for DSM disorders
SD	Standard Deviation
SF	Socialization skills
SS	Social difficulties/stereotypic behavior
SUD	Substance Use Disorder
SumID-Q	Substance use and misuse in intellectual disabilities questionnaire
TSB	Tverrfaglig spesialisert rusbehandling
VCI	Verbal Comprehension Index
Vineland II	Vineland Adaptive Behavior Scale – 2nd Edition
WAIS	Wechsler Adult Intelligence Scale
WAIS-IV	Wechsler Adult Intelligence Scale – 4th Edition
WASI	Wechsler Abbreviated Scale of Intelligence
WHO	World Health Organization
WMI	Working Memory Index

ABSTRACT

Background

Knowledge about the comorbidity of substance use disorder (SUD) and intellectual disabilities (ID) or borderline intellectual functioning is growing. However, most of the knowledge about the comorbidity of ID and SUD comes from studies conducted in ID services. The current knowledge about the prevalence of ID, characteristics, substance use profiles, and responses to treatment of individuals with ID in SUD treatment is limited. Several factors complicate the identification and diagnostic process when assessing ID in individuals with SUD. This PhD project investigates the comorbidity of ID and SUD in mainstream in-patient treatment for SUD. It examines prevalence and characteristics of ID as well as interpretation of test results and means of early ID identification.

Aims

Paper I. To investigate the direct effects of five areas of pre- substance-use childhood difficulties on IQ and their possible indirect effect through the mediating variables of education and severity of substance use.

Paper II. To investigate the prevalence of ID and borderline intellectual disability (BID) in a population of in-patients with SUD and to explore similarities and differences between ID/BID and non-ID among SUD in-patients with regard to education, previous contact with public support systems, childhood learning difficulties, comorbid mental disorders and substance-related factors.

Paper III: To validate the ability of the Hayes Ability Screening Index (HASI) to predict ID in in-patients with SUD.

Method

The project featured a retrospective, cross sectional design. In total, 94 participants were recruited from three in-patient treatment facilities for SUD. SUD and mental illness were diagnosed using the criteria from the10th version of the International

Classification of Diseases (ICD-10). Intelligence was measured using the fourth version of the Wechsler Adult Intelligence scale (WAIS-IV). Adaptive behavior was measured using the second edition of the Vineland Adaptive Behavioral Scale (Vineland II). Childhood difficulties, previous contact with support services, substance use and educational history were assessed using a self-report questionnaire. The HASI was used as a screening instrument for ID. Interrater reliability coefficients were calculated for the administrators of the WAIS-IV and the HASI.

Results

Mediator model of childhood difficulties and IQ. In Paper I, the variance in intelligence coefficient (IQ) was found to be related to childhood difficulties alone or through the mediator of education. IQ did not significantly differ between participants who used different substances, and the severity of substance use did not influence IQ in any of the five models tested.

Prevalence of ID/BID. In Paper II, the prevalence of ID/BID was found to be about 30% (ID: 7.7%, BID: 24.2%). Only one participant was identified with a developmental disorder by the treating institution. Statistically significant differences were found between the ID/BID group and non-ID group with regard to length of education, previous contact with public support systems, and self-reported childhood learning difficulties. There were no statistically significant differences between the groups concerning substance-related factors, except for substance-use relapse during treatment.

Validity of HASI. The results of Paper III showed a statistically significant positive correlation between both measures of IQ and adaptive skills and the HASI. The discriminant validity analysis showed that HASI had a sensitivity of 100% and a specificity of 65.4% in identifying individuals with ID at the original adult cut-off score of 85. Among the subjects falsely identified with ID, 76.2% fulfilled the criteria defined for BID.

Conclusion

The results in this PhD project indicate that a significant number of individuals in mainstream SUD in-patient treatment may meet the criteria for ID/BID. They also imply that these individuals are not identified with a developmental disorder during childhood or the treatment period. The findings support a hypothesis that signs of ID/BID in in-patients with SUD can most likely be attributed to pre-morbid functioning. Finally, the results indicate that the HASI may be a useful instrument for broad screening of the SUD in-patient population and selection of individuals for further ID assessment. The findings have theoretical as well as clinical implications and provide new knowledge on the comorbidity of ID and SUD with its unique contribution from mainstream SUD in-patient treatment.

LIST OF PUBLICATIONS

I. Braatveit, K., Torsheim, T., & Hove, O. (2018). Intellectual functioning in in-patients with substance use disorders: Preliminary results from a clinical mediation study of factors contributing to IQ variance. *European Addiction Research, 24*(1), 19–27.

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CONTENTS

1. GENERAL INTRODUCTION AND THEORETICAL FRAMEWORK

1.1 BACKGROUND

Identification of primary illness and comorbid conditions has implications for the understanding and treatment of a patient. Reliable identification is also a prerequisite for estimating the prevalence of an illness in a population. Knowledge about the prevalence of a disorder is important for the calibration and planning of health services.

There has been a growing recognition that individuals with intellectual disability (ID) may have a comorbid substance use disorder (SUD). During the last ten years, there has been an increase in the body of literature on adapted assessment and treatment of SUD among individuals with ID and borderline intellectual functioning and the understanding and recognition of the special needs of individuals with these dual conditions has improved (Didden, 2017; Kerr, Lawrence, Darbyshire, Middelton, & Fitzsimmons, 2013; VanDerNagel, Kemna, & Didden, 2013; VanDerNagel et al., 2017; van Duijvenbode et al., 2015).

Following the deinstitutionalization of people with ID in Norway, adapted services for individuals with ID have emerged in municipalities and in the specialist health services. ID services have reported a lack of knowledge on, and how to treat SUD in individuals with ID (VanDerNagel, Kiewik, Buitelaar, & de Jong, 2011a). Although individuals with ID have the same rights to qualified SUD treatment in Norway as individuals without ID, there is a lack of knowledge on ID in SUD services (Juberg, Røstad, & Søndenaa, 2017).

Despite increased focus on dual diagnosis in the field of SUD treatment and several calls for collaboration between ID and SUD services, most of the knowledge on the comorbidity of ID and SUD comes from studies conducted on services for individuals with ID. Prevalence rates, characteristics, substance use profiles, and responses to treatment may therefore only paint part of the picture of ID and SUD. In

addition, there is a growing recognition that many individuals in contact with mental health services, including services for SUD, may have a "hidden" or undiagnosed ID. Assessing ID among individuals with SUD can be difficult, which may partly explain the lack of attention given to this disorder within the field of SUD treatment. The focus of the current PhD project was to investigate the comorbidity of ID and SUD from the viewpoint of mainstream in-patient treatment for SUD. It examines the prevalence and characteristics of ID as well as interpretation of test results and means of early ID identification.

Considering that ID and SUD services have reported a lack of knowledge of each other's fields, this thesis provides a theoretical framework and description of both SUD and ID in addition to current knowledge on the comorbidity of the disorders.

1.2 SUBSTANCE USE DISORDER

1.2.1 DEFINITION AND PREVALENCE

1.2.1.1 Definition of Substance Use Disorder

The 10th version of the International Classification of Diseases, ICD-10 (World Health Organization [WHO], 1992) and the fifth version of the Diagnostic and Statistical Manual of Mental Disorders, DSM-5 (American Psychological Association [APA], 2013) label and define pathological substance use in slightly different ways. According to the ICD-10, *substance dependency* involves a spectrum of physiological, behavioral, and cognitive alterations, where the use of a substance or substance class is prioritized over other behavior that was previously of value for the individual. According to DSM-5, *SUD* is characterized as a condition of a problematic pattern of substance use leading to clinically significant impairment or distress (APA, 2013).

Both the ICD-10 and DSM-5 employ criteria for pathologies related to substance use that can be broadly categorized as impaired control, social impairment, risky use and pharmacological criteria. The ICD-10 requires that at least three of six

criteria must have been met in the last 12 months for a patient to be diagnosed with a substance dependency. Major changes in the description and diagnostic criteria are not expected in the upcoming 11th revision of the ICD (Saunders, 2017). In contrast to the ICD-10, the DSM-5 operates with degrees of the SUD, with the mild version requiring only 2-3 of 11 criteria to have been met during the last 12 months. Although the ICD-10 also enables diagnosis of the less severe *harmful use* in addition to the diagnosis of dependency, the ICD-10 and DSM-5 still label and address individuals with milder problematic substance use differently. This can affect both the reported prevalence and individuals' access to treatment. The research for the current thesis used the ICD-10 criteria, but the term *SUD* will be used throughout the thesis when referring to substance-related disorders as described by both by the ICD-10 and the DSM-5.

1.2.1.2 Prevalence of SUD

The estimated global point prevalence of alcohol use disorder is between 0% and 16% (WHO, 2010). For illicit drug use disorders the prevalence has varied between 0–3% in different countries (WHO, 2010). The prevalence rates of SUD vary according to age, gender, country, and location in the country (i.e., rural/urban area) (WHO, 2010). In Norway, the lifetime prevalence of SUD is estimated to be 10–20%, and follow the global pattern, alcohol use disorders are more frequent than illicit drug use disorders (Grønholt, Hånes, & Reneflot, 2014). In 2016 approximately 31.000 individuals received treatment from multidisciplinary specialized addiction health services (Tverrfaglig Spesialisert Rusbehandling [TSB]) in Norway, with 13.797 omissions from in-patient treatment (Indergård, Solbakken, & Urfjell, 2016).

1.2.4 RISK FACTORS FOR SUD AND THEORIES OF ADDICTION

The use of alcohol or illicit drugs during an individual`s lifetime is not uncommon, but only a small percentage of substance users develop a SUD. It is suggested that the cause of SUD cannot be narrowed down to one specific mechanism as it relies on the interplay of biological, psychological, social and environmental risk factors.

Addiction is therefore regarded as a multidimensional and complex disorder (West & Brown, 2013). For an overview of the biological, social/environmental and psychological theories and mechanisms thought to comprise addictive behavior see for example, the work of Ouzir and Errami (2016) and West and Brown (2013).

There are a substantial number of theories aiming to partially or completely explain the scope of addiction and addictive behavior, ranging from a focus on free choice to automatic processes and correlates in the brain. Addiction is suggested to involve distortion of several normal psychological processes such as learning by operant or classical conditioning, self-control, decision making, planning, beliefs, values, wants/needs, emotions, impulses, and other aspects of human functioning that affect a wide range of behaviors (West & Brown, 2013). There has been growing recognition that SUD is associated with changes in brain functioning (Ouzir & Errami, 2016). The DSM-5 highlights the notion of changes in brain functioning and its implications for long-term approaches to treatment (APA, 2013).

SUD is associated with a high degree of comorbid mental illnesses (Grant et al., 2016; Mueser, Noordsy, & Drake, 2016; Wu & Blazer, 2014). It is proposed that substance use itself can be the cause of mental illness as described in the substance dependency chapter of ICD-10 (WHO, 1992), but also that mental illnesses can be present before the SUD (Bakken, Landheim & Vaglum, 2003).

1.2.5 Treatment for SUD

The suggested multidimensional nature of SUD is reflected in treatment models in which several approaches are used simultaneously or in succession to target the many treatment needs of individuals with SUD. In Norway, new national guidelines for treatment and rehabilitation of SUD were developed in 2016 (Norwegian Directorate of Health, 2016). These guidelines recommend various psychological interventions (e.g., cognitive behavioral therapy, mindfulness, motivational interviewing and music therapy), social interventions (e.g., adequate housing, work toward better family and network relations, and job training) and medical interventions (e.g., blocking medicines for opioids and treatment of comorbid somatic conditions). In addition,

supplementary national treatment guidelines have been developed to address the comorbidity of mental illness in individuals with SUD (Norwegian Directorate of Health, 2012). It has been recognized that patients may require multiple episodes of care over several years to gain control over the SUD (Dennis, Scott, Funk & Foss, 2005).

1.3 INTELLECTUAL DISABILITY

1.3.1 DEFINITION AND PREVALENCE

1.3.1.1 Definition of Intellectual Disability

The ICD-10 defines *mental retardation* (current nomenclature: intellectual disability) as a condition of arrested or incomplete development of the mind, especially characterized by impairment of skills manifested during the developmental period, that contribute to the overall level of intelligence (i.e., cognitive, language, motor, and social abilities) (WHO, 1992). Some changes are expected with the upcoming 11th revision of the ICD, such as labeling the disorder as "disorders of intellectual development" (Cooray, 2015). The DSM-5 defines *ID* as a disorder with onset during the developmental period that involves both intellectual and adaptive functioning deficits in conceptual, social, and practical domains (APA, 2013).

For a diagnosis of ID, three criteria must be met (APA, 2013; WHO, 1992):

1. Impairments in general mental abilities/intellectual functioning.
2. Impairments in one or more of the adaptive domains (conceptual, social or practical).
3. Onset of both intellectual and adaptive impairments during the developmental period.

The American Association on Intellectual and Developmental Disabilities (AAIDD) defines significant impairment of both intellectual functioning and adaptive behavior to be two or more standard deviations (SD) below the population mean on

standardized tests or measures, and restricts the onset criteria to symptoms that appear before the age of 18 (AAIDD, 2010).

Diagnostics are based on both clinical assessment and standardized testing. Both the ICD-10 and the DSM-5 diagnose four levels of ID: mild, moderate, severe and profound. In the DSM-5, these levels are defined on the basis of adaptive functioning and not IQ scores because the level of adaptive functioning determines the level of support required. The ICD-10 has a vaguer notion of adaptive impairment ("adaptive behavior is always impaired") and places more weight on IQ in determining the level of ID.

Regarding ID diagnostics in adults, the British Psychological Society (2015) states that, "in cases where no direct evidence of the age-of-onset criterion can be found, then, if an assessment identifies the presence of impairments both of intellectual functioning and adaptive behavior it will usually be reasonable to conclude that those impairments are long-standing and, therefore, that the criterion has been met" (p. 25). They further state that, "exceptions to this include situations where there is evidence of events that could have compromised brain functioning (for example, a road traffic accident, a stroke or serious mental illness) having occurred only after the age of 18 years" (British Psychological Society, 2015, p. 26).

The research in the current thesis used the specifications provided by the AAIDD to label individuals as having ID or not having ID.

1.3.1.2 Definition of Borderline Intellectual disability

In the early versions of the DSM (APA, 1952; 1968) the term *borderline intellectual functioning* (BIF) was listed in the disorder chapters and recognized as a mental disorder with both intellectual (IQ range approximately between one and two SDs below the population mean) and functional impairment. It was later removed from the disorder chapters and is now coded in the V-section as a condition that may have clinical implications (APA, 2013). Similarly, the ICD redefined BIF as the symptom classification of R41.83 (APA, 2013).

The main argument for removing BIF form the disorder chapters during the revision of DSM-III (APA, 1980) was that individuals with BIF do not always display reduced adaptive skills or functional impairment (Wieland & Zitman, 2016). However, research has shown that individuals with BIF may indeed experience problems in coping with everyday life and may require support due to the condition (Ferrari, 2009; Hassiotis, 2015; Peltopuro, Ahonen, Kaartinen, Seppälä, & Närhi, 2014). In accordance with the notion of functional impairment, the current thesis will use the term *borderline intellectual disability* (BID) to recognize individuals who meet all three ICD-10/DSM-5 criteria for ID, but have both intellectual and adaptive impairments between one and two SDs below the population mean on standardized tests, with concurrent evidence for childhood learning difficulties. For simplification, BID will be used throughout this thesis, also when citing previous literature on BIF.

1.3.1.3 Prevalence of ID/BID

The estimated prevalence of ID is approximately 1% of the general population (APA, 2013). The prevalence is higher among children and adolescents and in low- to middle-income countries (Maulik, Mascarenhas, Mathers, Dua, & Saxena, 2011). There has been reported a discrepancy between the estimated 1% prevalence and the administrative prevalence of ID, that is, people with ID reported by municipality administrations to the authorities as service support receivers and studies based on social welfare benefits. Such studies indicate that only 0.44–0.6%, and thus about half of the estimated ID population, are diagnosed or known to have an ID (Søndenaa, Rasmussen, Nøttestad, & Lauvrud, 2010; Westerinen, Kaski, Virta, Almqvist, & Livanainen, 2007).

The prevalence of BID is currently unknown. Classified by IQ alone, the rate of BID has been reported to be 13–18% (Hassiotis, 2015). However, the rate of BID is most likely lower when one considers the three criteria of limitations in intellectual and adaptive functioning with onset during the developmental period.

1.3.2 RISK FACTORS FOR ID

The AAIDD (2010) promotes a multifactorial approach to risk factors and cause of ID, claiming that several risk factors interact over time to cause the disorder. The multifactorial approach refers to both the category of risk factors and the timing of risk factors. The categories are as follows: biomedical, social, behavioral, and educational. There may be different risk factors in each category for the prenatal, perinatal, and postnatal period. For example, maternal illness may be a significant biomedical risk factor during the prenatal period while prematurity may be an important biomedical risk factor during the perinatal period. In addition, the same risk factors may be present in two or all three of the different periods, such as family poverty, which is in the social category. Not all individuals who are at risk develop an ID. Nutritional, environmental, educational and social protective factors can hinder the development of ID, even when several risk factors are present (AAIDD, 2010).

1.3.3 Comorbidity and treatment

Individuals with ID experience the full range of mental disorders, have more general health problems, and die younger than the general population (Cooper, Smiley, Morrison, Williamson, & Allan, 2007; Davis, Proulx, & van Schrojenstein Lantman-de Valk, 2014; O'Leary, Cooper, & Hughes-McCormack, 2017). On a group level, both individuals with ID and those with BID have a higher rate of mental disorders than individuals with average intellectual functioning (Cooper et al., 2007; Emerson, Einfeld, & Stancliffe, 2010; Hassiotis et al., 2008). Prior studies have found health disparities and inequities associated with individuals with ID (Oulette-Kuntz, 2005). Oulette-Kuntz (2005) highlights several factors that can explain some of these disparities and inequities, such as the limitations of the person with ID (e.g., illiteracy, communication, personal hygiene or ability to recognize the need for care), social factors (e.g., poverty and access to nutritious food), support factors (e.g., living in institutions with high exposure to infectious diseases or having a physician that fails to recognize illnesses), and biological factors (e.g., higher frequency of syndromes with associated somatic or psychological conditions).

ID is characterized by a developmental delay in comparison to peers of the same age and cultural background. Strengths and weaknesses as well as support-related needs differ between individuals with the disorder. It is generally understood that the functioning and quality of life of an individual with ID will improve with appropriate, individualized support over a sustained period (AAIDD, 2010). In caring for and enhancing adaption to society, a social-ecological model of disability is often used as a theoretical framework for interventions (AAIDD, 2010). From a social-ecological viewpoint, disability is seen as human functioning in relation to environmental demands. Support is intended to narrow the gap between the individual's functioning and the environmental demands. Support can be given in many forms, such as communication technologies, supported housing, and work. Hassiotis (2015) argues that also the unique profiles of individuals with BID should be assessed to consider interventions and methods of support that may improve health and welfare. It is recommended that one adopt a developmental perspective when planning treatment and interventions for comorbid mental disorders in individuals with ID (Royal College of Psychiatrists, 2001).

1.4 Comorbidity of SUD and ID

1.4.1 Prevalence

The prevalence of SUD among individuals with ID varies according to definition and study population (van Duijvenbode et al., 2015). Although high rates of substance use have been reported in some studies (van Duijvenbode et al., 2015), the prevalence of substance-related disorders among individuals identified to have ID is estimated to be between 0.5–6% (Cooper et al., 2007; Lin et al., 2016; Slater, 2010a; Sturmey, Reyer, Lee, & Robek, 2003). Studies on substance use typically report that tobacco and alcohol are the most commonly used legal substances and that cannabis is the most commonly used illicit drug (VanDerNagel et al., 2017; vanDuijvenbode et al., 2015). Some argue that estimates of the comorbidity ID/SUD might be lower than the true prevalence rate since these figures are based only upon individuals that are identified

to have ID and are known to ID services (Taggart, McLaughlin, Quinn, & Milligan, 2006).

Studies of ID in subpopulations, such as prison inmates or patients with mental illness, have identified high prevalence of individuals with an undiagnosed ID. (Ferrari, 2009; Juberg et al, 2017; Nieuwenhuis, Norrthoorn, Nijman, Naarding, & Mulder, 2017; Søndenaa, Nygård, Nøttestad, & Linaker, 2011; Søndenaa, Rasmussen, Palmstierna, & Nøttestad, 2008). Similarly, patients in contact with SUD services may have an undiagnosed ID and thus the prevalence of SUD in the total population of individuals with ID might be higher than previously suggested.

The reported prevalence of ID/BID in SUD populations varies between 6–39% in different studies (Luteijn, Didden, & VanDerNagel, 2017; VanDerNagel et al., 2014; Westermeyer, Kemp, & Nugent, 1996). The current knowledge indicates that ID is overrepresented in SUD populations compared with the estimated 1% prevalence of ID in the general population (APA, 2013; Maulik et al., 2011) or the estimated 13% prevalence of ID and BID (Hassiotis, 2015). However, further studies are needed since the reported ID prevalence in SUD populations varies greatly and is mainly based on IQ scores, not all three ID criteria of impaired intellectual functioning and adaptive behavior with onset during the developmental period (AAIDD, 2010).

1.4.2 Risk factors for SUD in individuals with ID

Over the last 30 years, there has been a focus on deinstitutionalization of people with ID in Western countries (Sturmey et al., 2003). One of the main challenges facing people with ID who increasingly participate in community activities is the exposure to alcohol and drugs. The risk of substance abuse and substance related disorders is especially increased for individuals with mild to borderline ID who live independently (Sturmey et al., 2003). Individuals with lower levels of ID often live in specialized housing with a higher degree of care and may never be introduced to substances. In addition, individuals with lower levels of ID may be more dependent

on support in the community and thus have less capability or opportunity to engage in substance-related behaviors.

Other risk factors are as follows: male, young age, possession of a co-morbid mental health or behavioral problem (Taggart et al., 2006; Didden, Embregts, van der Toorn, & Laarhoven, 2009), personality traits of low anxiety, higher level of negative thinking, impulsivity and sensation-seeking behavior (Poelen, Schijven, Otten, & Didden, 2017), palliative coping style (Didden et al., 2009), family history of substance use, prenatal exposure to alcohol, temperament, and peer group socialization processes (Cocco & Harper, 2002). Also, elevated frequency of impaired inhibition and susceptibility to social pressure (Taggart, McLaughlin, Quinn, & Milligan, 2006), limited social skills (Chapman & Wu, 2012) and inability to understand the severe consequences of substance use (Cocco & Harper, 2002) are suggested to increase the risk of substance-related problems in individuals with mild to borderline ID.

It has been argued that substance use have a more negative impact on individuals with ID compared with their non-ID peers, as the former experience a higher level of comorbid psychiatric and somatic illnesses (McGillicuddy, 2006) and use more prescribed medication that may have negative effects when combined with substances (Chapman & Wu, 2012; Taggart et al., 2006). Also, individuals with ID seem to experience problems from using smaller amounts of substances and may develop an addiction faster following initiation of substance use, than the non-ID population (Burgard, Donohue, Azrin, & Teichner, 2000).

1.4.3 SUD TREATMENT FOR INDIVIDUALS WITH ID

Individuals with ID and SUD may experience barriers to substance abuse treatment (Chapman & Wu 2012; Slayter, 2010b; Slayter 2008). When admitted to mainstream SUD treatment individuals with ID have reported negative experiences (Taggart, McLaughlin, Quinn, & McFarlane, 2007). For instance, people with ID and SUD only or with comorbid serious mental illness drop out of mainstream SUD treatment at a higher rate than other patients (Chapman & Wu 2012; Slayter 2010b). Further,

unadjusted SUD treatment for people with ID can hinder recovery through learned failure (Annand & Ruff, 1998). In general, research on the effectiveness of psychotherapy for patients with ID has been understudied (Bhaumik, Gangadharan, Hiremath, & Russel, 2011). This is also seen in SUD treatment for individuals with ID (Burgard et al., 2000; Kerr et al., 2013).

Individuals with ID and substance-related problems are mainly treated by ID services (Slater, 2008; Taggart et al., 2006). These services have reported a lack of knowledge and means of treating SUD (Taggart et al., 2006; VanDerNagel et al., 2011a). In a recent paper, van Duijvenbode et al. (2015) challenge the fact that substance use or SUD is often seen as a behavioral problem by ID services and the notion that it can be overcome by brief behavioral/educational programs (vanDuijvenbode et al., 2015). The authors highlight the complex and multifaceted nature of SUD and argue for both adapted screening and assessment of SUD in individuals with ID, as well as adapted treatment interventions.

Recently, the substance use and misuse in intellectual disability questionnaire (*Sum*ID-Q) was developed for assessment of substance use in individuals with ID (VanDerNagel, Kiewik, Van Dijk, & de Jong, 2011b; VanDerNagel, Kemna, & Didden, 2013). Didden et al. (2009) specify suggestions for SUD treatment in individuals with ID. These suggestions align with mainstream treatment for SUD. When adapting psychotherapy for individuals with ID, Hurley, Tomasulo, & Pfadt (1998) suggest considering the following: simplification (e.g., shorter length of sessions), language (e.g., using simple words and shorter sentences), activities (e.g., use of drawings), developmental level (e.g., incorporating developmental level in presentation of techniques), directive methods (e.g., more direct treatment style), flexible methods (e.g., adjusting traditional techniques to suit individuals' cognitive level), involvement of caregivers (e.g., use staff to help with change), transference/countertransference (e.g., stronger boundaries set by the therapist) and disability/rehabilitation approaches (e.g., issues of disability must be addressed).

The low effectiveness of mainstream SUD treatment for individuals with ID (VanDerNagel et al., 2011a) indicates that SUD treatment services should be

educated in, and use specified interventions for the ID population when treating an individual with ID. However, as noted earlier, individuals in contact with SUD services may have an unknown ID, and it is difficult to make proper adjustments when one doesn't know who to make them for. Therefore, SUD treatment services also need to feature a means of identifying ID.

1.5 Assessing ID in individuals with SUD

Assessment of ID includes measurements of intellectual functioning and adaptive skills using standardized instruments with significant impairments compared to the population mean and requires evidence of such impairments before the age of 18 (AAIDD, 2010). Standardized assessment of ID in children is reasonably straight-forward, but assessment of ID in adults with SUD may pose challenges. Some of these will be discussed according to the three diagnostic criteria for ID more thoroughly below.

1.5.1 Intellectual functioning

One of the main problems that arise when trying to assess intellectual abilities in patients with SUD is that these patients may be under the direct or indirect influence of substances. This poses a threat to the reliability and validity of the test results. In other words, test results may vary according to the level of substance influence and reflect an intellectual functioning that is conditioned by substance use.

Previous research has found lower or declining IQ in SUD populations (Fried, Watkinson, James, & Gray, 2002; Jackson et al., 2016; Latvala et al., 2009; Lin, Huang, Lin, & Pan, 2010; Meyer et al., 2012; Tarter, Mezzich, Hsieh, & Parks, 1995). However, the proper way in which to interpret such findings is under discussion. Support has been found for both the long- and short-term effects of substance use, other scholars relate findings to factors preceding or co-occurring with substance use, such as childhood functioning, genes, socioeconomic status, environmental variations, and schooling (Battin-Pearson et al., 2000; De Witte, Cabus, Thyssen, Groot, & van den Brink, 2013; Fried et al., 2002; Jackson et al.,

2016; Kubicka, Matejcek, Dytrych, & Roth, 2001; Latvala et al., 2009; Lin et al., 2010; Luczak et al., 2015; Meyer et al., 2012, Mokrysz et al., 2016; Rogeberg, 2013; Tarter et al., 1995; Tarter et al., 2003).

This lack of agreement calls for further study of the relationship between IQ and substance use and how to interpret clinical assessments. However, most addictive substances will have acute or intoxicating effects on cognitive functioning. Cognitive function has been found to improve with a longer period of abstinence from substances, with 2–6 weeks for significant improvement (Fried et al., 2002; Vik, Cellucci, Jarchow, & Hedt, 2004). Ideally intellectual functioning in individuals with SUD should be tested after six weeks of abstinence when one is reasonably sure that at least the short-term effects of substance use have a minimum influence on test results.

1.5.2 Adaptive functioning

The validated scales for measuring adaptive skills are not diagnostic instruments or explanatory scales; they only provide a rating based on observations of what behaviors a person does or does not exhibit. Studies have found occupational challenges, social problems, lower academic performance, and reduced everyday functioning in SUD populations, however, how these challenges are related to substance use/lifestyle or to a potential pre-use ID has not been systematically investigated. (Cox, Zhang, Johnson, & Bender, 2007; Drake & Wallach, 1989; Faggiano et al., 2014; Harris, Matthews, Penrose-Wall, Alam, & Jaworski, 2014; Henkel, 2011; Jones, Greenberg, & Crowley, 2015; McAdams, Salekin, Marti, Lester, & Barker, 2014; Melchior, Chollet, Elidemir, Galèra, & Younes, 2015).

1.5.3 Onset of intellectual and adaptive deficits

A crucial part of ID assessment in adults is identification of the onset of intellectual and adaptive limitations. Signs of intellectual and adaptive impairment before the age of 18 can increase the likelihood that a patient with SUD has ID.

When assessing ID in adults, it is not always possible to obtain formal information about their developmental history in the clinical setting, and healthcare professionals must therefore rely on the patients' self-report. However, issues such as selective or biased memory may influence self-reports and evidence for the age criterion might be weak. In such cases, clinical judgement of an ID diagnosis may rely on the absence of evidence of events that compromise brain functions after the age of 18 rather than evidence for reduced intellectual and adaptive functioning during the developmental period (British Psychological Society, 2015).

1.5.4 Additional considerations

Time consumption and the necessary education/training to assess ID with validated measures must be considered in addition to the issues mentioned above. ID is associated with higher drop-out rates from mainstream SUD treatment (Chapman & Wu, 2012; Slater 2010b) and the available "assessment window" might therefor be limited. If the patient stays in treatment for a longer period, substance use relapse and its potential influence on test results can become an issue. If assessed too early in treatment, the potential acute influence of substance use on test results can make interpretations difficult. Too early assessment may also conflict with later assessment as a potential re-test effect can influence results if the same test is used twice. Thus, some SUD patients may not be eligible for a standardized ID assessment during the in-treatment period.

1.6 Screening for ID in individuals with SUD

In medicine, screening instruments can be used to detect abnormalities or conditions that are investigated closely in other tests. Screening has several benefits; for instance, it usually saves time and does not require the assessor to have special education. For a screening instrument to be beneficial it should detect conditions that have serious consequences, it should be reliable, it should not be harmful and a positive outcome should have impact on the treatment plan. By using a screening instrument at the start of SUD treatment, one can adjust treatment in case of ID and

further assess or refer for assessment of ID when the individual has been abstinent from substance use for a substantial amount of time.

Interest in identifying undiagnosed ID in subpopulations such as psychiatric patients or prisoners has led to the development of screening instruments for ID. There are three instruments that may also be applicable in SUD populations for ID screening: the rapid assessment of potential intellectual disability (RAPID) (Ali & Galloway, 2016), the Learning Disability Screening Questionnaire (LDSQ) (McKenzie, Michi, Murray, & Hales, 2012; McKenzie, Sharples, & Murray, 2015), and the Hayes Ability Screening Index (Hayes, 2000). In addition, short versions of IQ tests, such as the Wechsler Abbreviated Scale of Intelligence-WASI (Wechsler, 2011a) have been developed for quickly measuring IQ. As with the WASI, both the RAPID and the LDSQ have been validated against IQ only, and studies warrant caution in use of the Norwegian versions for both the WASI and the LDSQ (Bjørgen, Gimse, & Søndenaa, 2016; Siqveland, Dalsbø, Harboe, & Leiknes, 2014). The RAPID is currently not translated into or validated in Norwegian.

The HASI was originally validated against both IQ and adaptive behavior and was found to have both good construct and discriminative validity (Hayes, 2002). The Norwegian version was validated against standardized IQ tests and is recommended for ID screening among both prisoners and psychiatric patients in Norway (Søndenaa, Bjørgen, & Nøttestad, 2007; Søndenaa et al., 2008; Søndenaa et al., 2011). A study of patients with SUD also found the HASI to have good convergent and discriminative validity for this population when IQ was used as the validation criterion (To, Vanheule, Vanderplasschen, Audenaert, & Vandevelde, 2015), but the authors encourage further study of the validity of HASI for predicting ID in SUD based on all three ICD-10/DSM-5 criteria.

2. AIMS AND RESEARCH QUESTIONS

The main aim of this PhD project was to increase the knowledge about the comorbid conditions of ID and SUD from the viewpoint of mainstream SUD in-patient treatment. The two main objectives of the PhD project were to investigate the prevalence and characteristics of ID/BID in in-patients with SUD and to validate the HASI as a screening instrument for detecting ID in this population. A prerequisite for these two main objectives was the investigation of factors that contribute to IQ variance in in-patients with SUD; hence, this was a secondary objective. However, chronologically this objective is the starting point. The PhD project resulted in three papers, each of which had their own specific aims, as listed below.

Paper I

The main aim of Paper I was to investigate the direct and indirect effects of pre-substance-use childhood difficulties on IQ through the mediating variables of education and severity of substance use.

Paper II

Paper II was intended to investigate the prevalence of ID and BID in a population of in-patients with SUD. The three essential diagnostic criteria listed in the ICD-10/DSM-5 were employed: IQ scores in the ID or BID range, adaptive skills scores in the ID or BID range, and evidence of learning difficulties during the developmental period. In addition, the study aimed to explore similarities and differences between ID/BID and non-ID individuals among SUD in-patients with regard to education, previous contact with public support systems, childhood learning difficulties, comorbid mental disorders, and substance-related factors.

Paper III

The aim of the Paper III was to validate the ability of HASI to predict ID in in-patients with SUD. ID was defined in accordance with the criteria presented in ICD-10/DSM-5.

3. METHODS

3.1 DESIGN

The overall study design was retrospective, cross-sectional. The timing of measurements was included in the design. The specifications regarding timing are presented in the section titled “Procedures for Data Collection”.

3.2 STUDY POPULATION

Patients in treatment facilities for SUD who were over the age of 18 participated in the study. The exclusion criteria were having a native language other than Norwegian, being under the influence of substances at the time of IQ testing, or having been tested with the Wechsler Adult Intelligence Scale (WAIS) during the last six months.

3.3 TREATMENT CENTERS

Three of five treatment facilities for SUD invited to participate in this study, were included based on their willingness to participate. All three institutions were part of the public health-care system. Two were owned by the local health authorities and one was a private institution under an operating agreement with the local health authorities. In Norway, in-patient treatment for individuals with SUD is free of charge in both public institutions and private institutions under an operating agreement with the local health authorities, and patients can freely choose where they will be referred. All three participating institutions followed the recommended national guidelines for substance use treatment. No compensation was given to the participants or the treatment facility, and data were collected locally at the institutions.

3.4 INSTRUMENTS AND STUDY VARIABLES

The project collected data using five instruments: the WAIS, The Vineland Adaptive Behaviour Scale, the HASI, a self-report questionnaire for participants and a questionnaire for therapists.

3.4.1 The Wechsler Adult Intelligence Scale

The Norwegian adaptation of the Wechsler Adult Intelligence Scale – fourth edition (WAIS-IV) was used to measure participants' IQs. This is an individually administered psychological measurement instrument that judges the intellectual capacity of people between 16 and 89 years of age. In addition to full-scale IQ (FSIQ), IQ can be interpreted through the indexes of: verbal comprehension (VCI), perceptual reasoning (PRI), working memory (WMI), and processing speed (PSI) (Wechsler, 2011b).

The WAIS-IV was chosen as the Wechsler scales are the most commonly used IQ tests in Norway. The test is translated into Norwegian and uses Scandinavian norms. The reliability and validity of WAIS-IV is extensively studied in for both the Scandinavian and original versions and found to possess good psychometric properties for assessment of intellectual functioning (Wechsler, 2011b). In Paper I, the interpretation levels of FSIQ and the indexes VCI, PRI, PSI and WMI were used. In Papers II and III the interpretation level of FSIQ was used as the IQ criteria for ID/BID.

3.4.2 The Vineland Adaptive Behavior Scale

The second edition of the Vineland Adaptive Behavior Scale, Vineland II (Sparrow, Cicchetti, & Balla, 2011) was used to obtain information about participants' adaptive functioning. The Vineland II is designed to measure adaptive functioning through a global adaptive score (GAS), and thorough the more specific domains of communication (CF), daily living (ADL), and socialization skills (SF). It has both an interview format and a self-report scale. In the current PhD project, the self-report scale was administered to personnel at the participating institutions. The Norwegian adaptation was used. This version only has norms for individuals up to 21.11 years of

age, and the results for participants older than this were based on the highest available norms. The manual only allows two "don't know" answers per subdomain. For cases in which there were more than two "don't know" answers, all these answers were scored according to the rule for "don't know" answers, that is, given one point (see cases marked with asterisk in the appendix of Paper II for the cases where this was done).

The Vineland II was chosen as it is the only known measure on adaptive skills that is translated into Norwegian, culturally adapted, and validated for the Scandinavian population with associated Scandinavian norms. The reliability and validity of the Vineland II has been studied thoroughly in both its original and Scandinavian version, and it has been found to possess good psychometric properties for assessment of adaptive behavior (Sparrow et al. 2011).

In Papers II and III the interpretation level of both the global adaptive score and the more specific domains of CF, ADL and SF were used as the adaptive skills criteria for ID/BID.

3.4.3 The Hayes Ability Screening Index

The HASI consists of three short tests measuring individuals' spelling, visuospatial, and visuoconstructional abilities. It also includes four questions about known learning difficulties (Hayes, 2000). It operates with a cut-off score of 85 points for the adult population and recommends further assessment of ID in people who score under this cut-off point. In the current study, the Norwegian version was used (Søndenaa et al., 2007). The HASI can be administered by employees of different professions with the proper training.

Paper III used the total HASI score to validate the instrument.

3.4.4 Participant self-report questionnaire

A participant self-report questionnaire was used in this project. Many of the questions, including those regarding recent and current substance use, were derived from a national questionnaire for all patients registered in SUD treatment in Norway

(Norwegian Directorate of Health, 2010). The items concerning childhood functioning were based on the ICD-10 criteria and the characteristics of different childhood difficulties. The following variables from this questionnaire were employed.

Severity of substance use. A severity of substance use index was calculated from five dichotomous items. Each participant's severity of use was scored on a scale from 0–5, with a score of five indicating the most severe use. This score was obtained if all items were answered positively. The five items comprising the index were as follows: 1) regular drug use before 16 years of age, 2) polydrug use (two or more substances used regularly during the four weeks prior to treatment), 3) use of a syringe to administer substances the four weeks prior to treatment, 4) lifetime overdose, and 5) prior treatment for SUD. The variable was used in Papers I and II to account for participants overall severity of substance use behavior.

Childhood functioning. The questionnaire included 40 questions about childhood difficulties. Based on content and face validity, childhood items were grouped into five domains: learning difficulties (LD), attention deficit/hyperactivity (A/H), affective problems (AF), conduct problems (CP), and social difficulties/stereotypic behavior (SS). The ratio of sample-to-items was low, and a rigorous test of dimensionality was therefore not possible. Nevertheless, for heuristic purposes, the proposed five-factor model was tested using confirmatory factor analysis. This analysis suggested adequate model fit (comparative fit index = .902; root mean square error of approximation = 0.044). The five variables LD, A/H, AF, CP, and SS were used in Paper I to indicate the presence of different childhood difficulties. See the appendix for items concerning the different childhood functioning factors.

Childhood learning difficulties and special education. The dichotomized variables childhood learning difficulties (LD, 0/1), special education in primary school (0/1), and special education in secondary school (0/1) were summarized in the variable labeled "childhood learning difficulties and special education" (0/3). For this variable, "0" indicated no reported childhood learning difficulties or special

education in primary/secondary school; “1” indicated one childhood learning difficulty or special education in either primary or secondary school; “2” indicated a minimum of one childhood learning difficulty and special education in either primary or secondary school or special education in both primary and secondary school without self-reported childhood learning difficulties; and “3” indicated a minimum of one childhood learning difficulty and special education in both primary and secondary school. This variable was used for classification purposes only, indicating the fulfillment of the onset criteria for ID/BID in Papers II and III. For comparison between ID/BID and non-ID groups on childhood learning difficulties in Paper II, the sum (0/7) of the reported learning difficulties LD in childhood was used.

Education. Education was recorded by the participants as their highest completed education: primary school (1st–6th grade), secondary school (7th–9th grade), further education (10th–12th grade) or higher education (e.g., university). This variable (range: 1–4) was used in Papers I and II to indicate the participants’ education.

Previous contact with services. Participants self-reported contact with pedagogic services (yes/no), child psychiatric services (yes/no), youth SUD services (yes/no), child protection services (yes/no), and police (yes/no) during primary and secondary school were summarized by a variable ranging from 0–5. The variable was used in Paper II.

Substance use. Participants reported the substances they most commonly used the 6 months prior to treatment. This variable was used in Paper I. They also reported the age at which they first used substances and their age at regularly use of substances. These variables were used in Paper II.

3.4.5 THERAPIST QUESTIONNAIRE

Standardized clinical procedures at the treatment facilities were used to assess substance use and other comorbid mental disorders. These procedures included clinical interviews and structured measures, such as the Mini-International Neuropsychiatric Interview (M.I.N.I.) or the Structured Clinical Interview for DSM disorders (SCID). A diagnosis was made when the participant met the ICD-10 criteria

(WHO, 1992). The treating psychologist or physician reported the diagnosis in addition to relapses to substance use during treatment, reason for treatment termination, length of abstinence upon treatment termination, and further planned public or private support after treatment on a therapist questionnaire.

A variable concerning SUD was used in Papers I and II. A variable concerning mental illness was used in Paper II. A variable on relapse during treatment was used in Paper II.

See Table 1 for a simple overview of all the instruments and variables used in the three papers.

Table 1

Overview of Variables and Instruments Used in the Three Papers.

	Variables	Instruments
Paper I	FSIQ, VCI, PRI, WMI, PSI	WAIS-IV
	SUD diagnosis	Therapist questionnaire
	Severity of substance use	Self-report questionnaire
	Substance most used last 6 months prior to treatment	Self-report questionnaire
	Education	Self-report questionnaire
	Childhood functioning (LD, A/H, CP, AF, SS)	Self-report questionnaire
Paper II	FSIQ	WAIS-IV
	GAS, CF, ADL, SF	Vineland II
	Childhood learning difficulties and special education	Self-report questionnaire
	Sum of reported childhood learning difficulties	Self-report questionnaire
	Severity of substance use	Self-report questionnaire
	Education	Self-report questionnaire
	Previous contact with services	Self-report questionnaire
	Age of first episode substance use and regular use	Self-report questionnaire
	SUD diagnosis	Therapist questionnaire
	Mental illness diagnosis	Therapist questionnaire
	Relapse to substance use during treatment	Therapist questionnaire
Paper III	FSIQ	WAIS-IV
	GAS, CF, ADL, SF	Vineland II
	Childhood learning difficulties and special education	Self-report questionnaire
	Total score	HASI

3.4.6 Staff training and inter-rater reliability

All administrators of the HASI and WAIS-IV (psychologist or psychology students employed at the participating institutions) completed a three-day course on administration of the instruments and scoring of subtests. The course was given by a specialist in clinical psychology, who was competently able to administer, score, and interpret the WAIS-IV and HASI, and it included practical exercises. After the course, the administrators scored the same videos of nine patients' responses to the HASI and four randomly selected WAIS-IV subtests. Intraclass correlation (ICC) analyses were calculated. The ICC results for the WAIS-IV ranged from .84–1.0 and implied almost perfect consistency among raters, while the ICC results for the HASI ranged from .75–.98, implying substantial to almost perfect consistency, according to the interpretations suggested by Landis & Koch (1977).

Those who responded to the Vineland II were given a two-hour lecture by a specialist in clinical psychology, who was competently able to administer, score, and interpret the Vineland II. The lecture concerned the structure of the scale and guidance/discussion about how to complete the form.

3.4 Procedure for classification of intellectual and borderline intellectual disabilities

Papers II and III used three levels of ID identification: definite, possible and probable. To qualify for a *definite* diagnosis of ID, all three criteria for diagnosis had to be met. That is, the FSIQ score had to be 69 or lower, one or more of the Vineland II domains or the general adaptive functioning score had to be 69 or lower, and there had to be an indication of learning difficulties before the individual was18 years of age. The ID diagnosis was *probable* when there were indications of childhood learning difficulties and one or more of the adaptive domains were 69 or lower, but the FSIQ was between 70 and 73 (taking the standard error of measurement into account). The ID diagnosis was *possible* when information about only one or two of

the diagnostic criteria was available and the available criteria indicated ID functioning.

To qualify for *definite* classification of BID, one or more of the Vineland II domains had to be in the 70-85 range with none being 69 or lower. In addition, the FSIQ had to be 70–85 and there had to be evidence of childhood learning difficulties. In addition to a *definite* diagnosis, BID could be classified as *probable* BID or *possible* BID. *Probable* BID was identified when information about all three diagnostic criteria was available, but either the FSIQ or the Vineland profile indicated ID. BID was classified as *possible* when information about only one or two of the diagnostic criteria was available and the available criteria indicated BID functioning.

The Vineland II and WAIS-IV profiles were visually inspected to check for within-test differences as part of the classification of both ID and BID. The final classification was based upon agreement between two project researchers.

3.5 PROCEDURES FOR DATA COLLECTION

Upon admission to treatment, individuals were asked to join the study and those who agreed signed an informed consent form. Participants were given a self-report questionnaire to answer. In eight cases, missing data were supplemented with journal data.

An assessment appointment was set at least six weeks from the last intake of substances, at which time an IQ test and the HASI was administered by a clinical psychologist or student of psychology. Abstinence from substance use was ensured through urine samples and clinical observations. When an individual ended his or her treatment program, the treating psychologist/physician answered the therapist questionnaire. The Vineland II was completed by personnel at the institution based on observations throughout the treatment period. Personnel were encouraged to complete scoring for the Vineland II in groups to base the score on more observed behavior and to ensure agreement regarding the obvserved behavioral expression of each participant.

3.6 STATISTICAL METHODS

In **Paper I**, analyses of variance (ANOVAs) were run to determine the variance among groups based on the substance most commonly used in the last six months and therefore to test whether the sample was to be treated as homogenous or heterogeneous with regards to substance use. Mediation models were tested using the PROCESS SPSS macro (Hayes, 2013). In the multiple mediation models, the effect of the independent variable, childhood functioning, on the dependent variable, IQ, was mediated by the severity of substance use (substance pathway) and education (education pathway). Separate models were run for each of the five areas of childhood functioning (LD, A/H, AF, CP, and SS). The PROCESS module decomposes the effects into indirect (ab), direct (c'), and total effects (c). Mediation was tested by bootstrapped ab products and Sobel tests (Sobel, 1982). Missing data was handled by listwise deletion of cases.

In **Paper II**, a frequency analysis was performed for the ID, BID, and non-ID groups. Independent-samples t-tests were calculated to determine differences in group means; chi-square tests of independence were calculated to determine group associations for the categorical variables; and Mann–Whitney U tests were used to calculate group differences for the ordinal variables. Missing data was handled by pairwise deletion of cases.

In **Paper III**, the convergent validity of the HASI and WAIS-IV, and of the HASI and Vineland II was tested using the Pearson two-tailed correlation test. The discriminative ability of the HASI was tested using a receiver operating characteristic (ROC) curve analysis. Missing data was handled by listwise deletion of cases.

All statistical analysis was done using the statistical software package SPSS 23 (IBM Coro. Released 2015).

3.7 ETHICS

This PhD project was approved by the Regional Ethical Committee for Medical Research in Norway (Reference: 2011-00778).

4. RESULTS

4.1 RECRUITMENT AND PARTICIPANT FLOW

A total of 126 individuals were asked to participate during the 2013 to 2015 recruitment period. The estimated number of participants during the recruitment period was 300, but due to, for example, changes in staff only about half of the eligible participants were asked to join the study.

Of the 126 participants, three met the exclusion criteria (one male), 13 declined (10 males), and 16 dropped out due to drug-use relapse (11 males). Of the remaining 94 participants, 90 completed the WAIS-IV, 92 completed the therapist questionnaire, 60 had full results on the Vineland II, four had partial results on the Vineland II, and 84 returned a partially or fully completed participant questionnaire. In **Paper I**, the final samples that were eligible for IQ was 90 and 64 for the mediation analysis. As the PhD project operated with different levels of certainty regarding ID/BID (see the methods section) and participants could be missing one or two of the three criteria, the final sample that was eligible for classification as ID/BID or non-ID/BID in **Paper II** was 91. For comparison analysis between ID/BID and non-ID groups, N varied according to variable, ranging from 67–90 (see Table 3 in Paper II). In **Paper III**, the final sample that was eligible for ROC analysis was 84.

4.2 PAPER I: PREDICTORS OF IQ VARIANCE

Paper I examined the effect of five types of childhood difficulties on IQ variation in a SUD in-patient population. FSIQ was normally distributed in the studied population, with a mean of 87.3.Using mediation analysis, two mediating pathways between the independent variable, childhood difficulties, and the dependent variable, IQ, were investigated: one through education and one through the severity of substance use. The five types of childhood difficulties were analyzed separately. The results showed that IQ variance was related to childhood difficulties alone or through the mediator of education. LD and A/H in childhood were directly related to adult IQ, indicating that

the more severely a participant experienced these difficulties as a child, the lower that participant's measured IQ in treatment. This effect was found for the FSIQ, WMI, and PSI.

Education had a mediating effect between some types of childhood difficulties and VCI; higher LD and CP in childhood led to fewer years of education, which resulted in lower VCI. Education also had a mediating effect between CP and FSIQ. Education was found to have a univariate effect on VCI in all models and on FSIQ in two of the models. There was no significant difference in IQ due to the specific substance used, and the severity of substance use did not influence IQ in any of the five tested models.

4.3 Paper II: Prevalence and characteristics of ID/BID

The primary aim of Paper II was to estimate the prevalence of ID/BID and to explore the characteristics of ID/BID in a population of in-patients with SUD. Frequency analysis showed that 29 (31.9%) participants could be classified as having a definite, probable, or possible ID/BID (ID: 7.7%, BID: 24.2%). Using independent-samples t-tests, chi-square tests and Mann-Whitney U tests to determine between group differences, statistically significant differences between the ID/BID group and non-ID group with regard to length of education, previous contact with public support systems and self-reported childhood learning difficulties was found. Except for substance use relapse during treatment, there were no statistically significant differences between the groups concerning substance-related factors.

4.4 Paper III: Validation of the HASI

The primary aim of Paper III was to investigate whether the HASI is a valid instrument for ID screening among in-patients with SUD. Pearson two-tailed tests were used to investigate the convergent validity of instruments. Results showed a statistically significant positive correlation between measures of IQ and adaptive skills and the HASI. ROC analysis, which was used to determine the discriminant validity of the HASI, showed that the instrument had a sensitivity of 100% and a

specificity of 65.4% when identifying individuals with ID at the original adult cut-off score of 85. In our sample of 84 participants, all of the individuals with ID were identified correctly and 34.6% of the subjects were falsely identified with ID. Among the subjects falsely identified with ID, 76.2% fulfilled the criteria for BID.

5. DISCUSSION

5.1 MAIN FINDINGS

One of the main objectives of this PhD project was to investigate the prevalence of ID/BID in an in-patient SUD population. A high prevalence of ID/BID was found in the sample when all three diagnostic criteria recommended for use in ID classification were employed. Evidence was found supporting the hypothesis that childhood learning difficulties exist prior to onset of substance use in this population. Further investigation revealed that these patients had lower education, a higher level of self-reported childhood learning difficulties, more history of previous contact with support systems, and more instances of substance use relapse during treatment than their non-ID peers.

In Paper I it was found that IQ in the sample of in-patients with SUD was normally distributed and below average at a group level. Regarding the secondary aim, to investigate factors that predict IQ variance– the results indicated that, after at least six weeks of abstinence, childhood difficulties and education influence IQ variance among in-patients with SUD. Substance-related factors had no effect on IQ variance in the present sample.

The second main objective was to evaluate the HASI as a screening instrument for ID in a SUD in-patient population. The HASI was found to have acceptable validity as a screening instrument for ID in this population.

The findings of this PhD project add to the body of literature on the comorbidity of ID/BID and SUD with its unique investigation from the viewpoint of mainstream SUD in-patient treatment, where only a few previous studies have been conducted. By using all three ICD-10/DSM-5criteria for ID/BID identification, the project enables a more certain identification of ID/BID than previous subpopulation studies that mainly have relied on IQ measures for ID identification. The project also enables ICD-10 diagnosis of SUD, which have been lacking in many previous studies. The findings of this project provide new knowledge, showing that many individuals in SUD in-patient treatment meet the criteria for ID/BID. The findings

support the hypothesis that those who meet the ID/BID criteria faced developmental difficulties prior to substance use. The findings further suggest that these individuals are part of a population that is undiagnosed/unrecognized for their ID/BID from an early age, despite the fact that they have more contact with public support systems, and continues be unrecognized during SUD treatment. The project also adds to the field of research with its validation of HASI as a screening instrument for ID identification among SUD in-patients.

The main findings of the PhD project will be discussed more thoroughly in relation to previous research findings below.

5.1.1 Prevalence

The results of Paper II indicate that individuals with ID/BID are overrepresented in SUD in-patient treatment compared to the expected 12–15% based on normal distribution of the general population. These results both support and deviate from previous reports. The results are quite similar to those of Luteijn et al. (2017), who reported the prevalence of ID/BID in a forensic addiction treatment center. Based on IQ scores, they found a prevalence of 39% for mild to borderline ID with a normally distributed FSIQ and a mean of 87.9.

In comparison to the methodology of previously conducted studies on ID/BID prevalence in SUD in-patient treatment, the current study used all three criteria for ID, not only IQ. The procedures ensured testing of all included participants, unlike VanDerNagel et al. (2014), who relied on previous IQ tests or a history of special education or institutionalization in ID facilities. The results in Paper II, indicate that the procedure used in this PhD project identified individuals who had not been previously diagnosed with an ID and constitute parts of a “hidden” ID population.

In Paper II, a prevalence of mild to borderline ID and no other levels of ID was found. Previous studies have suggested that individuals with mild or borderline ID who live independently are especially at risk for developing substance-related problems (Sturmey et al., 2003). Intellectual and functional impairment may not be as apparent in these individuals as those with other levels of ID (AAIDD, 2010), and the

individuals' ID may go unrecognized during childhood (APA, 2013). An identified and more apparent ID provides access to support, including protection from interaction with substances.

Regarding the substance use profiles, the results in Paper II, similar to those of Luteijn et al. (2017), indicate that individuals classified as having ID/BID use the same substances as their non-ID peers across a wider range and at a higher degree than previously suggested for the ID population (vanDuijvenbode et al., 2015). This indicates that there may be differences in the substance use profiles of the identified individuals with ID/BID in contact with ID services and unidentified individuals in treatment for SUD. Individuals in contact with ID services may receive support and education regarding substance use and may be strongly encouraged to abstain from the use of illegal substances. Individuals with an unrecognized ID, and thus without support for their ID needs, may experience more contact and identification with non-ID substance users. Such differences in social interaction and modeling may result in different user profiles.

5.1.2 Substance induced level of functioning or ID?

One might argue that ID/BID identified among individuals with SUD is not a developmental disorder, but a reflection of substance use or substance-related behavior. Although deficits in adult IQ and adaptive functioning are required to diagnose ID, a deficit in the level of functioning must be present during the developmental period for a diagnosis (AAIDD, 2010). The findings of Paper I suggest that at least the explained variation in IQ among in-patients with SUD can be attributed to premorbid learning difficulties and length of education rather than the specific substance used or severity of substance use. The notion of premorbid difficulties was further supported in the findings from paper II, which showed that compared to their non-ID in-treatment peers, individuals identified to have an ID/BID had significantly less education, more childhood learning difficulties, and more contact with pedagogic services during the developmental period.

Although previous studies have found lower levels of IQ scores in groups of individuals with SUD compared to non-substance-using controls (Tarter et al., 1995) and suggested that substance use can cause either a temporary decline in IQ (Fried et al., 2002: Lin et al., 2010), a permanent, partial, decline in IQ (Latvala et al., 2009: Schottenbauer, Momenan, Kerick & Hommer, 2007), or a permanent global decline in IQ (Meyer et al., 2012), there is little evidence for substance use as an explanatory model for the intellectual impairments associated with ID.

In a longitudinal study of cannabis users (Meyer et al., 2012), both the mean IQ at baseline (99.68) and mean IQ at follow-up (93.93) was in the normal range of intellectual functioning for individuals with the most severe and persistent cannabis use. While studying alcohol use disorders among in-patients, Manning et al. (2008) found similar results. The mean estimated premorbid IQ was 107.1 and the mean measured IQ was 99.4 after 26 days of treatment among 30 in-patients. In a study of cannabis users Fried et al. (2002), found a four-point drop in the IQ of those with heavy, ongoing cannabis use, from the premorbid IQ of 109.1 to a measured IQ of 105.1. Thus, several studies indicate a possible IQ drop in the range of 4–8 points with substance use.

In their study of individuals with known premorbid intellectual functioning in the ID range, van Duijvenbode, Didden, VanDerNagel, Korzelius, and Engels (2016) failed to find a difference between light and problematic drinkers with mild to borderline ID in terms of performance IQ. However, they found significant differences between light and problematic drinkers among non-ID patients. They provide possible explanations that impaired cognitive functioning might not be further impaired due to the harmful effects of alcohol use. They also argue that IQ tests may not be sensitive enough to detect differences in the lower boundaries of IQ.

In conclusion, the pattern of prior findings suggests that, even though substance use may cause some intellectual impairment, it is not likely that the harmful effects of substance use will make an individual's normal intellectual functioning to be impaired to a level associated with ID/BID. Furthermore, IQ scores in the ID/BID range do not seem to be further reduced due to substance use. The

findings form previous studies and the results of Paper I indicate that intellectual functioning at an ID/BID level in patients with SUD is more likely a reflection of impaired functioning originated prior to initiation of substance use than the result of substance use.

5.1.3 Identification and diagnostics

Although there was found a high prevalence of ID/BID in Paper II, individuals had not been diagnosed with such conditions, indicating that the disorders go unrecognized during SUD treatment. More surprisingly the findings indicate that the patients in the ID/BID group had significantly more contact with public services during childhood and adolescence but not identified with a developmental disorder. Generally, children with ID display more problematic behaviors in school (McIntyre, Blacher, & Baker, 2006) and have higher frequencies of mental illness (Emerson & Hatton, 2007; Emerson et al., 2010). Children with ID also more often have parents with mental health problems than children without ID (Emerson & Hatton, 2007). The lack of diagnosis may be because attention given to other problematic areas or treatment for comorbid conditions overshadows the developmental disorder, or that healthcare professionals withholds from diagnosing ID when complicating factors, such as mental illness or child neglect, make interpretation of test results and observations difficult.

Diagnostic overshadowing or reluctance to diagnose a person with ID in the presence of complex differential diagnosis may also be present when individuals enter SUD treatment, especially when healthcare professionals are uncertain how to interpret the results considering the three ID criteria. Also, due to factors such as drop out or relapse during the treatment period, the realistic “assessment window” may be limited, and ID assessment may never take place. The results in Paper III, found the HASI to be a good screening instrument for detecting possible ID/BID in the SUD population. Similar results have been reported by To et al. (2015). The HASI can be easily administered by SUD personnel to all patients and form the basis for further assessment and adjusted treatment. The HASI may thus, be an effective tool in the

early stage of the SUD treatment. The need for early identification is particularly highlighted by the findings in paper II, which shows that individuals in the ID/BID group had a significantly higher rate of substance use relapse during treatment than their non-ID peers, indicating that early identification of ID may be of great importance for the treatment plans and follow-up.

The further ID assessment for diagnostic purposes in individuals with SUD should be based on the "gold standard" with the use of standardized measurements for both IQ and adaptive functioning and evidence of the onset of impairments. In Paper I it was found that substance-related factors did not influence IQ variation among the sampled in-patients with SUD after six weeks of abstinence and that IQ variation was related to childhood functioning. Diagnosis of ID requires that both IQ and adaptive behavior are impaired simultaneously (APA, 2013; British Psychological Society, 2015). It therefore seems reasonable that simultaneous impaired adaptive and intellectual functioning in in-patients with SUD after six weeks of abstinence indicates an ID.

In the presence of ID-level IQ and adaptive functioning, the onset of impairments determines whether a diagnosis of ID should be made. Although weak as an explanatory model for intellectual functioning on an ID level, some have argued that, for early onset substance users, substance use can disturb the development of IQ and cause intellectual decline (Meier et al., 2012). However, independently of cause, an ID diagnosis should be made when there is evidence of significant impairment of intellectual and adaptive functioning before the age of 18. Possible causes should be coded separately, as is the case for the genetic disorder of Downs syndrome. Thus, if there is evidence that substance use is the cause of intellectual and adaptive impairment on an ID level before the age of 18, the diagnosis of ID should be made.

Regarding the classification of BID, there is currently no category in either the ICD-10 or the DSM-5 that describes the co-occurrence of intellectual functioning and adaptive behavior in the borderline range starting in the developmental period. Although the term BID was used in Papers II and III to highlight the impaired functioning beyond IQ, classification for this group according to the diagnostic

manuals is based on IQ scores. As the DSM-5 stresses the importance of adaptive behavior in classification of ID for targeted services and interventions, it can be argued that adaptive behavior must be measured in addition to IQ for this group as well. Even though classification is based on IQ, the clinician should specify of limits of a patient's adaptive functioning. This is a group that often fall between two chairs (Peltopuro et al., 2014), and better support may be provided when both their functional impairments and intellectual impairments are assessed and recognized.

5.2 METHODOLOGICAL ISSUES

5.2.1 DESIGN

The study was conducted with a retrospective, cross-sectional design and strategic timing of measurements. A minimum period of abstinence of six weeks was set before IQ testing and ID screening, and adaptive skills were assessed at the end of the treatment period. These limits were set to minimize the influence of recent substance use and strengthen the reliability and validity of the results.

The design is considered reasonably suitable for answering the research questions of Papers II and III, as the investigations did not intend to determine the cause of ID. For the research questions of Paper I, this design can pose difficulties in interpretation of the results. A mediation analysis, as used in Paper I, implies causal relationships between the independent variable and mediators of the dependent variable. Although respondents were asked to report their functioning and childhood events, all variables were measured at one point in time, and one cannot definitely conclude the direction of the relationship. In general, retrospective designs have several limitations: the outcome has already happened, the researcher has to rely on secondary sources of information and has no direct control over exposures, and it is difficult to make casual inferences. Therefore, one`s current level of IQ may affect the way in which one reports childhood difficulties and not the other way around. The results of Paper I should therefore be interpreted with caution.

Some of the weak aspects of a retrospective design could be ameliorated by a longitudinal design to answer the research questions of Paper I. The causal pathways could be strengthened with certain measures of premorbid functioning. However, as no register data related to the research question was available, a prospective design would be both time consuming and costly, and therefore was not possible in the current PhD project.

5.2.2 Participation rate and selection bias

Methodological biases are factors that may influence the results of a study and threaten both the reliability and validity of the findings. Selection biases are among the most common of these biases. The current study applied a convenience sampling method to select participating institutions. Both institutions owned by local health authorities and private institutions under operating agreements with local health authorities from different regions in Norway were recruited to participate in the study. It was ensured that the institutions did not have any specific orientation, such as 12 step-programs or therapeutic communities that may recruit certain types of patients. All the recruited institutions followed national guidelines for substance use treatment (Norwegian Directorate of Health, 2016).

An estimated number of 300 new patients were admitted to all three institutions during the recruitment period. Due to factors such as change in psychological staff, only about half of the eligible patients were asked to join the study. Patients were randomly assigned to the main psychologist with no systematic exclusion. It is therefore reasonable to believe that the studied population represents a random sample of in-patients in the participating institutions.

Of the 126 individuals asked to participate, only 13 declined. Sixteen dropped out due to substance use relapse and three met the exclusion criteria, leaving a fairly good response rate and a reasonably large clinical sample considering the extensive psychometric and observational data collection.

5.2.3 Measurements

Standardized measurements are part of ID diagnostics. Many factors can influence test results, and the standard error of measurement is an expression of variation in test scores due to these potential measurement errors. It can be used to establish a confidence interval around the obtained score, within which it is assumed that the individual's true score lies. The DSM-IV criteria for ID (APA, 2013) states that reduced intellectual functioning and deficits in one or more adaptive domains is most commonly defined as a score of two or more SDs below the population mean on standardized IQ tests or measures of adaptive skills. One of the major strengths of this PhD project is that both IQ and adaptive skills were assessed with standardized measures, validated for the Norwegian population. When classifying ID, the project included the standard error of measurement in the IQ boundaries for inclusion, in accordance with suggestions made by the AAIDD (2010).

Extensive effort was made to ensure the quality of measurements in the current PhD project. All administrators of the WAIS-IV and the HASI were given a three day lecture after accepting to participate in the project. An analysis of inter-rater reliability was done for all administrators of the WAIS-IV and HASI. The achieved results from this analysis were satisfying. A lecture regarding the administration of the Vineland II was also given. For this measurement, staff was encouraged to complete the form in groups because, different staff observes the patient in different settings, and the Vineland II should reflect the average functioning of the patient. The forms should therefore reflect a reasonable consensus from the different staff members regarding ratings of patients functioning. The time frame for the project did not allow for a pilot study to assess the inter-rater reliability of the Vineland II. A pilot study would require patients to be observed by two or more raters for a long period of time.

The use of Vineland II had some limitations. For example the respondents were personnel employed at the participating institutions and thus had known the studied individuals for a limited amount of time. Further, observations were conducted during treatment, which may not reveal the patient's full range of adaptive behavior or behavioral potential and may therefore not be representative of

functioning out of a treatment context. Also, the Norwegian norms for Vineland II are only provided for individuals up to approximately 22 years of age, and therefore the PhD project had to use the highest norms for participants older than 22 years of age. However, as the manual states that this is less of a problem in higher functioning individuals (Sparrow et al., 2011), and that the current research only identified individuals with mild and borderline ID, it is believed that the use of these norms does not threaten the main findings.

A self-report questionnaire concerning childhood difficulties was used to obtain information about patients' childhood difficulties. Although the items were based upon the ICD-10 descriptions of different disorders, no validation study was conducted prior to the data collection in this project. Nevertheless, it is believed that the best was done with the available data in ensuring reasonable validation of the background factors by confirmatory factor analysis.

A strength of the project was the timing of measurements. By ensuring at least six weeks of abstinence from substance use at the time of testing for both the WAIS-IV and the HASI, we minimized the influence of substances on performance. The Vineland II was administered at the end of patients' treatment period for the same reason. In addition, we ensured that SUD diagnosis was certain through clinical procedures using diagnostic interviews such as the M.I.N.I or SCID.

5.2.4 CONFOUNDING FACTORS

Confounding variables are factors that influence the variables in a study in unforeseen or unintended ways, producing exaggerated or false results. Factors related to substance use may have confounding effects and result in an overestimation of the ID/BID prevalence in the current study. However, in Paper I, an ANOVA revealed that the specific substances used had no significant effect on IQ. A severity of use index was also included in the mediation analysis, finding no significant effect on IQ variation. In Paper II, no significant differences in substance-related factors between the ID/BID group and non-ID group were found, except for substance use relapse during treatment.

Although the study population represented a reasonably large clinical sample, the number of participants in each substance use group was low, and polydrug use was common in the sample. This means that conclusions regarding IQ variation are on a "any use" level and not on a more detailed substance-by-substance level. Also, the study did not have a non-user control group with matched childhood difficulties and duration of schooling, which could have provided information about possible group-specific differences.

5.2.5 Validity of the ID/BID classification

The validity of measures describes whether one has measured what was intended. ID is the only psychiatric diagnosis that is based on standardized measurements. It is a dimensional diagnosis with a cut-off for clinical relevance. The current study measured all three ID criteria with the "gold standard", validated measurements for both IQ and adaptive skills. The measures used in classifying ID/BID in the present sample are therefore thought to have good construct validity.

The measure of childhood learning difficulties was based on self-reports and thus may be biased due to memory issues. However, for diagnosing ID in adults, the British Psychological Society (2015) states that, in cases with a lack of information regarding the onset, if both intellectual impairment and adaptive skills are impaired, one should consider them to be long-standing, and make a diagnosis of ID. However, when there is evidence of events that could have compromised brain functioning after the age of 18 a diagnosis should be questioned (The British Psychological Society, 2015). Overdoses in individuals with SUD may be one such event. In Papers I and II, overdose was included in the severity of use index. In Paper I, the index did not have a significant effect on IQ variation. In Paper II, there were no significant differences between the ID/BID and non-ID groups regarding the severity of use index. For a definite classification of ID/BID in Paper II and III, both adaptive and intellectual functioning had to be impaired with evidence of onset before the age of 18. It can therefore be argued that the current study's classification of ID/BID has good validity.

5.2.6 GENERALIZABILITY

The generalizability of scientific findings refers to the extent to which findings from a sample population are true for, or can be applied to, the total population. The two main objectives of the present project were to estimate the prevalence of ID/BID and evaluate the ability of the HASI to identify ID in an in-patient SUD population. The low number of institutions and participants included in this project challenge the generalizability of ID/BID prevalence.

As the sample was drawn from convenience, the reported prevalence of ID/BID among in-patients with SUD may not be representative of the "true" prevalence. Also, the prevalence of ID/BID may vary in different SUD populations, such as out-patients vs. in-patients. It can be hypothesized that individuals with ID/BID need more support and intense treatment for their SUD and are therefore more prevalent in in-treatment facilities

Both the diagnostic procedure used to classify ID/BID and the use of HASI as a screening instrument are considered to have good construct validity and may be generalized to other populations of in-patients with SUD. It is also believed that the finding that there are individuals who meet the criteria for ID/BID in mainstream SUD treatment can be generalized.

5.3 DISCUSSION OF THE FINDINGS IN A THEORETICAL FRAMEWORK

ID is a disorder originating in the developmental period manifested by impairments in intellectual and adaptive functioning. Previous research has suggested that substance use can disturb the normal development of, at least, intellectual functioning. In Paper I, a normal development model versus a harmful effects of substance use model was systematically investigated, finding that substance-related factors had no effect on IQ. The findings support a normal view of development, with well-known risk factors to explain the variation in IQ observed in in-patients with SUD after at least six weeks of abstinence from substance use.

As the study population comprised only of individuals where all had a SUD, the present research cannot answer the question of whether substance-related factors may contribute to some of the variance in IQ between individuals with SUD and individuals without SUD or individuals who never used substance. Population-based studies explain this phenomenon in different ways; some support the findings of pre-morbid factors, and some describe the harmful effects of substance use. However, there is little evidence from previous research that substance-related factors reduce intellectual functioning one to two SDs below the population average, which is required for the diagnosis of ID/BID. Also, in the lower ranges of IQ, there is currently no evidence that substance use have effect on IQ at all. Although similar research on adaptive skills is lacking, a significant correlation between IQ and adaptive skills have been found. Thus, it can be argued that that standardized ID assessment is applicable to the sub-population of in-patients with SUD.

The findings in Paper II provide new information about a potentially high prevalence of ID/BID among in-patients with SUD. Both ID and SUD may share some common developmental pathways with overlapping risk factors. For example, the most commonly known preventable risk factor for ID is maternal alcohol use during pregnancy, and parental substance use is a risk factor for SUD (Cocco & Harper, 2002). Therefore, the same risk factors may result in development of ID or SUD, and in some individuals, both ID and SUD.

The findings in Paper II indicate that many individuals do not receive services and support that acknowledge their intellectual and adaptive limitations. According to a socio-ecological model of disability, environmental demands should be adjusted to the individuals functioning to optimize functioning and quality of life. By not identifying these conditions during SUD treatment, or adjusting treatment for individuals with ID/BID, we may fail to provide an in-treatment environment that is adapted to the individual's strengths and weaknesses. This can, at least partly, explain the lack of SUD treatment effect and reported negative in-treatment experiences in this group. Individuals with ID/BID may also leave SUD in-treatment with no further support or specialized ID services and face environmental demands that are too great

to cope with alone, such as adequate housing or economic responsibility. This again, can lead to use of inexpedient coping strategies such as substance use.

6. CONCLUSIONS AND DIRECTIONS FOR FUTURE STUDIES

The two main objectives of this PhD project were to investigate the prevalence of ID/BID in mainstream in-patient treatment for SUD and to validate the HASI in predicting ID. The results of Paper II indicate that there may be an overrepresentation of ID/BID in mainstream SUD in-patient treatment. The results further imply that these patients are not identified with ID/BID as children or during the SUD treatment period. The results of Paper III found the HASI to have good construct and discriminant validity in detecting ID in in-patients with SUD and indicate that the HASI may be a useful instrument for broad screening in the SUD in-patient population and selection of patients for further ID assessment. The secondary objective of the PhD project was to investigate factors that influence IQ in in-patients with SUD. The findings of Paper I support a hypothesis that signs of ID/BID in in-patients with SUD can most likely be attributed to pre-morbid functioning and a diagnosis of a developmental disorder is needed. Overall, results from this PhD project highlight the presence of ID/BID in mainstream SUD treatment, the need for ID identification in in-patients with SUD, the identification process itself and how to interpret results from ID assessment in patients with SUD.

The results have theoretical as well as clinical implications. To date, few studies have investigated ID/BID in SUD populations. The present PhD study therefore contributes to the international literature on the comorbidity of ID/SUD and may stimulate further investigation of the topic from the viewpoint of SUD treatment. Studies in a wide range of SUD treatment facilities and countries are warranted.

During the conduction of the PhD project, some knowledge gaps have been identified that future studies should address. First, the findings from this PhD project should be replicated using a larger sample. Secondly, studies that systematically investigate adaptive behavior, causes of variation in in-patients with SUD, and how to understand limitations in a clinical setting should be conducted. Studies should also continue to investigate whether substance use in general or specific substances can

disturb the normal development of IQ and cause ID. Although the findings in Paper I support a pre-morbid ID/BID in individuals with SUD, the field would benefit from further clinical and population-based studies. Longitudinal designs with control groups of similar background characteristics and different substance user profiles as well as clinical samples with good, validated, measures of pre-morbid functioning are encouraged. Further investigations of the potential harmful effects of substance use in the lower boundaries of IQ should be conducted. Although there is reason to believe that identification of ID/BID has implications for SUD in-patient treatment and post-treatment follow-up, future studies should develop and systematically investigate the effects of adjusted SUD treatment programs for these individuals.

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APPENDIX

Items in each factor of childhood difficulties.

Factor
Learning difficulties (LD)
I was slow in learning to walk
I was slow in learning to talk
I learned to read later than others
I had difficulties learning to button/tie
I had difficulties with language or speech
I had immature behavior for my age
I had memory problems
Attention deficit/hyperactivity (A/H)
I had difficulties with attention
I was easily distracted
I had difficulties sitting still
I had difficulties completing things I started
My attention wandered
I couldn't wait for my turn
I was hyperactive
I was impulse
I was unorganized
I was easily active/overactive
My behavior was unpredictable
Conduct problems (CP)
I had behavior problems at home
I had behavior problems at school
I had lots of conflicts with other children
I was stubborn
I was aggressive
I had outbursts of anger
I shoplifted/was involved in petty theft
I couldn't stand losing in games
I had difficulties regulating my emotions
I was easily frustrated
Affective problems (AF)
I bit my nails
I experienced depression
I cried easily/often
I experienced nervousness
I had episodes of emptiness of where I would stare into space
I experienced bedwetting
I experienced nightmares
I had a low self-image
I was shy
I frequently daydreamed
Social problems/stereotypic behavior (SS)
I had difficulties making friends
I had bad coordination
I had repeating movements
I preferred playing alone

Doctoral Theses at The Faculty of Psychology, University of Bergen

1980	Allen, H.M., Dr. philos.	Parent-offspring interactions in willow grouse (Lagopus L. Lagopus).
1981	Myhrer, T., Dr. philos.	Behavioral Studies after selective disruption of hippocampal inputs in albino rats.
1982	Svebak, S., Dr. philos.	The significance of motivation for task-induced tonic physiological changes.
1983	Myhre, G., Dr. philos.	The Biopsychology of behavior in captive Willow ptarmigan.
	Eide, R., Dr. philos.	PSYCHOSOCIAL FACTORS AND INDICES OF HEALTH RISKS. The relationship of psychosocial conditions to subjective complaints, arterial blood pressure, serum cholesterol, serum triglycerides and urinary catecholamines in middle aged populations in Western Norway.
	Værnes, R.J., Dr. philos.	Neuropsychological effects of diving.
1984	Kolstad, A., Dr. philos.	Til diskusjonen om sammenhengen mellom sosiale forhold og psykiske strukturer. En epidemiologisk undersøkelse blant barn og unge.
	Løberg, T., Dr. philos.	Neuropsychological assessment in alcohol dependence.
1985	Hellesnes, T., Dr. philos.	Læring og problemløsning. En studie av den perseptuelle analysens betydning for verbal læring.
	Håland, W., Dr. philos.	Psykoterapi: relasjon, utviklingsprosess og effekt.
1986	Hagtvet, K.A., Dr. philos.	The construct of test anxiety: Conceptual and methodological issues.
	Jellestad, F.K., Dr. philos.	Effects of neuron specific amygdala lesions on fear-motivated behavior in rats.
1987	Aarø, L.E., Dr. philos.	Health behaviour and sosioeconomic Status. A survey among the adult population in Norway.
	Underlid, K., Dr. philos.	Arbeidsløyse i psykososialt perspektiv.
	Laberg, J.C., Dr. philos.	Expectancy and classical conditioning in alcoholics' craving.
	Vollmer, F.C., Dr. philos.	Essays on explanation in psychology.
	Ellertsen, B., Dr. philos.	Migraine and tension headache: Psychophysiology, personality and therapy.
1988	Kaufmann, A., Dr. philos.	Antisosial atferd hos ungdom. En studie av psykologiske determinanter.

	Mykletun, R.J., Dr. philos.	Teacher stress: personality, work-load and health.
	Havik, O.E., Dr. philos.	After the myocardial infarction: A medical and psychological study with special emphasis on perceived illness.
1989	Bråten, S., Dr. philos.	Menneskedyaden. En teoretisk tese om sinnets dialogiske natur med informasjons- og utviklingspsykologiske implikasjoner sammenholdt med utvalgte spedbarnsstudier.
	Wold, B., Dr. psychol.	Lifestyles and physical activity. A theoretical and empirical analysis of socialization among children and adolescents.
1990	Flaten, M.A., Dr. psychol.	The role of habituation and learning in reflex modification.
1991	Alsaker, F.D., Dr. philos.	Global negative self-evaluations in early adolescence.
	Kraft, P., Dr. philos.	AIDS prevention in Norway. Empirical studies on diffusion of knowledge, public opinion, and sexual behaviour.
	Endresen, I.M., Dr. philos.	Psychoimmuniological stress markers in working life.
	Faleide, A.O., Dr. philos.	Asthma and allergy in childhood. Psychosocial and psychotherapeutic problems.
1992	Dalen, K., Dr. philos.	Hemispheric asymmetry and the Dual-Task Paradigm: An experimental approach.
	Bø, I.B., Dr. philos.	Ungdoms sosiale økologi. En undersøkelse av 14-16 åringers sosiale nettverk.
	Nivison, M.E., Dr. philos.	The relationship between noise as an experimental and environmental stressor, physiological changes and psychological factors.
	Torgersen, A.M., Dr. philos.	Genetic and environmental influence on temperamental behaviour. A longitudinal study of twins from infancy to adolescence.
1993	Larsen, S., Dr. philos.	Cultural background and problem drinking.
	Nordhus, I.H., Dr. philos.	Family caregiving. A community psychological study with special emphasis on clinical interventions.
	Thuen, F., Dr. psychol.	Accident-related behaviour among children and young adolescents: Prediction and prevention.
	Solheim, R., Dr. philos.	Spesifikke lærevansker. Diskrepanskriteriet anvendt i seleksjonsmetodikk.
	Johnsen, B.H., Dr. psychol.	Brain assymetry and facial emotional expressions: Conditioning experiments.
1994	Tønnessen, F.E., Dr. philos.	The etiology of Dyslexia.
	Kvale, G., Dr. psychol.	Psychological factors in anticipatory nausea and vomiting in cancer chemotherapy.

	Asbjørnsen, A.E., Dr. psychol.	Structural and dynamic factors in dichotic listening: An interactional model.
	Bru, E., Dr. philos.	The role of psychological factors in neck, shoulder and low back pain among female hospitale staff.
	Braathen, E.T., Dr. psychol.	Prediction of exellence and discontinuation in different types of sport: The significance of motivation and EMG.
	Johannessen, B.F., Dr. philos.	Det flytende kjønnet. Om lederskap, politikk og identitet.
1995	Sam, D.L., Dr. psychol.	Acculturation of young immigrants in Norway: A psychological and socio-cultural adaptation.
	Bjaalid, I.-K., Dr. philos	Component processes in word recognition.
	Martinsen, Ø., Dr. philos.	Cognitive style and insight.
	Nordby, H., Dr. philos.	Processing of auditory deviant events: Mismatch negativity of event-related brain potentials.
	Raaheim, A., Dr. philos.	Health perception and health behaviour, theoretical considerations, empirical studies, and practical implications.
	Seltzer, W.J., Dr.philos.	Studies of Psychocultural Approach to Families in Therapy.
	Brun, W., Dr.philos.	Subjective conceptions of uncertainty and risk.
	Aas, H.N., Dr. psychol.	Alcohol expectancies and socialization: Adolescents learning to drink.
	Bjørkly, S., Dr. psychol.	Diagnosis and prediction of intra-institutional aggressive behaviour in psychotic patients
1996	Anderssen, Norman, Dr. psychol.	Physical activity of young people in a health perspective: Stability, change and social influences.
	Sandal, Gro Mjeldheim, Dr. psychol.	Coping in extreme environments: The role of personality.
	Strumse, Einar, Dr. philos.	The psychology of aesthetics: explaining visual preferences for agrarian landscapes in Western Norway.
	Hestad, Knut, Dr. philos.	Neuropsychological deficits in HIV-1 infection.
	Lugoe, L.Wycliffe, Dr. philos.	Prediction of Tanzanian students' HIV risk and preventive behaviours
	Sandvik, B. Gunnhild, Dr. philos.	Fra distriktsjordmor til institusjonsjordmor. Fremveksten av en profesjon og en profesjonsutdanning
	Lie, Gro Therese, Dr. psychol.	The disease that dares not speak its name: Studies on factors of importance for coping with HIV/AIDS in Northern Tanzania
	Øygard, Lisbet, Dr. philos.	Health behaviors among young adults. A psychological and sociological approach
	Stormark, Kjell Morten, Dr. psychol.	Emotional modulation of selective attention: Experimental and clinical evidence.

	Einarsen, Ståle, Dr. psychol.	Bullying and harassment at work: epidemiological and psychosocial aspects.
1997	Knivsberg, Ann-Mari, Dr. philos.	Behavioural abnormalities and childhood psychopathology: Urinary peptide patterns as a potential tool in diagnosis and remediation.
	Eide, Arne H., Dr. philos.	Adolescent drug use in Zimbabwe. Cultural orientation in a global-local perspective and use of psychoactive substances among secondary school students.
	Sørensen, Marit, Dr. philos.	The psychology of initiating and maintaining exercise and diet behaviour.
	Skjæveland, Oddvar, Dr. psychol.	Relationships between spatial-physical neighborhood attributes and social relations among neighbors.
	Zewdie, Teka, Dr. philos.	Mother-child relational patterns in Ethiopia. Issues of developmental theories and intervention programs.
	Wilhelmsen, Britt Unni, Dr. philos.	Development and evaluation of two educational programmes designed to prevent alcohol use among adolescents.
	Manger, Terje, Dr. philos.	Gender differences in mathematical achievement among Norwegian elementary school students.
1998 V	Lindstrøm, Torill Christine, Dr. philos.	«Good Grief»: Adapting to Bereavement.
	Skogstad, Anders, Dr. philos.	Effects of leadership behaviour on job satisfaction, health and efficiency.
	Haldorsen, Ellen M. Håland, Dr. psychol.	Return to work in low back pain patients.
	Besemer, Susan P., Dr. philos.	Creative Product Analysis: The Search for a Valid Model for Understanding Creativity in Products.
H	Winje, Dagfinn, Dr. psychol.	Psychological adjustment after severe trauma. A longitudinal study of adults' and children's posttraumatic reactions and coping after the bus accident in Måbødalen, Norway 1988.
	Vosburg, Suzanne K., Dr. philos.	The effects of mood on creative problem solving.
	Eriksen, Hege R., Dr. philos.	Stress and coping: Does it really matter for subjective health complaints?
	Jakobsen, Reidar, Dr. psychol.	Empiriske studier av kunnskap og holdninger om hiv/aids og den normative seksuelle utvikling i ungdomsårene.
1999 V	Mikkelsen, Aslaug, Dr. philos.	Effects of learning opportunities and learning climate on occupational health.
	Samdal, Oddrun, Dr. philos.	The school environment as a risk or resource for students' health-related behaviours and subjective well-being.
	Friestad, Christine, Dr. philos.	Social psychological approaches to smoking.
	Ekeland, Tor-Johan, Dr. philos.	Meining som medisin. Ein analyse av placebofenomenet og implikasjoner for terapi og terapeutiske teoriar.

H	Saban, Sara, Dr. psychol.	Brain Asymmetry and Attention: Classical Conditioning Experiments.
	Carlsten, Carl Thomas, Dr. philos.	God lesing – God læring. En aksjonsrettet studie av undervisning i fagtekstlesing.
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	Engen, Liv, Dr. philos.	Kartlegging av leseferdighet på småskoletrinnet og vurdering av faktorer som kan være av betydning for optimal leseutvikling.
2000 V	Hovland, Ole Johan, Dr. philos.	Transforming a self-preserving "alarm" reaction into a self-defeating emotional response: Toward an integrative approach to anxiety as a human phenomenon.
	Lillejord, Sølvi, Dr. philos.	Handlingsrasjonalitet og spesialundervisning. En analyse av aktørperspektiver.
	Sandell, Ove, Dr. philos.	Den varme kunnskapen.
	Oftedal, Marit Petersen, Dr. philos.	Diagnostisering av ordavkodingsvansker: En prosessanalytisk tilnærmingsmåte.
H	Sandbak, Tone, Dr. psychol.	Alcohol consumption and preference in the rat: The significance of individual differences and relationships to stress pathology
	Eid, Jarle, Dr. psychol.	Early predictors of PTSD symptom reporting; The significance of contextual and individual factors.
2001 V	Skinstad, Anne Helene, Dr. philos.	Substance dependence and borderline personality disorders.
	Binder, Per-Einar, Dr. psychol.	Individet og den meningsbærende andre. En teoretisk undersøkelse av de mellommenneskelige forutsetningene for psykisk liv og utvikling med utgangspunkt i Donald Winnicotts teori.
	Roald, Ingvild K., Dr. philos.	Building of concepts. A study of Physics concepts of Norwegian deaf students.
H	Fekadu, Zelalem W., Dr. philos.	Predicting contraceptive use and intention among a sample of adolescent girls. An application of the theory of planned behaviour in Ethiopian context.
	Melesse, Fantu, Dr. philos.	The more intelligent and sensitive child (MISC) mediational intervention in an Ethiopian context: An evaluation study.
	Råheim, Målfrid, Dr. philos.	Kvinners kroppserfaring og livssammenheng. En fenomenologisk – hermeneutisk studie av friske kvinner og kvinner med kroniske muskelsmerter.
	Engelsen, Birthe Kari, Dr. psychol.	Measurement of the eating problem construct.
	Lau, Bjørn, Dr. philos.	Weight and eating concerns in adolescence.
2002 V	Ihlebæk, Camilla, Dr. philos.	Epidemiological studies of subjective health complaints.

	Rosén, Gunnar O. R., Dr. philos.	The phantom limb experience. Models for understanding and treatment of pain with hypnosis.
	Høines, Marit Johnsen, Dr. philos.	Fleksible språkrom. Matematikklæring som tekstutvikling.
	Anthun, Roald Andor, Dr. philos.	School psychology service quality. Consumer appraisal, quality dimensions, and collaborative improvement potential
	Pallesen, Ståle, Dr. psychol.	Insomnia in the elderly. Epidemiology, psychological characteristics and treatment.
	Midthassel, Unni Vere, Dr. philos.	Teacher involvement in school development activity. A study of teachers in Norwegian compulsory schools
	Kallestad, Jan Helge, Dr. philos.	Teachers, schools and implementation of the Olweus Bullying Prevention Program.
H	Ofte, Sonja Helgesen, Dr. psychol.	Right-left discrimination in adults and children.
	Netland, Marit, Dr. psychol.	Exposure to political violence. The need to estimate our estimations.
	Diseth, Åge, Dr. psychol.	Approaches to learning: Validity and prediction of academic performance.
	Bjuland, Raymond, Dr. philos.	Problem solving in geometry. Reasoning processes of student teachers working in small groups: A dialogical approach.
2003 V	Arefjord, Kjersti, Dr. psychol.	After the myocardial infarction – the wives' view. Short- and long-term adjustment in wives of myocardial infarction patients.
	Ingjaldsson, Jón Þorvaldur, Dr. psychol.	Unconscious Processes and Vagal Activity in Alcohol Dependency.
	Holden, Børge, Dr. philos.	Følger av atferdsanalytiske forklaringer for atferdsanalysens tilnærming til utforming av behandling.
	Holsen, Ingrid, Dr. philos.	Depressed mood from adolescence to 'emerging adulthood'. Course and longitudinal influences of body image and parent-adolescent relationship.
	Hammar, Åsa Karin, Dr. psychol.	Major depression and cognitive dysfunction- An experimental study of the cognitive effort hypothesis.
	Sprugevica, Ieva, Dr. philos.	The impact of enabling skills on early reading acquisition.
	Gabrielsen, Egil, Dr. philos.	LESE FOR LIVET. Lesekompetansen i den norske voksenbefolkningen sett i lys av visjonen om en enhetsskole.
H	Hansen, Anita Lill, Dr. psychol.	The influence of heart rate variability in the regulation of attentional and memory processes.
	Dyregrov, Kari, Dr. philos.	The loss of child by suicide, SIDS, and accidents: Consequences, needs and provisions of help.
2004 V	Torsheim, Torbjørn, Dr. psychol.	Student role strain and subjective health complaints: Individual, contextual, and longitudinal perspectives.

	Haugland, Bente Storm Mowatt Dr. psychol.	Parental alcohol abuse. Family functioning and child adjustment.
	Milde, Anne Marita, Dr. psychol.	Ulcerative colitis and the role of stress. Animal studies of psychobiological factors in relationship to experimentally induced colitis.
	Stornes, Tor, Dr. philos.	Socio-moral behaviour in sport. An investigation of perceptions of sportspersonship in handball related to important factors of socio-moral influence.
	Mæhle, Magne, Dr. philos.	Re-inventing the child in family therapy: An investigation of the relevance and applicability of theory and research in child development for family therapy involving children.
	Kobbeltvedt, Therese, Dr. psychol.	Risk and feelings: A field approach.
2004 H	Thomsen, Tormod, Dr. psychol.	Localization of attention in the brain.
	Løberg, Else-Marie, Dr. psychol.	Functional laterality and attention modulation in schizophrenia: Effects of clinical variables.
	Kyrkjebø, Jane Mikkelsen, Dr. philos.	Learning to improve: Integrating continuous quality improvement learning into nursing education.
	Laumann, Karin, Dr. psychol.	Restorative and stress-reducing effects of natural environments: Experiencal, behavioural and cardiovascular indices.
	Holgersen, Helge, PhD	Mellom oss - Essay i relasjonell psykoanalyse.
2005 V	Hetland, Hilde, Dr. psychol.	Leading to the extraordinary? Antecedents and outcomes of transformational leadership.
	Iversen, Anette Christine, Dr. philos.	Social differences in health behaviour: the motivational role of perceived control and coping.
2005 H	Mathisen, Gro Ellen, PhD	Climates for creativity and innovation: Definitions, measurement, predictors and consequences.
	Sævi, Tone, Dr. philos.	Seeing disability pedagogically – The lived experience of disability in the pedagogical encounter.
	Wiium, Nora, PhD	Intrapersonal factors, family and school norms: combined and interactive influence on adolescent smoking behaviour.
	Kanagaratnam, Pushpa, PhD	Subjective and objective correlates of Posttraumatic Stress in immigrants/refugees exposed to political violence.
	Larsen, Torill M. B. , PhD	Evaluating principals` and teachers` implementation of Second Step. A case study of four Norwegian primary schools.
	Bancila, Delia, PhD	Psychosocial stress and distress among Romanian adolescents and adults.
2006 V	Hillestad, Torgeir Martin, Dr. philos.	Normalitet og avvik. Forutsetninger for et objektivt psykopatologisk avviksbegrep. En psykologisk, sosial, erkjennelsesteoretisk og teorihistorisk framstilling.

	Nordanger, Dag Øystein, Dr. psychol.	Psychosocial discourses and responses to political violence in post-war Tigray, Ethiopia.
	Rimol, Lars Morten, PhD	Behavioral and fMRI studies of auditory laterality and speech sound processing.
	Krumsvik, Rune Johan, Dr. philos.	ICT in the school. ICT-initiated school development in lower secondary school.
	Norman, Elisabeth, Dr. psychol.	Gut feelings and unconscious thought: An exploration of fringe consiousness in implicit cognition.
	Israel, K Pravin, Dr. psychol.	Parent involvement in the mental health care of children and adolescents. Emperical studies from clinical care setting.
	Glasø, Lars, PhD	Affects and emotional regulation in leader-subordinate relationships.
	Knutsen, Ketil, Dr. philos.	HISTORIER UNGDOM LEVER – En studie av hvordan ungdommer bruker historie for å gjøre livet meningsfullt.
	Matthiesen, Stig Berge, PhD	Bullying at work. Antecedents and outcomes.
2006 H	Gramstad, Arne, PhD	Neuropsychological assessment of cognitive and emotional functioning in patients with epilepsy.
	Bendixen, Mons, PhD	Antisocial behaviour in early adolescence: Methodological and substantive issues.
	Mrumbi, Khalifa Maulid, PhD	Parental illness and loss to HIV/AIDS as experienced by AIDS orphans aged between 12-17 years from Temeke District, Dar es Salaam, Tanzania: A study of the children's psychosocial health and coping responses.
	Hetland, Jørn, Dr. psychol.	The nature of subjective health complaints in adolescence: Dimensionality, stability, and psychosocial predictors
	Kakoko, Deodatus Conatus Vitalis, PhD	Voluntary HIV counselling and testing service uptake among primary school teachers in Mwanza, Tanzania: assessment of socio-demographic, psychosocial and socio-cognitive aspects
	Mykletun, Arnstein, Dr. psychol.	Mortality and work-related disability as long-term consequences of anxiety and depression: Historical cohort designs based on the HUNT-2 study
	Sivertsen, Børge, PhD	Insomnia in older adults. Consequences, assessment and treatment.
2007 V	Singhammer, John, Dr. philos.	Social conditions from before birth to early adulthood – the influence on health and health behaviour
	Janvin, Carmen Ani Cristea, PhD	Cognitive impairment in patients with Parkinson's disease: profiles and implications for prognosis
	Braarud, Hanne Cecilie, Dr.psychol.	Infant regulation of distress: A longitudinal study of transactions between mothers and infants
	Tveito, Torill Helene, PhD	Sick Leave and Subjective Health Complaints

	Magnussen, Liv Heide, PhD	Returning disability pensioners with back pain to work
	Thuen, Elin Marie, Dr.philos.	Learning environment, students' coping styles and emotional and behavioural problems. A study of Norwegian secondary school students.
	Solberg, Ole Asbjørn, PhD	Peacekeeping warriors – A longitudinal study of Norwegian peacekeepers in Kosovo
2007 H	Søreide, Gunn Elisabeth, Dr.philos.	Narrative construction of teacher identity
	Svensen, Erling, PhD	WORK & HEALTH. Cognitive Activation Theory of Stress applied in an organisational setting.
	Øverland, Simon Nygaard, PhD	Mental health and impairment in disability benefits. Studies applying linkages between health surveys and administrative registries.
	Eichele, Tom, PhD	Electrophysiological and Hemodynamic Correlates of Expectancy in Target Processing
	Børhaug, Kjetil, Dr.philos.	Oppseding til demokrati. Ein studie av politisk oppseding i norsk skule.
	Eikeland, Thorleif, Dr.philos.	Om å vokse opp på barnehjem og på sykehus. En undersøkelse av barnehjemsbarns opplevelser på barnehjem sammenholdt med sanatoriebarns beskrivelse av langvarige sykehusopphold – og et forsøk på forklaring.
	Wadel, Carl Cato, Dr.philos.	Medarbeidersamhandling og medarbeiderledelse i en lagbasert organisasjon
	Vinje, Hege Forbech, PhD	Thriving despite adversity: Job engagement and self-care among community nurses
	Noort, Maurits van den, PhD	Working memory capacity and foreign language acquisition
2008 V	Breivik, Kyrre, Dr.psychol.	The Adjustment of Children and Adolescents in Different Post-Divorce Family Structures. A Norwegian Study of Risks and Mechanisms.
	Johnsen, Grethe E., PhD	Memory impairment in patients with posttraumatic stress disorder
	Sætrevik, Bjørn, PhD	Cognitive Control in Auditory Processing
	Carvalhosa, Susana Fonseca, PhD	Prevention of bullying in schools: an ecological model
2008 H	Brønnick, Kolbjørn Selvåg	Attentional dysfunction in dementia associated with Parkinson's disease.
	Posserud, Maj-Britt Rocio	Epidemiology of autism spectrum disorders
	Haug, Ellen	Multilevel correlates of physical activity in the school setting
	Skjerve, Arvid	Assessing mild dementia – a study of brief cognitive tests.

	Kjønniksen, Lise	The association between adolescent experiences in physical activity and leisure time physical activity in adulthood: a ten year longitudinal study
	Gundersen, Hilde	The effects of alcohol and expectancy on brain function
	Omvik, Siri	Insomnia – a night and day problem
2009 V	Molde, Helge	Pathological gambling: prevalence, mechanisms and treatment outcome.
	Foss, Else	Den omsorgsfulle væremåte. En studie av voksnes væremåte i forhold til barn i barnehagen.
	Westrheim, Kariane	Education in a Political Context: A study of Konwledge Processes and Learning Sites in the PKK.
	Wehling, Eike	Cognitive and olfactory changes in aging
	Wangberg, Silje C.	Internet based interventions to support health behaviours: The role of self-efficacy.
	Nielsen, Morten B.	Methodological issues in research on workplace bullying. Operationalisations, measurements and samples.
	Sandu, Anca Larisa	MRI measures of brain volume and cortical complexity in clinical groups and during development.
	Guribye, Eugene	Refugees and mental health interventions
	Sørensen, Lin	Emotional problems in inattentive children – effects on cognitive control functions.
	Tjomsland, Hege E.	Health promotion with teachers. Evaluation of the Norwegian Network of Health Promoting Schools: Quantitative and qualitative analyses of predisposing, reinforcing and enabling conditions related to teacher participation and program sustainability.
	Helleve, Ingrid	Productive interactions in ICT supported communities of learners
2009 H	Skorpen, Aina Øye, Christine	Dagliglivet i en psykiatrisk institusjon: En analyse av miljøterapeutiske praksiser
	Andreassen, Cecilie Schou	WORKAHOLISM – Antecedents and Outcomes
	Stang, Ingun	Being in the same boat: An empowerment intervention in breast cancer self-help groups
	Sequeira, Sarah Dorothee Dos Santos	The effects of background noise on asymmetrical speech perception
	Kleiven, Jo, dr.philos.	The Lillehammer scales: Measuring common motives for vacation and leisure behavior
	Jónsdóttir, Guðrún	Dubito ergo sum? Ni jenter møter naturfaglig kunnskap.
	Hove, Oddbjørn	Mental health disorders in adults with intellectual disabilities - Methods of assessment and prevalence of mental health disorders and problem behaviour
	Wageningen, Heidi Karin van	The role of glutamate on brain function

	Bjørkvik, Jofrid	God nok? Selvaktelse og interpersonlig fungering hos pasienter innen psykisk helsevern: Forholdet til diagnoser, symptomer og behandlingsutbytte
	Andersson, Martin	A study of attention control in children and elderly using a forced-attention dichotic listening paradigm
	Almås, Aslaug Grov	Teachers in the Digital Network Society: Visions and Realities. A study of teachers' experiences with the use of ICT in teaching and learning.
	Ulvik, Marit	Lærerutdanning som danning? Tre stemmer i diskusjonen
2010 V	Skår, Randi	Læringsprosesser i sykepleieres profesjonsutøvelse. En studie av sykepleieres læringserfaringer.
	Roald, Knut	Kvalitetsvurdering som organisasjonslæring mellom skole og skoleeigar
	Lunde, Linn-Heidi	Chronic pain in older adults. Consequences, assessment and treatment.
	Danielsen, Anne Grete	Perceived psychosocial support, students' self-reported academic initiative and perceived life satisfaction
	Hysing, Mari	Mental health in children with chronic illness
	Olsen, Olav Kjellevold	Are good leaders moral leaders? The relationship between effective military operational leadership and morals
	Riese, Hanne	Friendship and learning. Entrepreneurship education through mini-enterprises.
	Holthe, Asle	Evaluating the implementation of the Norwegian guidelines for healthy school meals: A case study involving three secondary schools
H	Hauge, Lars Johan	Environmental antecedents of workplace bullying: A multi-design approach
	Bjørkelo, Brita	Whistleblowing at work: Antecedents and consequences
	Reme, Silje Endresen	Common Complaints – Common Cure? Psychiatric comorbidity and predictors of treatment outcome in low back pain and irritable bowel syndrome
	Helland, Wenche Andersen	Communication difficulties in children identified with psychiatric problems
	Beneventi, Harald	Neuronal correlates of working memory in dyslexia
	Thygesen, Elin	Subjective health and coping in care-dependent old persons living at home
	Aanes, Mette Marthinussen	Poor social relationships as a threat to belongingness needs. Interpersonal stress and subjective health complaints: Mediating and moderating factors.
	Anker, Morten Gustav	Client directed outcome informed couple therapy

	Bull, Torill	Combining employment and child care: The subjective well-being of single women in Scandinavia and in Southern Europe
	Viig, Nina Grieg	Tilrettelegging for læreres deltakelse i helsefremmende arbeid. En kvalitativ og kvantitativ analyse av sammenhengen mellom organisatoriske forhold og læreres deltakelse i utvikling og implementering av Europeisk Nettverk av Helsefremmende Skoler i Norge
	Wolff, Katharina	To know or not to know? Attitudes towards receiving genetic information among patients and the general public.
	Ogden, Terje, dr.philos.	Familiebasert behandling av alvorlige atferdsproblemer blant barn og ungdom. Evaluering og implementering av evidensbaserte behandlingsprogrammer i Norge.
	Solberg, Mona Elin	Self-reported bullying and victimisation at school: Prevalence, overlap and psychosocial adjustment.
2011 V	Bye, Hege Høivik	Self-presentation in job interviews. Individual and cultural differences in applicant self-presentation during job interviews and hiring managers' evaluation
	Notelaers, Guy	Workplace bullying. A risk control perspective.
	Moltu, Christian	Being a therapist in difficult therapeutic impasses. A hermeneutic phenomenological analysis of skilled psychotherapists' experiences, needs, and strategies in difficult therapies ending well.
	Myrseth, Helga	Pathological Gambling - Treatment and Personality Factors
	Schanche, Elisabeth	From self-criticism to self-compassion. An empirical investigation of hypothesized change prosesses in the Affect Phobia Treatment Model of short-term dynamic psychotherapy for patients with Cluster C personality disorders.
	Våpenstad, Eystein Victor, dr.philos.	Det tempererte nærvær. En teoretisk undersøkelse av psykoterapautens subjektivitet i psykoanalyse og psykoanalytisk psykoterapi.
	Haukebø, Kristin	Cognitive, behavioral and neural correlates of dental and intra-oral injection phobia. Results from one treatment and one fMRI study of randomized, controlled design.
	Harris, Anette	Adaptation and health in extreme and isolated environments. From 78°N to 75°S.
	Bjørknes, Ragnhild	Parent Management Training-Oregon Model: intervention effects on maternal practice and child behavior in ethnic minority families
	Mamen, Asgeir	Aspects of using physical training in patients with substance dependence and additional mental distress
	Espevik, Roar	Expert teams: Do shared mental models of team members make a difference
	Haara, Frode Olav	Unveiling teachers' reasons for choosing practical activities in mathematics teaching

2011 H	Hauge, Hans Abraham	How can employee empowerment be made conducive to both employee health and organisation performance? An empirical investigation of a tailor-made approach to organisation learning in a municipal public service organisation.
	Melkevik, Ole Rogstad	Screen-based sedentary behaviours: pastimes for the poor, inactive and overweight? A cross-national survey of children and adolescents in 39 countries.
	Vøllestad, Jon	Mindfulness-based treatment for anxiety disorders. A quantitative review of the evidence, results from a randomized controlled trial, and a qualitative exploration of patient experiences.
	Tolo, Astrid	Hvordan blir lærerkompetanse konstruert? En kvalitativ studie av PPU-studenters kunnskapsutvikling.
	Saus, Evelyn-Rose	Training effectiveness: Situation awareness training in simulators
	Nordgreen, Tine	Internet-based self-help for social anxiety disorder and panic disorder. Factors associated with effect and use of self-help.
	Munkvold, Linda Helen	Oppositional Defiant Disorder: Informant discrepancies, gender differences, co-occuring mental health problems and neurocognitive function.
	Christiansen, Øivin	Når barn plasseres utenfor hjemmet: beslutninger, forløp og relasjoner. Under barnevernets (ved)tak.
	Brunborg, Geir Scott	Conditionability and Reinforcement Sensitivity in Gambling Behaviour
	Hystad, Sigurd William	Measuring Psychological Resiliency: Validation of an Adapted Norwegian Hardiness Scale
2012 V	Roness, Dag	Hvorfor bli lærer? Motivasjon for utdanning og utøving.
	Fjermestad, Krister Westlye	The therapeutic alliance in cognitive behavioural therapy for youth anxiety disorders
	Jenssen, Eirik Sørnes	Tilpasset opplæring i norsk skole: politikeres, skolelederes og læreres handlingsvalg
	Saksvik-Lehouillier, Ingvild	Shift work tolerance and adaptation to shift work among offshore workers and nurses
	Johansen, Venke Frederike	Når det intime blir offentlig. Om kvinners åpenhet om brystkreft og om markedsføring av brystkreftsaken.
	Herheim, Rune	Pupils collaborating in pairs at a computer in mathematics learning: investigating verbal communication patterns and qualities
	Vie, Tina Løkke	Cognitive appraisal, emotions and subjective health complaints among victims of workplace bullying: A stress-theoretical approach
	Jones, Lise Øen	Effects of reading skills, spelling skills and accompanying efficacy beliefs on participation in education. A study in Norwegian prisons.

2012 H	Danielsen, Yngvild Sørebø	Childhood obesity – characteristics and treatment. Psychological perspectives.
	Horverak, Jøri Gytre	Sense or sensibility in hiring processes. Interviewee and interviewer characteristics as antecedents of immigrant applicants' employment probabilities. An experimental approach.
	Jøsendal, Ola	Development and evaluation of BE smokeFREE, a school-based smoking prevention program
	Osnes, Berge	Temporal and Posterior Frontal Involvement in Auditory Speech Perception
	Drageset, Sigrunn	Psychological distress, coping and social support in the diagnostic and preoperative phase of breast cancer
	Aasland, Merethe Schanke	Destructive leadership: Conceptualization, measurement, prevalence and outcomes
	Bakibinga, Pauline	The experience of job engagement and self-care among Ugandan nurses and midwives
	Skogen, Jens Christoffer	Foetal and early origins of old age health. Linkage between birth records and the old age cohort of the Hordaland Health Study (HUSK)
	Leversen, Ingrid	Adolescents' leisure activity participation and their life satisfaction: The role of demographic characteristics and psychological processes
	Hanss, Daniel	Explaining sustainable consumption: Findings from cross-sectional and intervention approaches
	Rød, Per Arne	Barn i klem mellom foreldrekonflikter og samfunnsmessig beskyttelse
2013 V	Mentzoni, Rune Aune	Structural Characteristics in Gambling
	Knudsen, Ann Kristin	Long-term sickness absence and disability pension award as consequences of common mental disorders. Epidemiological studies using a population-based health survey and official ill health benefit registries.
	Strand, Mari	Emotional information processing in recurrent MDD
	Veseth, Marius	Recovery in bipolar disorder. A reflexive-collaborative exploration of the lived experiences of healing and growth when battling a severe mental illness
	Mæland, Silje	Sick leave for patients with severe subjective health complaints. Challenges in general practice.
	Mjaaland, Thera	At the frontiers of change? Women and girls' pursuit of education in north-western Tigray, Ethiopia
	Odéen, Magnus	Coping at work. The role of knowledge and coping expectancies in health and sick leave.
	Hynninen, Kia Minna Johanna	Anxiety, depression and sleep disturbance in chronic obstructive pulmonary disease (COPD). Associations, prevalence and effect of psychological treatment.

	Flo, Elisabeth	Sleep and health in shift working nurses
	Aasen, Elin Margrethe	From paternalism to patient participation? The older patients undergoing hemodialysis, their next of kin and the nurses: a discursive perspective on perception of patient participation in dialysis units
	Ekornås, Belinda	Emotional and Behavioural Problems in Children: Self-perception, peer relationships, and motor abilities
	Corbin, J. Hope	North-South Partnerships for Health: Key Factors for Partnership Success from the Perspective of the KIWAKKUKI
	Birkeland, Marianne Skogbrott	Development of global self-esteem: The transition from adolescence to adulthood
2013 H	Gianella-Malca, Camila	Challenges in Implementing the Colombian Constitutional Court's Health-Care System Ruling of 2008
	Hovland, Anders	Panic disorder – Treatment outcomes and psychophysiological concomitants
	Mortensen, Øystein	The transition to parenthood – Couple relationships put to the test
	Årdal, Guro	Major Depressive Disorder – a Ten Year Follow-up Study. Inhibition, Information Processing and Health Related Quality of Life
	Johansen, Rino Bandlitz	The impact of military identity on performance in the Norwegian armed forces
	Bøe, Tormod	Socioeconomic Status and Mental Health in Children and Adolescents
2014 V	Nordmo, Ivar	Gjennom nåløyet – studenters læringserfaringer i psykologutdanningen
	Dovran, Anders	Childhood Trauma and Mental Health Problems in Adult Life
	Hegelstad, Wenche ten Velden	Early Detection and Intervention in Psychosis: A Long-Term Perspective
	Urheim, Ragnar	Forståelse av pasientaggresjon og forklaringer på nedgang i voldsrate ved Regional sikkerhetsavdeling, Sandviken sykehus
	Kinn, Liv Grethe	Round-Trips to Work. Qualitative studies of how persons with severe mental illness experience work integration.
	Rød, Anne Marie Kinn	Consequences of social defeat stress for behaviour and sleep. Short-term and long-term assessments in rats.
	Nygård, Merethe	Schizophrenia – Cognitive Function, Brain Abnormalities, and Cannabis Use
	Tjora, Tore	Smoking from adolescence through adulthood: the role of family, friends, depression and socioeconomic status. Predictors of smoking from age 13 to 30 in the "The Norwegian Longitudinal Health Behaviour Study" (NLHB)
	Vangsnes, Vigdis	The Dramaturgy and Didactics of Computer Gaming. A Study of a Medium in the Educational Context of Kindergartens.

	Nordahl, Kristin Berg	Early Father-Child Interaction in a Father-Friendly Context: Gender Differences, Child Outcomes, and Protective Factors related to Fathers' Parenting Behaviors with One-year-olds
2014 H	Sandvik, Asle Makoto	Psychopathy – the heterogenety of the construct
	Skotheim, Siv	Maternal emotional distress and early mother-infant interaction: Psychological, social and nutritional contributions
	Halleland, Helene Barone	Executive Functioning in adult Attention Deficit Hyperactivity Disorder (ADHD). From basic mechanisms to functional outcome.
	Halvorsen, Kirsti Vindal	Partnerskap i lærerutdanning, sett fra et økologisk perspektiv
	Solbue, Vibeke	Dialogen som visker ut kategorier. En studie av hvilke erfaringer innvandrerungdommer og norskfødte med innvandrerforeldre har med videregående skole. Hva forteller ungdommenes erfaringer om videregående skoles håndtering av etniske ulikheter?
	Kvalevaag, Anne Lise	Fathers' mental health and child development. The predictive value of fathers' psychological distress during pregnancy for the social, emotional and behavioural development of their children
	Sandal, Ann Karin	Ungdom og utdanningsval. Om elevar sine opplevingar av val og overgangsprosessar.
	Haug, Thomas	Predictors and moderators of treatment outcome from high- and low-intensity cognitive behavioral therapy for anxiety disorders. Association between patient and process factors, and the outcome from guided self-help, stepped care, and face-to-face cognitive behavioral therapy.
	Sjølie, Hege	Experiences of Members of a Crisis Resolution Home Treatment Team. Personal history, professional role and emotional support in a CRHT team.
	Falkenberg, Liv Eggset	Neuronal underpinnings of healthy and dysfunctional cognitive control
	Mrdalj, Jelena	The early life condition. Importance for sleep, circadian rhythmicity, behaviour and response to later life challenges
	Hesjedal, Elisabeth	Tverrprofesjonelt samarbeid mellom skule og barnevern: Kva kan støtte utsette barn og unge?
2015 V	Hauken, May Aasebø	«*The cancer treatment was only half the work!»* A Mixed-Method Study of Rehabilitation among Young Adult Cancer Survivors
	Ryland, Hilde Katrin	Social functioning and mental health in children: the influence of chronic illness and intellectual function
	Rønsen, Anne Kristin	Vurdering som profesjonskompetanse. Refleksjonsbasert utvikling av læreres kompetanse i formativ vurdering

	Hoff, Helge Andreas	Thinking about Symptoms of Psychopathy in Norway: Content Validation of the Comprehensive Assessment of Psychopathic Personality (CAPP) Model in a Norwegian Setting
	Schmid, Marit Therese	Executive Functioning in recurrent- and first episode Major Depressive Disorder. Longitudinal studies
	Sand, Liv	Body Image Distortion and Eating Disturbances in Children and Adolescents
	Matanda, Dennis Juma	Child physical growth and care practices in Kenya: Evidence from Demographic and Health Surveys
	Amugsi, Dickson Abanimi	Child care practices, resources for care, and nutritional outcomes in Ghana: Findings from Demographic and Health Surveys
	Jakobsen, Hilde	The good beating: Social norms supporting men's partner violence in Tanzania
	Sagoe, Dominic	Nonmedical anabolic-androgenic steroid use: Prevalence, attitudes, and social perception
	Eide, Helene Marie Kjærgård	Narrating the relationship between leadership and learning outcomes. A study of public narratives in the Norwegian educational sector.
2015 H	Wubs, Annegreet Gera	Intimate partner violence among adolescents in South Africa and Tanzania
	Hjelmervik, Helene Susanne	Sex and sex-hormonal effects on brain organization of fronto-parietal networks
	Dahl, Berit Misund	The meaning of professional identity in public health nursing
	Røykenes, Kari	Testangst hos sykepleierstudenter: «Alternativ behandling»
	Bless, Josef Johann	The smartphone as a research tool in psychology. Assessment of language lateralization and training of auditory attention.
	Løvvik, Camilla Margrethe Sigvaldsen	Common mental disorders and work participation – the role of return-to-work expectations
	Lehmann, Stine	Mental Disorders in Foster Children: A Study of Prevalence, Comorbidity, and Risk Factors
	Knapstad, Marit	Psychological factors in long-term sickness absence: the role of shame and social support. Epidemiological studies based on the Health Assets Project.
2016 V	Kvestad, Ingrid	Biological risks and neurodevelopment in young North Indian children
	Sælør, Knut Tore	Hinderløyper, halmstrå og hengende snører. En kvalitativ studie av håp innenfor psykisk helse- og rusfeltet.
	Mellingen, Sonja	Alkoholbruk, partilfredshet og samlivsstatus. Før, inn i, og etter svangerskapet – korrelater eller konsekvenser?
	Thun, Eirunn	Shift work: negative consequences and protective factors

	Hilt, Line Torbjørnsen	The borderlands of educational inclusion. Analyses of inclusion and exclusion processes for minority language students
	Havnen, Audun	Treatment of obsessive-compulsive disorder and the importance of assessing clinical effectiveness
	Slåtten, Hilde	Gay-related name-calling among young adolescents. Exploring the importance of the context.
	Ree, Eline	Staying at work. The role of expectancies and beliefs in health and workplace interventions.
	Morken, Frøydis	Reading and writing processing in dyslexia
2016 H	Løvoll, Helga Synnevåg	Inside the outdoor experience. On the distinction between pleasant and interesting feelings and their implication in the motivational process.
	Hjeltnes, Aslak	Facing social fears: An investigation of mindfulness-based stress reduction for young adults with social anxiety disorder
	Øyeflaten, Irene Larsen	Long-term sick leave and work rehabilitation. Prognostic factors for return to work.
	Henriksen, Roger Ekeberg	Social relationships, stress and infection risk in mother and child
	Johnsen, Iren	«Only a friend» - The bereavement process of young adults who have lost a friend to a traumatic death. A mixed methods study.
	Helle, Siri	Cannabis use in non-affective psychoses: Relationship to age at onset, cognitive functioning and social cognition
	Glambek, Mats	Workplace bullying and expulsion in working life. A representative study addressing prospective associations and explanatory conditions.
	Oanes, Camilla Jensen	Tilbakemelding i terapi. På hvilke måter opplever terapeuter at tilbakemeldingsprosedyrer kan virke inn på terapeutiske praksiser?
	Reknes, Iselin	Exposure to workplace bullying among nurses: Health outcomes and individual coping
	Chimhutu, Victor	Results-Based Financing (RBF) in the health sector of a low-income country. From agenda setting to implementation: The case of Tanzania
	Ness, Ingunn Johanne	The Room of Opportunity. Understanding how knowledge and ideas are constructed in multidisciplinary groups working with developing innovative ideas.
	Hollekim, Ragnhild	Contemporary discourses on children and parenting in Norway. An empirical study based on two cases.
	Doran, Rouven	Eco-friendly travelling: The relevance of perceived norms and social comparison
2017 V	Katisi, Masego	The power of context in health partnerships: Exploring synergy and antagony between external and internal ideologies in implementing Safe Male Circumcision (SMC) for HIV prevention in Botswana

	Jamaludin, Nor Lelawati Binti	The “why” and “how” of International Students’ Ambassadorship Roles in International Education
	Berthelsen, Mona	Effects of shift work and psychological and social work factors on mental distress. Studies of onshore/offshore workers and nurses in Norway.
	Krane, Vibeke	Lærer-elev-relasjoner, elevers psykiske helse og frafall i videregående skole – en eksplorerende studie om samarbeid og den store betydningen av de små ting
	Søvik, Margaret Ljosnes	Evaluating the implementation of the Empowering Coaching™ program in Norway
	Tonheim, Milfrid	A troublesome transition: Social reintegration of girl soldiers returning ‘home’
	Senneseth, Mette	Improving social network support for partners facing spousal cancer while caring for minors. A randomized controlled trial.
	Urke, Helga Bjørnøy	Child health and child care of very young children in Bolivia, Colombia and Peru.
	Bakhturidze, George	Public Participation in Tobacco Control Policy-making in Georgia
	Fismen, Anne-Siri	Adolescent eating habits. Trends and socio-economic status.
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