

Mental Disorders in Foster Children: A Study of Prevalence, Comorbidity, and Risk Factors

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List of Abbreviations

ADHD	Attention Deficit Hyperactive Disorder
BUFETAT	The Regional Office for Children, Youth, and Family Affairs
CAMHS	Child and Adolescent Mental Health Services
CBCL	Child Behaviour Checklist
CFA	Confirmatory Factor Analysis
CGAS	Children's Global Assessment Scale
CI	Confidence Interval
CPQ	Child Protection Questionnaire
DAWBA	The Developmental and Wellbeing Assessment
DSED	Disinhibited Social Engagement Disorder
DSM-IV	The Diagnostic and Statistical Manual of Mental Disorders, 4 th edition
DSM-5	The Diagnostic and Statistical Manual of Mental Disorders, 5 th edition
FASD	Foetal Alcohol-Spectrum Disorders
ICD-10	The International Classification of Diseases, 10 th edition
RAD	Reactive Attachment Disorder
ROC	Receiver Operating Characteristic
SDQ	Strengths and Difficulties Questionnaire

Scientific Environment

The dissertation is presented through the University of Bergen, with Professor Odd E. Havik, Department of Clinical Psychology, Faculty of Psychology, University of Bergen, as main supervisor. Professor Einar R. Heiervang, Division of Mental Health and Addiction, University of Oslo, Norway, and Senior Researcher Toril Havik, Regional Centre for Child and Youth Mental Health and Welfare, Uni Health, Uni Research, have been co-supervisors.

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Abstract

Children in foster care have often experienced multiple adverse childhood experiences, including maltreatment and the rupture of attachment bonds. Maltreatment and the rupture of attachment bonds make foster children vulnerable to later mental health problems. Register-based studies in Norway indicate that a history of out-of-home care is associated with marginalization in several areas of life, including school dropout, low income, the receipt of disability benefits, and early death.

The overall aim of the present thesis was to extend the knowledge on the mental health problems of children placed in foster care. First, the point-prevalence and patterns of comorbidity of mental disorders in school-aged foster children were examined. Second, a standardized questionnaire frequently used for mental health assessment in child populations was validated as a screening tool to identify foster children with mental disorders. Third, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) classify reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) as two separate disorders. We examined the validity of the conceptual structure of RAD and DSED as two separate dimensions for foster children. Finally, the associations between exposure to maltreatment prior to placement and placement history, on the one hand, and psychopathology, on the other hand, were examined.

Child mental health was assessed using the web-based diagnostic interview the Developmental and Well-Being Assessment (DAWBA), eliciting DSM-IV diagnoses, and eliciting dimensions of children's mental health through the Strengths and Difficulties Questionnaire (SDQ). Both measures were completed online by foster parents and teachers of foster children 6-12 years of age. Data on exposure to maltreatment prior to placement and placement history were derived from a custom-made questionnaire completed by the child's caseworker at child protective services.

Of 395 eligible children, 279 had the DAWBA completed by at least one informant. The results in Paper I indicated that 50.9% of the participating children met the criteria for one or more DSM-IV disorders at the time of assessment. The comorbidity rate was very high. In Paper II, support for the screening properties of the SDQ Total Difficulties and Impact scales was reported. There was an additive effect of combining the scores for these two scales for screening purposes. In Paper III, confirmatory factor analyses (CFA) supported the conceptualization of RAD and DSED as two distinct dimensions, congruent with the DSM-5 definition.

The risk for mental disorders increased with exposure to serious neglect, increasing numbers of types of violence, and increasing numbers of prior placements (Paper I). The associations between external risk factors and RAD and DSED were somewhat different depending on whether they were combined into a single diagnostic category (Paper I), or treated as separate dimensional scales (Paper III). Whereas more exposure to violence in the family of origin and more prior out-of-home placements were associated with having RAD according to the DSM-IV (Paper I), these findings were not replicated for the dimensional measures of RAD and DSED according to the DSM-5 (Paper III). Instead, male gender and mental disorder in biological parents were associated with higher scores on the RAD scale.

These findings show that foster children have a high prevalence of mental disorders, including ADHD, behavioural disorders, emotional disorders, and trauma- and stress-related disorders. The results support the use of the SDQ Total Difficulties and Impact scales when screening foster children for mental disorders. The high prevalence and comorbidity of mental disorders, including attachment disorders, indicate a need for further development of diagnostic and therapeutic competence for foster children and their families.

List of Publications

Lehmann, S., Havik, O. E., Havik, T., & Heiervang, E.R. (2013). Mental disorders in foster children: a study of prevalence, comorbidity and risk factors. *Child and Adolescent Psychiatry and Mental Health*, 7(39). doi:<http://dx.doi.org/10.1186/1753-2000-7-39>

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Lehmann, S., Breivik, K., Heiervang, E., Havik, T., & Havik, O. (2015). Reactive Attachment Disorder and Disinhibited Social Engagement Disorder in School-Aged Foster Children - A Confirmatory Approach to Dimensional Measures. *Journal of Abnormal Child Psychology*, 1-13. doi: 10.1007/s10802-015-0045-4

1. Introduction

Children in foster care have started life in relations that endanger their health and development. The aim of foster placement in Norway is “to provide opportunities for development through positive personal experiences together with other people who may counteract the effect of earlier negative interaction and thus to correct some of the problems that may have developed” (NOU 2000, p. 144; Ministry of Children, Equality and Social Inclusion, 2000). Still, the long-term effects of foster care indicate that upbringing in a foster family alone is not sufficient to alter all foster children’s developmental trajectories (Egelund, Christensen, Jakobsen, Jensen, & Olsen, 2009; Goemans, van Geel, & Vedder, 2015). Whereas the prevalence of mental disorders among school-aged children in the Western world is estimated to be in the range of 7-13% (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Ford, R. Goodman, & Meltzer, 2003; Heiervang et al., 2007), estimates for youths placed in foster care are up to three times as high, in the range of 21-39%, according to British and American studies (Ford, Vostanis, Meltzer, & R. Goodman, 2007; McMillen et al., 2005).

To increase and improve services tailored to the needs of foster children, we need more information about the types and rates of mental disorders observed among these children. Additionally, more knowledge is needed about the psychometric qualities of methods used to screen for mental disorders, and of the risk factors associated with and possibly contributing to mental disorders in foster children.

Based on a sample of school-aged foster children, this thesis is composed of three papers: Paper I examines the point prevalence and comorbidity of mental disorders in foster children, along with psychosocial risk factors associated with mental disorders. Paper II examines the psychometric properties of the Strengths and Difficulties Questionnaire (SDQ) (R. Goodman, 1997, 1999) as a screening instrument for identifying mental disorders among foster children. Paper III investigates the conceptual validity of the DSM-5 construct of reactive attachment disorder (RAD)

and disinhibited social engagement disorder (DSED) as assessed by the DAWBA (Goodman, Ford, Richards, Gatward, & Meltzer, 2000).

1.1 Child Protection in Norway: A Review of Values and Practice

Like other Nordic countries, Norway has a family service-oriented model of child welfare services. Integrated into the overarching welfare state model, the emphasis is on providing in-home interventions that aim to support families' provision of adequate care for their children (N. Gilbert, Parton, & Skivenes, 2011). Thus, the Norwegian child welfare system incorporates both supportive welfare services through voluntary interventions and child protection services for children at risk (Skivenes, 2011). In this thesis, the focus is on the group of children placed out-of-home by care orders; therefore, the term "child protection" will be used.

Removing children from their biological parents is seen as society's last resort, to be effected only after voluntary interventions within the family context have been either considered or tried. Still, Norway has a large group of children living in foster care. Parallel to growth in the provision of in-home services, there has been an increase in the number of foster-family placements, from 5.5 per 1.000 children in 2003 to more than 7.7 per 1.000 in 2012; by the end of December 2012, and more than 9.500 children lived with foster families (Statistics Norway, 2012). Placement in private family households is the most frequent form of placement in Norway: Nine of ten children removed from their biological families are placed in foster families. Among children living in foster families, approximately half are aged 12 years or younger, and the gender distribution is fairly equal. One in four foster children has an ethnic-minority background, primarily from Asian and European countries (Backe-Hansen, Havik, & Grønningsæter, 2013).

In Norway, out-of-home placements often occur rather late in childhood. Among a cohort of foster children born between 1990 and 1992, more than 70% had their first out-of-home placement after six years of age (Backe-Hansen, Madsen, Kristofersen,

& Hvinden, 2014). This indicates a higher age at first out-of-home placement than in e.g., the US (Pösö, Skivenes, & Hestbæk, 2013). Older age at first placement in Norway corresponds with the generally long duration of in-home interventions. When children are placed out-of-home, their families have received services from child protection services for an average of 3 years, during which those children remain in their parents' care (Christiansen & Anderssen, 2010).

The primary reason for foster-home placement in Norway is the existence of enduring, potentially harmful conditions -such as neglect and abuse -in the biological family. Parental characteristics that may interfere with good parenting, such as drug or alcohol addiction and mental disorders, are the other primary reasons for out-of-home placement (Backe-Hansen et al., 2014). Despite voluntary interventions of long duration, national statistics imply that approximately half of Norway's out-of-home placements from 2011-2013 were acute interventions (Norwegian Directorate for Children, Youth and Family affairs, 2014), indicating an immediate danger to a child's health and safety.

After placement, nearly half of the children live in foster families which receive various types of compensation. The most prevalent types of compensation include financial support enabling the caregiver to stay at home either full- or part time during the first period after placement, counselling and supervision, and respite care in a second family (for example, every third weekend) (Backe-Hansen et al., 2014).

Taken together, these features of the Norwegian child protection service indicate a family-preserving focus in the services provided, which reflects an optimistic view of the possibility of improving parental functioning through voluntary interventions. The unintended side effect of long-lasting in-home interventions may be a prolonged exposure to care conditions that have a negative effect on the child's development and mental health. The high rate of acute out-of-home placements and the frequent use of compensated foster families may indicate that many foster children have endured considerable strain before placement, rendering them a vulnerable group in need of intensive care and follow-up after placement.

1.2 Legal Principles Regulating Child-Protection Policy

The first Norwegian act regulating the care of young criminals and children in extremely deprived conditions was introduced in 1896 and was later replaced by the Child Protection Act of 1953. A growing knowledge of developmental psychology yielded an optimistic approach to preventive in-home interventions to support the family and was incorporated in a wider mandate for service provision by the public sector for vulnerable children and their families (Ministry of Children, Equality and Social Inclusion, 2000).

The current Child Welfare Act, revised in 1992, reflects three legal principles: First, the *biological principle* states that growing up with one's biological parents is the best option for children. Second, the principle of the *least intrusive form of intervention* emphasizes voluntary, supportive measures. These two principles are reflected in the legislation, which states that out-of-home placement is temporary and thus renders adoption from foster care rare, even in long-term placements (Skivenes, 2011). This is in contrast to England and the US, where permanency through adoption is the preferred solution if reunification with the biological family is not possible (N. Gilbert et al., 2011; Skivenes & Tefre, 2012). Another consequence of these two principles is biological parents' frequent use of visitation rights, even in placements intended to last through childhood; and biological parents' ability to reopen a legal case for reunification with the county social welfare board every 12 months (Ministry of Children, Equality and Social Inclusion, 1992).

The third principle in the 1992 Act states, in accordance with the United Nations Convention on Children's Rights (3rd article, nr1) and the Norwegian Constitution (§ 104), that all actions and decisions involving a child must be rooted in the *child's best interests* (Smith, 2008). In circumstances in which the child's need for care and protection is incongruent with the interests of the parents, the child's best interests are a fundamental consideration and should be given priority (Ministry of Children, Equality and Social Inclusion, 2000). Evolving knowledge of child development,

along with society's view on children's rights and their place within the family, will continually influence the understanding of what is in a child's best interest.

1.3 Research on Mental Health Among Foster Children

Knowledge of foster children's mental health status is crucial to develop and implement knowledge-based practices in the assessment and treatment of this group. Child mental health may be assessed using different methods. Brief screening instruments may range from screening for symptoms of specific problem areas to broad screening for a large number of mental health problems. Some screening instruments also include measures of impairment in different areas in the child's everyday life. Diagnostic assessment methods cover the presence of mental disorders, with a detailed examination of the criteria specified in diagnostic classifications, e.g., the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2000, 2013) and the International Classification of Diseases (ICD) (World Health Organization, 1992). Diagnostic assessment takes into consideration symptoms, their onset, intensity, duration, and functional impairment in an individual's everyday life, thereby giving a more detailed and complete picture of the child's mental health. Both for screening and diagnostic assessment purposes, various versions of instruments are usually developed to allow for information from multiple informants: the child, parents or caregivers, and teachers. The strength of studies relying on more than one informant is that they assess the child based on descriptions from various areas in the child's everyday life.

In epidemiological studies of mental disorders in children, an estimate of total prevalence may be refined by reporting the prevalence of subgroups of diagnostic categories and the prevalence of single mental disorders. A further elaborated picture of the mental health within defined groups of children may be provided by reporting rates and patterns of comorbidity (Costello et al., 2003; Ford et al., 2003; Heiervang et al., 2007).

1.3.1 A Summary of the Research Literature, 1990-2015

To obtain an overview of the findings reported in studies assessing the prevalence of mental disorders in foster children, a systematic search of the published literature dating from 1990 through February 15, 2015, was performed. An overview of both the procedure and the search terms is displayed in Table A1, in Appendix A. The search resulted in 51 included publications. Because 11 publications came from the same study; the National Survey of Child and Adolescent Wellbeing (Leslie, Hurlburt, Landsverk, Barth, & Slymen, 2004), 41 studies were included. Of the included studies, 33 reported mental health problems using various symptom-checklists, not a complete diagnostic assessment. Those 33 studies will not be commented on in further detail.

Eight of the studies used standard diagnostic measures and reported the prevalence of one or more mental disorders. Details on these studies are given in Table B1 in Appendix B and may be summarized as follows:

- In the earliest study, the total prevalence rate of DSM III-R mental disorders was reported to be 67.0% among youths (N = 88) aged 13-17 years who were living in residential units or with foster caregivers in Britain (McCann, James, Wilson, & Dunn, 1996).
- Two studies reported separate prevalence estimates of a range of diagnostic categories for samples living in foster families. McMillen et al. (2005) report an overall DSM-IV past-year prevalence rate of 33.0% among American youths (N = 115) 17 years of age, who were about to leave foster care. In the second study, Ford et al. (2007) found an overall ICD-10 point prevalence rate of 38.6% among foster youth (N = 839) aged 5-17 years. These two studies reported estimates of behavioural disorders from 12.0% in the study by McMillen et al. (2005) to 32.2% in the study by Ford et al. (2007). The prevalence of the ICD-10 hyperkinetic disorder and DSM-IV ADHD was comparable for the two samples (10.0% versus 8.5%). The prevalence rates of depression were also quite similar in the two studies (12.0% versus 9.7%). This was in line with a third study reporting a prevalence of depression of

13.8% among predominantly African-American foster youths (N = 160) aged 8-16 years (Allen, Combs-Orme, McCarter, & Grossman, 2000).

- Only one study examined mental disorders among younger children (N = 144) aged 0-3 years. This study from the US reported a total prevalence of 61.0%, based on the Diagnostic Classification of Mental Health Disorders of Infancy and Early Childhood (DC: 0-3) (Reams, 1999).
- Three studies examined post-traumatic stress disorder (PTSD): Keller, Salazar, and Courtney (2010) reported a 16.1% prevalence of DSM-IV defined PTSD in foster youths (N = 262) from the US aged 17-18 years old, who were leaving care. Among foster youths aged 10-18 years in Bavaria (N = 36), the prevalence of PTSD varied depending on the diagnostic classification manuals used. The DSM-IV criteria yielded a prevalence estimate of 11%. When ICD-10 criteria were applied, the prevalence rate increased to 44% (Rosner, Arnold, Groh, & Hagl, 2012). In the third study of youths aged 8-19 years entering foster care (N = 150), the prevalence of DSM-III-R PTSD was found to depend on the degree and type of abuse. Among non-abused children (N = 50), the prevalence was 18.0%, whereas 64.0% of children exposed to sexual abuse (N = 50) met the criteria for PTSD (Dubner & Motta, 1999).

In summary, three studies reported the total prevalence of mental disorders (Ford et al., 2007; McCann et al., 1996; McMillen et al., 2005). Two of these studies also reported on behavioural, emotional, and ADHD diagnostic groups (Ford et al., 2007; McMillen et al., 2005), but none of the studies reported prevalence estimates for single disorders for selected samples of youths placed in foster families. Other studies reported estimates for selected diagnoses: PTSD (Dubner & Motta, 1999; Rosner et al., 2012), major depression (Allen et al., 2000) and alcohol and substance abuse (Keller et al., 2010). None of these eight studies reported comorbidity, i.e., the co-occurrence of different disorders at the time of assessment. This is in contrast to prevalence studies on the general child population in which the single prevalence and patterns of comorbidity are reported (Costello et al., 2003; Ford et al., 2003; Heiervang et al., 2007).

Of the eight studies reviewed here, seven originate from Anglo-American countries. These countries are recognized for their child-protection-oriented model of child welfare services, which differs from that of the Nordic countries, which have a more family-service-oriented model (N. Gilbert et al., 2011). We therefore do not know whether these prevalence estimates are transferable to a Norwegian context.

1.3.2 Reactive Attachment Disorder and Disinhibited Social Engagement Disorder

With the exception of one study of children aged 0-3 years (Reams, 1999), none of the reviewed studies included diagnostic assessments of attachment disorders among foster children. This is somewhat surprising because the concept of attachment disorders is central to studies of psychopathology in children with an early and very deprived care history in institutions (O'Connor, Bredenkamp, & Rutter, 1999; Smyke, Dumitrescu, & Zeanah, 2002). For foster children without an institutional background, with exposure to severe neglect that has occurred in a family context, our knowledge is limited, both with regard to the prevalence, the structure and the correlates of attachment disorders (Zeanah & Gleason, 2010). The following will outline a brief description of the organization and core features of attachment disorders as defined in the DSM. Next, empirical and statistical findings from studies of noninstitutionalized children are briefly reviewed.

Exposure to social neglect and an absence of adequate care giving during childhood are assumed to be part of a shared aetiology for the two subtypes of attachment disorder: the indiscriminately social/disinhibited and the emotionally withdrawn/inhibited (Zeanah & Gleason, 2015). However, these patterns differ in phenotypic characteristics, external correlates, developmental course, and responsiveness to enriched care conditions (Rutter, Kreppner, & Sonuga-Barke, 2009; Zeanah & Gleason, 2010). As a result, the former DSM-IV classification of RAD as one disorder with two sub patterns, was revised in the DSM-5 (American Psychiatric Association, 2013). The two patterns are now organized as two distinct disorders under the section of trauma and stress-related disorders: reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED). This

corresponds to the ICD-10 (World Health Organization, 1992) categorization of the two disorders of reactive attachment disorder (RAD) and disinhibited attachment disorder (DAD). Below, the term “attachment disorder” will be used to denote the general concept of reactive attachment disorder used in the DSM-IV, whereas RAD and DSED refer to the two disorders as operationalized in the DSM-5 and the ICD-10.

Studies of dimensional measures of disordered attachment behaviour in at-risk groups of school-aged (Kay & Green, 2013; Millward, Kennedy, Towlson, & Minnis, 2006; Minnis, Rabe-Hesketh, & Wolkind, 2002; Vervoort, De Schipper, Bosmans, & Verschueren, 2013) and toddler-aged children (Boris et al., 2004; Kočovská et al., 2012; Oosterman & Schuengel, 2007; Zeanah et al., 2004) have shown that symptoms of attachment disorders may be found among non-institutionalized children. This indicates that there is a need to assess trauma- and stress-related disorders when studying mental health in foster children.

The validity of the construct of attachment disorder have been addressed in studies of both school-aged children (Millward et al., 2006; Minnis et al., 2009; Minnis et al., 2013; Minnis et al., 2007) and adolescents (Kay & Green, 2013) without early institutional rearing. These studies have in common that they were explorative in their analytic approaches and used criteria and measures that did not fully comply with the current diagnostic definition in the DSM-5 (Zeanah & Gleason, 2015). For example, in a sample of 10-16-year-old children in care (N = 153), Kay and Green (2013) identified four factors in the 24-item attachment disorder scale in the DAWBA interview: disinhibited, indiscriminate attention seeking, superficial relationships, and unpredictability. Therefore, we need research that addresses the construct validity of the DSM-5 definitions of RAD and DSED as two separate disorders in school-aged, noninstitutionalized foster children. If empirical findings support the current DSM-5 definitions of these two stress and trauma-related disorders for foster children raised in family settings, this will have clinical implications. Further evidence for the constructs of RAD and DSED in foster children may inform the development and use of mental health assessment tools and treatment for children placed out-of-home.

1.4 Psychosocial Risk Factors for Child Mental Disorders

The research field of developmental psychopathology seeks to “elucidate the interplay among the biological, psychological and social-contextual aspects of normal and abnormal development across the life-course” (Cicchetti & Toth, 2009, p. 16). Within this framework, a child’s development reflects combinations of risk factors and protective factors (Belsky, 1993). Research aims to explain the development of individual patterns of psychosocial adjustment and maladjustment (Sroufe & Rutter, 1984). Below, the focus will be on psychosocial risk factors for mental disorders in childhood. This overview will move from general risk factors to more specific adverse childhood experiences of maltreatment. After defining the concept of maltreatment, findings regarding associations between child maltreatment and subsequent mental health problems are presented. Finally, factors restricted to children subjected to out-of-home placement are presented.

Population-based studies in youth indicate that both older age (Ford et al., 2003) and male gender (Ford et al., 2003; Heiervang et al., 2007) are associated with increased risk of mental disorders. Furthermore, in the general child population, a variety of child mental health problems and disorders are associated with low socioeconomic status, either defined by income (e.g., (Huisman et al., 2010; Velez, Johnson, & Cohen, 1989) or parental education levels (e.g., (Ford, Goodman, & Meltzer, 2004; Merikangas et al., 2010). In a community sample in Norway, associations between low socioeconomic status and child mental health were found to be partly mediated by parental emotional wellbeing and parenting practices (Bøe et al., 2014). There is a consistent association between low socioeconomic status and contact with child protective services, and unemployed parents are overrepresented among children placed in foster families (Kojan & Fauske, 2011).

The possible associations between child maltreatment and psychopathology are central to the understanding of foster children’s mental health. Cicchetti and Toth (2005) conceptualize child maltreatment as "a pathogenic relational environment that poses substantial risk for undermining biological and psychological development

across a broad spectrum of domains and functioning” (p. 414). Child maltreatment may be divided into four main categories: physical abuse, sexual abuse, neglect, and emotional abuse (Cicchetti & Toth, 2005). Maltreatment includes single events, repeated events, or patterns of interaction (Glaser, 2000). Factors possibly influencing parental functioning such as mental disorders, alcoholism, drug addiction, and life crises such as divorce and exposure to domestic violence may also serve as indirect indicators of maltreatment and are often included in studies of associations between adverse childhood experiences and later mental health.

In a community sample of adults ($N = 17,337$), current mental and physical health, substance abuse and early death were strongly related to self-reports of adverse childhood experiences (Anda, Croft, Felitti, & et al., 1999; Dube et al., 2001; Felitti et al., 1998). This study included experiences of emotional, physical or sexual abuse; parental mental disorders and alcohol/substance abuse or criminal behaviour; witnessing domestic violence; and parental divorce. The results indicated a strong relationship between the number of adverse childhood experiences, and the risk of mental health disturbances and increased comorbidity (Anda et al., 2006).

The World Health Organization World Mental Health Survey (Kessler et al., 2010), found one major factor representing maladaptive family functioning, which was composed of parental mental illness, substance misuse, criminal behaviour, domestic violence, physical and sexual abuse, and neglect. This factor was strongly associated with DSM-IV disorders in adulthood, whereas other childhood adversities such as parental divorce, death, and physical illness generally represented a smaller risk. One rather strong finding, in line with the study of Anda et al. (2006), was that increasing numbers of childhood adversities were associated with a greater risk of disorders. However, there was little evidence for risk specificity across disorders. Childhood adversities predicted the first onset of a range of 20 DSM-IV disorders; this was found for all 21 of the participating countries. In this study, it was estimated that differences in childhood adversities accounted for 29.8% of the explained variations in total prevalence of adult mental disorders across countries.

A review of prospective and retrospective studies and reviews published between 2000-2008 from high-income countries (R. Gilbert et al., 2009) also found long-term consequences of child maltreatment to increase with multiple types of maltreatment, early timing, and repeated exposure. Again, little support was found for the specific effects of any particular type of maltreatment. Rather, the findings indicated a general effect on a wide range of problems and disorders, such as internalizing problems, behaviour problems, post-traumatic stress disorder, attempted suicide, and alcohol and drug problems.

A later meta-analysis reviewed 124 studies on relationships between non-sexual child maltreatment and a range of health outcomes (Norman et al., 2012). This study concluded, following the use of weighted summary measures, that risk factors were more specific: emotional abuse, physical abuse, and neglect increased the risk of depressive disorders and anxiety disorders; whereas only physical abuse and neglect increased the risk of childhood behavioural and conduct disorders. Consistent with the findings in the previously described studies (Anda et al., 2006; R. Gilbert et al., 2009; Kessler et al., 2010), the results indicated a dose-response relationship; being exposed to multiple types of maltreatment may result in more severe consequences. No gender effects were found.

Several studies have addressed the question of early versus late onset of child maltreatment. In one prospective study, children aged 0-12 years (N = 496) with confirmed maltreatment were followed up in adulthood. Here, the time of maltreatment onset was related to the type of mental disorder in adulthood. Controlling for other risk factors, earlier onset of maltreatment (0-5 years) predicted symptoms of anxiety and depression; whereas later onset (6-11 years) predicted behavioural problems (Kaplow & Widom, 2007). A later study has supported these findings. Children exposed to sexual and physical abuse during their first five years of life (N = 60), experienced more internalizing symptoms than maltreated children without early abuse (N = 205) (Cicchetti, Rogosch, Gunnar, & Toth, 2010).

In addition to having been exposed to various forms of maltreatment, foster children are also at high risk of experiencing multiple ruptures of attachment bonds, both from biological parents and subsequent caregivers. In a review of outcome of placements for children and young people in care, older age at first placement and increased number of placements were associated with worse outcomes such as emotional and behavioural problems and increased use of mental health services (Jones et al., 2011). Findings from the National Survey of Child and Adolescent Wellbeing (N = 729) also indicated that placement instability was an important risk factor for mental health problems among children in foster care (Rubin, O'Reilly, Luan, & Localio, 2007). Furthermore, a history of multiple caregivers has shown an association with increased prevalence of indiscriminate friendliness among previously maltreated preschool foster children (N = 93) (Pears, Bruce, Fisher, & Kim, 2010). The association between multiple placements / placement-breakdowns and behavioural problems may be bidirectional (Leve et al., 2012) in that children with more severe problems set off negative reactions in their caregivers that increase the risk of placement breakdown (Gibbs, Sinclair, & Wilson, 2004).

It is worth noticing that associations between psychosocial risk factors and mental disorders are generally stronger in retrospective than in prospective studies (R. Gilbert et al., 2009). Retrospective studies often use self-reports (e.g. Anda et al., 2006; Kessler et al., 2010). The results from these studies could be affected by recall-bias leading to more proneness to recall or report child maltreatment among responders with adjustment problems (Norman et al., 2012). Conversely, it has been argued that self-reports by adults of their experiences of child maltreatment may lead either to rater bias increasing false negatives or to underreporting of adverse childhood experiences (Hardt & Rutter, 2004). Still, as noted earlier, prevalence estimates of maltreatment based on self-reports are much higher than those found in official statistics (R. Gilbert et al., 2009). Either way, these limitations of the accuracy of retrospective studies that use self-reported exposure to child maltreatment may distort the estimates of the effect of maltreatment on mental health, either by general underreporting or by a selective response bias due to the responder's current life

situation. Nevertheless, subgroup analyses in a meta-review concluded that the associations between child maltreatment and negative health outcomes were robust both in prospective and retrospective designs (Norman et al., 2012).

1.5 The Identification of Mental Disorders in Child Protection Services

Epidemiological studies on community samples show that for many individuals with early onset disorders, seeking and receiving adequate help may take several years (Wang et al., 2005) and most mental disorders that are detected in adulthood actually started early in life (Insel & Fenton, 2005). For foster children, the reviewed literature indicates that mental health screening and assessment ought to be a routine procedure because of high exposure to known risk factors and indications of a high prevalence of mental disorders in this group.

Structured diagnostic interviews are recognized as the “gold standard” both in research and in clinical practice (Miller, Dasher, Collins, Griffiths, & Brown, 2001; Zimmerman, 2003). However, conducting and interpreting in-depth assessment is demanding with regard to the use of time, economic resources, and professional competence. The use of standardized, validated brief screening tools in the child protection context as a first step to identify foster children in need of referral for specialized assessment and treatment may therefore provide an alternative approach.

Currently, there are several instruments available that might be relevant to the screening for externalizing and internalizing problems and impairment in different areas in a child’s everyday life. In a recent overview (Luke, Sinclair, Woolgar, & Sebba, 2014), three major instruments used to screen foster children for mental health problems in research and clinical work were evaluated: the SDQ (R. Goodman, 1997, 1999), the Child Behaviour Checklist (CBCL) (Achenbach & Rescorla, 2001), and the Children’s Global Assessment Scale (CGAS) (Shaffer et al., 1983) Luke et al. (2014) concluded that the CBCL, the CGAS, and the SDQ demonstrated sensitivity to

changes in mental health problems over time. The SDQ also seemed promising in screening foster children for mental disorders.

The SDQ was originally developed and validated for use in community samples and clinic-referred children (R. Goodman, 1997, 1999, 2001) but during the last decade, it has been widely used with foster children for research purposes, especially in Northern Europe (Anderson, Vostanis, & Spencer, 2004; Egelund & Lausten, 2009; Maaskant, van Rooij, & Hermanns, 2014; Rees, 2013). In Britain, the local authorities are required to administer the SDQ annually to caregivers of looked-after children aged 4 to 16 (A. Goodman & R. Goodman, 2012). The aim is not only to initiate necessary mental health services for the child but also to monitor placement outcomes and the need for intervention at a group level (R. Goodman, personal communication 24.05.14).

An alternative approach to screening is to develop new instruments that are specially tailored to encompass difficulties that have been documented as relevant for foster children. Tarren-Sweeney (2007) has developed a 120-item screening measure for this purpose: the Assessment Checklist for Children and Adolescents, along with a brief 20-item caregiver report version designed for use by health and social care professionals without specialized mental health competence (Tarren-Sweeney, 2013). Both measures include screening of attachment- and trauma-related mental health problems that established screening tools such as the CBCL and the SDQ lack.

In addition to feasibility in a child-protection context, instruments used for screening purposes must be both sensitive and specific. An instrument used for screening a general child population with low prevalence of mental disorders will not necessarily have the same screening properties when used on a group of children with the high prevalence of mental disorders, such as foster children. Furthermore, instruments used to screen for common mental health problems may be unable to detect symptoms that are central to this high-risk group of children because of the infrequency of such problems in the community samples (Tarren-Sweeney, 2007).

Thus, an instrument's screening ability for foster children should be addressed by thorough validation studies among foster child populations.

1.6 Summary of the Reviewed Literature

Foster youth have a high prevalence of mental disorders. There is a paucity of studies that have reported the entire spectrum of mental disorders experienced by children placed in foster families. Reports on rates and patterns of comorbidity may add to the understanding of psychopathology in this high-risk group. Additionally, because most previous reports stem from studies of youth leaving care in Anglo-American societies, there is a need for information about the mental health of school-aged foster children from other cultural and socioeconomic contexts.

Children are highly dependent on their immediate relations and surroundings, and their mental health cannot be seen in isolation from their family contexts (Cicchetti & Toth, 2005). Child maltreatment is associated with later psychopathology (Anda et al., 2006). Recent reviews indicate that family dysfunction, the early onset of child maltreatment, and the increased number of adverse childhood experiences all seem to increase the risk of developing psychopathology. There seem to be little evidence for high specificity in types of risk factors and types of mental health problems or disorders (R. Gilbert et al.; Kessler et al., 2010). For children placed out of the home, older age at placement and an increased number of placements are associated with increased mental health problems (Jones et al., 2011).

Frontline offices such as the child protection service serve as gatekeepers for establishing contact with specialized mental health services for children. In Norway, very few child protection caseworkers have the competence to administer and interpret diagnostic assessment instruments. Brief screening instruments for detecting foster children with mental disorders should be validated and implemented.

1.7 Research Aims

The overall research aim of this thesis was to examine different aspects of mental health problems in school-aged foster children. A further aim was to examine methods for the early identification of children in need of further assessment and intervention. More specifically, the following research questions were examined:

1. What is the point-prevalence of the core DSM-IV disorders in school-aged foster children? (Paper I).
2. What is the rate and patterns of comorbidity among the primary diagnostic groups in this child population (Paper I) and to what degree do different dimensions of psychopathology overlap? (Paper III).
3. Can a standardized questionnaire used in various child populations be recommended as a screening tool for the identification of mental disorders in a child protection context? (Paper II).
4. Is the factor structure of attachment disorders consistent with the DSM-5 operationalization of two separate dimensions of RAD and DSED? (Paper III).
5. What are the associations between adverse childhood experiences prior to placement and placement history, and diagnostic categories of mental disorders? (Paper I). Furthermore, to what extent is early adverse care giving and placement history associated with RAD and DSED as dimensional constructs? (Paper III).

2. Methods

2.1 The Study of Foster Children's Mental Health

This study targeted the 63 municipalities in the five counties encompassed by the Regional Office for Children Youth and Family Affairs – South (Bufetat South). The data collection began on September 1, 2011, and lasted until the end of February 2012.

2.2 Recruitment

Eligible participants were foster children between the age of 6 and 12 years, all of whom had lived in their foster family for at least 5 months following legally mandated placement. Foster parents, teachers, and caseworkers in the municipal child protection offices were invited to participate as informants.

According to the regional register of foster children in Bufetat South, 391 children were eligible in the 63 municipalities. Information letters were sent to the head of each municipal child protection office. The office heads were asked to review the list of foster children from the regional register and add potentially eligible children, if any, to those in the register. As a follow-up, the office heads in all 63 municipalities were telephoned by the principal investigator (SL), who enquired about the completeness of the list of foster children from the regional register. This search process identified 28 additional eligible children. Twenty children who had been returned to biological families or who had been adopted were removed from the list. Another three children were deemed ineligible because of serious neurological disabilities. Thus, the final number of eligible children was 396. The office heads were asked to distribute envelopes to caseworkers for each eligible child, containing informational letters, and the Child Protection Questionnaire (CPQ). The caseworkers were asked to complete the CPQ, provide contact information for each child's school and teacher, and return the questionnaire and information by mail to the principal

investigator. Non-responding caseworkers were contacted by telephone by the principal investigator after 14 days.

Foster parents received a letter with detailed information about the study and instructions on how to complete the DAWBA diagnostic interview and the SDQ online. All of the foster parents were telephoned by the principal investigator 14 days after the letters were sent. Thirty-one foster parents who agreed to participate either lacked Internet access or were uncomfortable using the Internet. Those foster parents were interviewed on the telephone. All of the telephone interviews were conducted by a psychology student under the supervision of the principal investigator (SL). The foster parents were also asked to provide contact information for the children's school and teacher. Foster parents were not compensated for their participation.

Contact information was obtained for 307 teachers, who were contacted by mail at their schools and asked to complete the teacher version of the DAWBA interview and the SDQ online. As with the caseworkers in child protection offices and the foster parents, the participation of the teachers was procured by telephone follow-up. Teachers were offered 250 NOK/31USD/29 EUR for their participation. The response on all measures is illustrated in the flowchart in figure C1 in Appendix C.

2.3 Ethics

The Regional Committee for Medical and Health Research Ethics West Norway approved the study. In accordance with Norwegian ethics requirements, oral consent was obtained from children who were at least 12 years old. According to Norwegian law, foster parents do not have the right to consent on behalf of their foster children. The study was therefore reviewed by the Ministry of Children, Equality and Social Integration, which provided caseworkers, foster parents and teachers with exemptions from confidentiality for the study.

2.4 Measures and Assessment

2.4.1 Mental Health Problems and Functional Impairment

The SDQ (R. Goodman, 1997) is a 25-item mental health questionnaire for 3- to 16-year-olds that may be completed by parents and teachers; it is also used as a self-report for children 11 years old and above (R. Goodman, Meltzer, & Bailey, 1998). The SDQ have five subscales, each of which has five items: Prosocial, Peer Problems, Emotional, Conduct Problems, and Hyperactivity-Inattention. Each item is scored on a three-point scale (0-1-2) with a subscale score range from 0-10. A Total Difficulties score ranging from 0-40 is calculated by combining the three symptom subscales and the Peer Problem subscale. The two-page version of the SDQ also includes an Impact scale, which measures distress to the child and interference of symptoms and problems in the child's daily life (R. Goodman, 1999). The parent version of the Impact scale has a score range of 0-10, whereas the teacher version has a score range of 0-6.

When the SDQ has been completed by at least two types of informants (e.g., the foster mother and the teacher), algorithms combine the scores from informants for the three SDQ symptom subscales and the Impact scale (R. Goodman, Renfrew, & Mullick, 2000). These algorithms estimate the following probabilities for the presence of a disorder: "unlikely", "possible", and "probable". Independent probabilities are provided for having an emotional disorder, a conduct disorder and hyperactivity disorder, along with an overall probability for any mental disorder.

Total Difficulties scale and subscales were used together with the Impact scale and the multi-informant algorithms as target measures of the screening ability for the SDQ. The results are reported in Paper II. The SDQ scales were used as dimensions of mental health problems and functional impairment in Paper III.

2.4.2 Psychosocial Risk Factors for Psychopathology

A 10-item Child Protection Questionnaire (CPQ) for completion by caseworkers in child protection services was developed for this study. The CPQ assessed adverse

childhood experiences in the biological family and the child's placement history. Placement history was assessed with questions concerning duration of stay in current foster family (years/months), age when placed in current foster family, age at first placement out of the home, and number, duration, and forms of previous placements. Based on the child's case file, adverse childhood experiences in the biological family before placement were assessed according to the following categories: serious neglect, exposure to physical violence, witnessing physical violence, exposure to emotional abuse (threats, verbal punishment, harsh criticism, hostile parenting), witnessing emotional abuse, mother's and/or father's physical disability, intellectual disability, serious physical illness, mental disorders, addiction or death. The informant was asked to mark the number of these categories known to have occurred to the child in question. The answers were coded Yes = 2 or No = 1. The CPQ also registered the ethnicity of both the child and the biological parents. In Papers I and III, data from the CPQ were utilized both in the description of sample characteristics and as indicators of exposure to risk.

2.4.3 Child Mental Disorders

The assessment of child mental disorders was performed using the web-based diagnostic interview DAWBA (R. Goodman, Ford, et al., 2000), which the teachers and foster parents completed online. The DAWBA covers a broad spectrum of mental disorders, combining structured questions on symptoms and impairment with open-ended questions in which the respondents describe the child's problems and resources in their own words. The DAWBA administered to parents or caregivers has 17 sections covering diagnostic areas, child and family background, and child strengths. Due to the inclusion of skip-rules, the interview becomes shorter if no problems are reported in each section's initial screening questions. Depending on the child's mental health problems, the completion of the DAWBA may last from 30 minutes to several hours. Teachers used a shorter version of the interview, which typically can be completed in 15-30 minutes.

The DAWBA has shown good ability to discriminate between children from community and clinical settings (R. Goodman, Ford, et al., 2000) and when used by public health services to generate realistic prevalence estimates of mental disorders (Heiervang et al., 2007; Meltzer, Gatward, Goodman, & Ford, 2003).

Rating of the DAWBA interviews

In this study, all of the available DAWBA information from both teachers and foster parents was reviewed and rated separately by two clinical specialists in child and youth mental health. One of the raters, ERH, has documented high inter-rater agreement with Robert Goodman, who developed the DAWBA (Heiervang et al., 2007). All 279 DAWBA protocols were rated by the principal investigator (S.L.), and supervised by ERH. 207 DAWBA interviews were used to examine the reliability of the diagnostic assessment. SL read and rated these alone, and the interviews were subsequently read and rated by ERH. The κ statistics for chance-corrected inter-rater agreement between the two clinicians was very good (Kappa = 0.87, 95% CI: 0.82-0.92).

If children had already received an ADHD diagnosis by a mental health specialist and used ADHD medication, this diagnosis was accepted, even if the child's DAWBA reported symptoms were sub-threshold for the diagnosis.

The following 21 specific DSM-IV diagnoses derived from the DAWBA were reported separately in Paper I: separation anxiety disorder, specific phobia, social phobia, post-traumatic stress disorder, obsessive-compulsive disorder, generalized anxiety, other anxiety, major depression, other depression, undifferentiated anxiety/depression, ADHD combined, ADHD inattentive, ADHD hyperactive-impulsive, other hyperactivity NOS, oppositional defiant disorder, conduct disorder, other disruptive disorder NOS. These diagnoses were also categorized into four main diagnostic groups: any disorder, emotional disorder, ADHD, and behavioural disorder. The following single disorders were also reported: reactive attachment disorder, pervasive developmental disorder, tic disorder, and "not otherwise specified" disorder. In Paper II, the four diagnostic groups of any disorder, emotional

disorder, ADHD and behavioural disorder were used as the “gold standard” in the investigation of the SDQ as a feasible instrument for mental health screening.

The assessment of DSM-IV RAD

The parent version of the DAWBA has a section for the assessment of attachment disorders among the 5-10-year-olds. This section is not included in the teacher version. It is composed of 14 questions describing social behaviours that cause concern for caregivers (range 0-28, $\alpha = .82$). The items are rated on a three-point scale: No = 0, A little = 1, and A lot = 2. They are organized into two subscales. The emotionally withdrawn/inhibited (DSM-IV)/RAD (DSM-5) subscale has 5 items, e.g., “Does he avoid emotional closeness with adults he knows well” (range 0-10, $\alpha = .60$). The subscale for the indiscriminately social/disinhibited subtype (DSM-IV)/DSED (DSM-5) has 9 items, e.g., “Is he worryingly overfriendly with strangers” (range 0-18, $\alpha = .82$).

The DAWBA Attachment Disorder section also includes a question regarding whether the behaviour causes concern to the caregivers and eight questions measuring distress to the child and interference of the behaviour in the child’s daily life. The section also has an open-ended question in which the foster parents may provide information relevant to this section in their own words.

The rating procedures for assigning a DSM-IV RAD diagnosis are illustrated in Figure 2 and will be described in detail.

The DSM-IV RAD diagnosis was assessed with use of the DAWBA Attachment Disorder section and the open text fields. Both of the raters first evaluated the information in the DAWBA Attachment Disorder section independently and then discussed the case to reach a consensus decision about the presence or absence of a DSM-IV RAD diagnosis.

Of the 122 children aged 6-10 years with completed DAWBA Attachment Disorder sections, the one rater (SL) assigned a RAD diagnosis to 30 children and the other rater (ERH) assigned a RAD diagnosis to 24 children (Kappa = .86, 95% CI = .75-

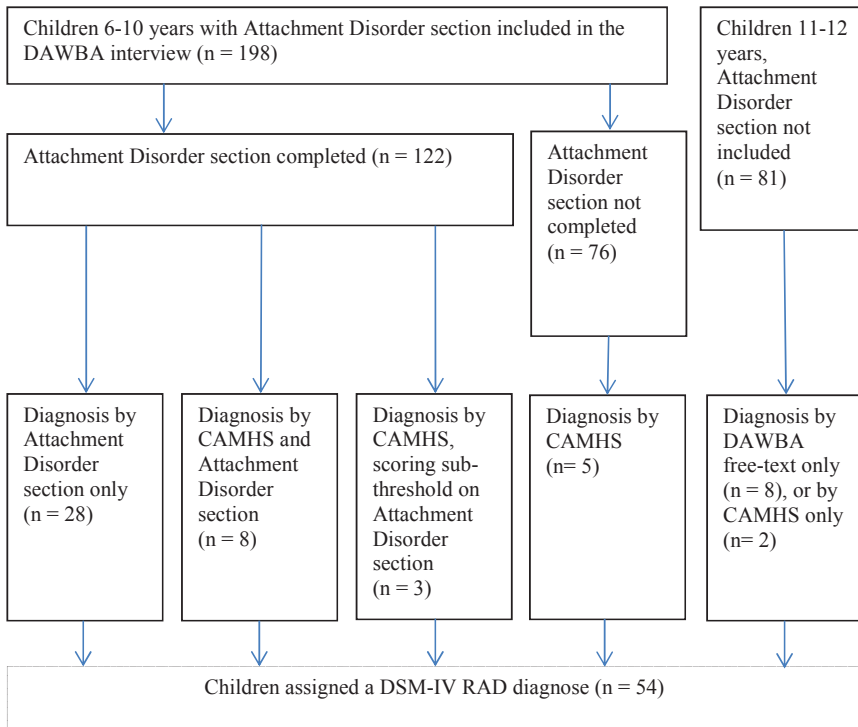
.97). Following a third reading, consensus was reached in all but three cases. As a final consensus, these three children were not diagnosed with RAD, leaving 28 children with a diagnoses of RAD based on information from the DAWBA Attachment Disorder section.

Children could also receive a diagnosis of RAD when the open text-fields of the DAWBA provided information that the child had received the RAD diagnoses by a professional in the child and adolescent mental health service (CAMHS). This applied to 16 children aged 6-10. Among those children, five did not have information from the RAD section, but the text confirmed that the RAD diagnosis had been given in CAMHS. Eight children not only met the criteria for RAD according the Attachment Disorder section but also had received the RAD diagnosis at CAMHS. Finally, three of the children scored sub-threshold on the DAWBA Attachment Disorder section but had received the RAD diagnose in the CAMHS.

For children 11 years old and above, the Attachment Disorder section is not a part of the DAWBA interview. For these children ($n = 81$), the raters therefore used a free-text description of symptoms and impairments meeting the DSM-IV criteria to assess RAD. This group included eight children. In addition, two children had a RAD diagnosis given by a specialist at CAMHS.

In Paper I, RAD was used as a diagnostic category according to the criteria in DSM-IV. In Paper III, the two RAD and DSED subscales and the total scale from the DAWBA Attachment Disorder section were used as dimensional measures of the DSM-5 RAD and DSED.

Figure 2
Illustration of the procedure for diagnosing DSM-IV Reactive Attachment Disorder
(N = 279)



2.5 Study Sample and Missing Data

Figure D1 in Appendix D illustrates the available data and the subsamples used in the three papers.

The SDQ was completed by at least one informant for 300 of the 396 eligible children (75.8%). Foster fathers completed 106 SDQs; foster mothers completed 213, and teachers completed 205. Among these 300 children, there were no missing responses on SDQ items.

The DAWBA interviews were completed by at least one informant for 279 of the 396 eligible children (70.5%). Table E1 in Appendix E displays the number of children in the sample for whom different combinations of informants completed the DAWBA. All of the sections were completed by at least one of the foster parents for 132 children (47.3%). The DAWBA sections most frequently completed were ADHD (91.0%), behavioural disorders (89.6%), and depression (87.1%), a completion rate in line with previous studies using the DAWBA (Heiervang & Goodman, 2011). All of the children with DAWBAs completed by teachers, caregivers, or both, also had SDQs completed.

The CPQ was completed for 283 children (71.5%), of whom 219 (78.5%) had the DAWBA completed by at least one informant. Thus, 64 children had the CPQ completed but not the DAWBA. There were no missing responses on the completed CPQ.

2.5.1 Subsamples and Missing Data

Missing data were managed in different ways depending on the research questions addressed. For the prevalence estimates in Paper I, the calculation of the prevalence of disorders and comorbidity included all of the children with completed DAWBAs ($N = 279$), referred to as the “All data” sample. Children who had missing information on one or more DAWBA sections were attributed no disorders from those sections.

The information from the CPQ was used in the analyses of Paper I and III. We did not employ statistical procedures to address missing data on the CPQ but instead reported child protection information for only those children with completed questionnaires. In Paper I, 219 children had both DAWBA and CPQ information. The associations among demographic characteristics, possible risk factors and mental disorders were analysed in this subsample. A comparison of this subsample ($n = 219$) and the group of children with CPQ information but missing DAWBA information ($n = 64$) showed no significant differences related to gender, age, age at first placement, number of former placements, or time in the current foster family.

In Paper II, we collapsed the DAWBAs from foster fathers and foster mothers into one group of informants ($n = 223$), referred to as the “Caregivers”, using information from the foster mothers when available.

For the calculation of predictions based on the multi-informant algorithms, we used a subsample of children referred to as the “Two-informant” sample, whose SDQs were completed by both caregivers and teachers ($n = 141$). No significant differences were evident between the “All data” ($N = 279$) and “Two informant” ($n = 141$) subsamples regarding age, gender, SDQ Total Difficulties score, or DAWBA disorder prevalence.

Of the 223 children with the DAWBA completed by at least one caregiver, 198 children were aged 10 years or younger and had the DAWBA Attachment Disorder section included in the DAWBA interview. The DAWBA Attachment Disorder section was completed for 122 (61.6%) children. These 122 children comprise the study sample in Paper III. In this subsample, the SDQ was available for all of the children; and the CPQ was completed for 92 of the children. There were no significant difference between this study sample and children aged 6-10 without a completed DAWBA Attachment Disorder section ($n = 76$) with respect to age, gender or SDQ Total Difficulties scores and symptom subscale scores.

2.6 Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences, version 19 for Windows. Receiver operating characteristic (ROC) analyses were conducted using STATA 12. Confirmatory factor analyses (CFA) was performed using Mplus 7.1 (L. K. Muthén & Muthén, 2012).

2.6.1 The Prevalence and Comorbidity of Mental Disorders

The prevalence of disorders was calculated by frequency analyses with 95% confidence intervals (CI). Comparisons of the subsamples were performed with t-tests and Chi-square tests. Cross-tabulations were used to examine patterns of comorbidity. Binary logistic regression was used to examine the odds of comorbidity.

2.6.2 Screening Properties of the SDQ

ROC analyses were conducted to examine the overall discriminative ability of the SDQ scales. The associations between the SDQ scale scores and diagnostic categories of mental disorders were analysed by logistic regression analysis. Based on the coordinates of the ROC curve, sensitivity, specificity, and both positive and negative predictive values for the SDQ scales were calculated using Chi-square analyses. Because these estimates are influenced by the prevalence of the disorder in the sample (Akobeng, 2007), we also calculated likelihood ratios (Deeks & Altman, 2004). Sensitivity, specificity, predictive values, and likelihood ratios were also calculated for the multi-informant algorithms. Here, the two predefined probability levels in the algorithms were used as cut-offs.

2.6.3 Dimensional Measures of Reactive Attachment Disorder and Disinhibited Social Engagement Disorder in DAWBA

CFA models were estimated to test the conceptual structure of the 14 RAD and DSED items in the DAWBA Attachment Disorders section. The fit of the CFA models was evaluated according to the following standard indices (Jackson, Gillasp

Jr, & Purc-Stephenson, 2009): Chi-square, comparative fit index, and root mean square error of approximation.

Associations among the RAD and DSED scales, functional impairment and help-seeking behaviour were examined using multiple regression and binary logistic analyses.

2.6.4 Psychosocial Risk Factors

In Paper I, a principal component analysis with oblimin rotation was employed to investigate the structure of selected CPQ variables. Binary logistic regression analyses were used to analyse the associations between risk factors and diagnostic groups. In Paper II, associations between risk factors and dimensional measures of RAD/DSED were examined with correlation analyses.

3. Results

3.1 Child Characteristics

Table 4 displays characteristics for the group of children with both DAWBA and CPQ information. The mean age in this sample was 9.0 years (*SD* 2.0); 47.0% were girls. The children had been exposed to a wide range of adverse childhood experiences before placement out-of-home (*M* 3.0, *SD* 1.6). Serious neglect (86.3%), violence exposure (35.9%), parental addiction (55.3%), and parental mental disorders (52.3%) were the most frequent forms of adverse childhood experiences for the children participating in the study. More than half (68.8%) of the children were under the age of six years at first placement, and 67.8% had between 1-5 previous placements (*M* 0.9, *SD* 0.9).

Table 4

Child characteristics of foster children with DAWBA and CPQ (n =219)

	%	<i>M</i>	<i>SD</i>
Age (years)		9.0	2.0
Female gender	47.0		
Former placements		0.9	0.9
0	32.0		
1	52.2		
2	12.5		
3-5	3.1		
Age at first placement		3.7	3.0
0–6 months	16.0		
7 months–2 years	26.0		
3–5 years	28.8		
6–12 years	29.2		
Years in current foster family		5.1	3.1
0-2	23.5		
3-5	25.3		
6-7	25.3		
8-12	25.8		
Number of adverse care experiences ¹		3.0	1.6
Violence exposure (range 0–4) ²		0.7	1.1
0	64.1		
1-2	26.2		
3-4	9.7		
Serious neglect	86.3		
Parent's drug/alcohol abuse	55.3		
Parent's mental disorder	52.3		
Parent's intellectual disability	9.6		

Note. ¹Experiences in the family of origin. ²Violence exposure = the sum of witnessing domestic violence; exposure to physical violence; exposure to emotional abuse; witnessing emotional abuse.

3.2 The Prevalence and Comorbidity of Mental Disorders

As reported in Paper I, 50.9% of the children in the study sample (N=279) met the criteria for one or more DSM-IV disorder. The most common groups of disorders were emotional disorders (24.0%), behavioural disorders (21.5%), and ADHD (19.0%). The comorbidity rates among these three main diagnostic groups were high: 30.4% had disorders in two of the three groups, and 13.0% had disorders in all three groups. Of the 198 children aged 6-10 years, 22.2% were classified as meeting DSM-IV criteria for RAD, and 12.4% of the 81 children aged 11-12 years were classified as meeting DSM-IV criteria for RAD, yielding a total prevalence estimate of 19.4%. Of these, 58.5% had co-morbid disorders in at least one of the main diagnostic groups. Overall, 63.0% of children with a mental disorder had a co-morbid disorder in another diagnostic group.

3.3 SDQ-Screening for Mental Disorders

Paper II reported the screening properties of the SDQ. ROC analyses supported the screening properties of the SDQ Total Difficulties and Impact scores (area under the curve = .80 / .83). Logistic regression analyses showed that the prevalence of mental disorders increased linearly with the SDQ Total Difficulties score and the Impact score. The findings indicated an additive value of combining the scores from the Total Difficulties and Impact scales: scores above the cut-off on any of the two scales predicted disorders with high sensitivity (89.1%) but only moderate specificity (62.1%). Scores above the cut-off on both scales yielded somewhat lower sensitivity (73.4%) but higher specificity (81.1%). The SDQ multi-informant algorithm showed low discriminative ability for the main diagnostic categories, with an exception being the SDQ Conduct subscale.

In sum, the present findings support the use of the SDQ Total Difficulties and Impact scales as a screening instrument for mental disorders among foster children. Based on the present findings, the SDQ multi-informant algorithms may not be recommended for mental health screening of foster children in Norway.

3.4 The DSM-5 Constructs of Reactive Attachment Disorder and Disinhibited Social Engagement Disorder

In Paper III, the construct of attachment disorders was examined further and took a confirmatory approach to dimensional measures of the two trauma and stress-related DSM-5 disorders of RAD and DSED. Good fit for a model with a two-factor structure, congruent with the DSM-5 definition of RAD and DSED, was observed. This finding was also robust when the two RAD and DSED factors were included in a six-factor model together with the four problem factors of the SDQ (emotional, conduct, hyperactivity, and peer problems). Thus, the findings support the conceptualization of RAD and DSED as two distinct dimensions. Because these dimensions could not be fully accounted for by the comorbidity among more traditional mental health problems, the assessment of inhibited and disinhibited behaviour should be a part of the standard assessment of mental health problems among foster children. Together with emotional symptoms, RAD and DSED behaviour did not contribute to explaining the increase in caregiver-rated impairment, as did conduct, hyperactivity and peer problems. However, both RAD and DSED behaviour were associated with the increased probability of contact with CAMHS.

3.5 Psychosocial Risk Factors for Psychopathology

In Paper I, we found that exposure to a broader range of types of violence, serious neglect, and a higher number of prior placements increased the risk of mental disorders. However, whereas both number of placements and exposure to violence types were associated with the categorical measure of DSM-IV RAD, as shown in Paper I, this association was not found when RAD and DSED were operationalized as separate dimensional measures in Paper III. Here, male gender and mental disorders in biological parents were associated with higher scores on the RAD scale.

4. Discussion

4.1 Summary of Findings

This study found a high prevalence of mental disorders among school-aged foster children. The results showed a fairly equal prevalence of the main diagnostic groups of ADHD, emotional, behavioural, and attachment disorders. High comorbidity indicated the existence of complex symptom patterns among foster children. Serious neglect, exposure to increasing numbers of violence types, and more placements were associated with all of the diagnostic groups, with the exception of emotional disorders. The SDQ showed a good ability to identify children with mental disorders, and combining the Total Difficulties scale and the Impact scale yielded additional predictive value. Furthermore, the findings in this study support the concept of RAD and DSED as two separate constructs not accounted for by more established child psychopathology. Together with emotional symptoms, RAD- and DSED behaviours did not contribute to explaining the increase in caregiver-rated impairment, as did externalizing and peer problems. However, both RAD- and DSED behaviours were associated with the increased probability of contact with CAMHS.

4.2 General Discussion

4.2.1 Prevalence of Disorders

Although the prevalence estimates of mental disorders are in line with previous studies of foster children, there are some distinct differences that should be addressed. The main finding of a total prevalence of mental disorders at 50.9% is high compared to the findings of Ford et al. (2007) of 38.7% ($X^2 = 64.19$, $df = 1$, $p < .01$) and McMillen et al. (2005) of 33.0% ($X^2 = 12.99$, $df = 1$, $p < .01$). Furthermore, the findings in this study indicate an equal distribution across the main diagnostic groups of ADHD, emotional, behavioural and attachment disorders. The present prevalence estimate and the distribution of cases across the diagnostic main groups are

comparable to those found in Norwegian youth referred to CAMHS (Brøndbo et al., 2011). However, also using the DAWBA, Ford et al. (2007) report a threefold prevalence of behavioural disorders (32.3%) over emotional disorders (9.7%) and hyperactivity-inattention disorder (8.5%). Thus, Norwegian foster children seem to have a relatively high prevalence of emotional disorders compared to previous findings in foster-child populations. Emotional disorders in general -especially panic disorders and phobias- are associated with later onset of anxiety and depression, behavioural disorders and substance abuse (Kessler et al., 2012). The current results indicate that assessment and treatment of foster children should be tailored to include the needs of children with internalizing disorders.

The differences in reported distribution of cases across the diagnostic main groups may be partially explained by differences between the present study and that of Ford et al. (2007) regarding placement history: compared to the Norwegian foster children, the British sample was composed of older children, had an older age at first placement, and had stayed for a shorter period of time in their current foster homes. Thus comparison of the results from the two studies is not straightforward. The high prevalence rates among Norwegian foster children found in this study should also be evaluated in the context of sample characteristics. The present sample was young with a narrow age range, not including adolescents. It is well documented that prior to adolescence, children have a lower prevalence of mental disorders than do adolescents and young adults (Costello et al., 2003; Hamdi & Iacono, 2014), and the evidence suggests both homotypic and heterotypic continuity (Costello et al., 2003). In line with this, one would expect that the prevalence rates would increase to even higher levels when the sample grows older. Furthermore, mental disorders display rather high stability from childhood into young adulthood if left untreated (Loth, Drabick, Leibenluft, & Hulvershorn, 2014), and mental disorders in children are largely undetected and not adequately treated (Essau, Conradt, & Petermann, 2000; Grills-Taquechel & Ollendick, 2012). These findings indicate that one cannot expect spontaneous recovery for foster children with a mental disorder, even though care-conditions change. The high prevalence of mental disorders in this group highlights

the need for early detection through the use of a broad and thorough assessment of children's mental health at the time of out-of-home placement. Furthermore, access to individually tailored interventions and regular follow-up to monitor development over time should have a high priority.

The current results may also be interpreted in the context of Norwegian child protection policy and practice. One may speculate that the high prevalence rates of mental disorders are related to the generally extensive and lengthy effort to improve caretakers' abilities in-home before resorting to foster placement. Because there is little evidence for either drastic improvement or deterioration caused by foster care in itself (Goemans et al., 2015), one may speculate that these mental health problems were present at the time of out-of-home placement. If this is the case, our findings suggest that assessment of child mental health should be part of not only the regular follow-up with foster children but also the evaluation of in-home services.

4.2.2 Comorbidity

The current findings indicate that foster children have a higher rate of comorbidity (63.0%) and therefore a more complex symptom pattern than that found in community samples (Costello et al., 2003; Ford et al., 2003; Heiervang et al., 2007). One should also note that the present estimate of comorbidity is actually three times as high (63.0% versus 21.0%) as the rate found among youths referred to CAMHS in Norway and assessed with the DAWBA (Brøndbo et al., 2011), despite similarities in the overall prevalence rate.

This considerable overlap among the diagnostic groups poses a challenge as to how we should best describe the symptoms and functioning of children with disorders in more than one diagnostic category. The high comorbidity rate together with a high prevalence of mental disorders may indicate the presence of a substantial, broad level of sub-threshold symptoms that are not captured by the dichotomous categories of disorders but that may still warrant attention (Kessler et al., 2003; Lewinsohn, Shankman, Gau, & Klein, 2004). This is important because comorbidity may increase

the possibility of overlooking symptom patterns that do not follow the boundaries of the standard diagnoses.

One way of meeting the challenges of comorbidities may be the increased use and reporting of dimensional measures, in which scores on different symptom-dimensions comprise detailed symptom profiles (Rutter, 2011) that correspond more directly to the child's actual problems and resources. However, as Rutter (2011) notes, this may offer an advantage to research, whereas categorical diagnoses still enjoy the advantage not only of facilitating communication with families or other professionals but also of planning treatment.

However, one should bear in mind that the high prevalence of comorbidity may reflect the relatively large and increasing number of diagnoses in the DSM and ICD. Thus the concept of comorbidity may be reformulated to a more parsimonious structure of psychopathology than that of current diagnostic systems, i.e. DSM and ICD (Caspi et al., 2014). Mental health diagnoses often include some of the same symptoms, and comorbidity rates may therefore be inflated in high-prevalence samples. One may argue that comorbidity reflects a general factor underlying the different dimensions of psychopathology. Bi-factor models with one common factor in which all of the dimensions of pathology share what they have in common have demonstrated good fit in both adult (Lahey et al., 2012) and child samples (Lahey et al., 2014). The Dunedin study (Caspi et al., 2014), a longitudinal study assessing 11 different mental disorders repeatedly for 20 years among a cohort of adults aged 18-38, also supports a bi-factor model with an Externalizing, Internalizing and a General Psychopathology factor. Moreover, in this study increased risk for General Psychopathology was associated with deprived childhood, a family history of mental disorders, earlier onset of disorder, and a history of child maltreatment.

Taken together, these findings of a general factor of psychopathology lend support not only to the possibility of shared aetiology but also to the shared loss of functions and indicate both common and unique features of the different dimensions of psychopathology. Furthermore, the results from Caspi et al. (2014) indicate that the

construct of a General Psychopathology factor may be of special relevance for foster children, who are exposed to a range of psychosocial risk factors early in life; such a factor might contribute to the explanation of the high comorbidity found in the present study. Conversely, whereas the findings in these studies are highly relevant in the explanation of the high comorbidity rated in Paper I, the CFA model in Paper III, which hypothesizes six factors of mental health problems, yielded a good fit with our data.

4.2.3 Trauma and Stress-Related Disorders

Nineteen point four percent of the foster children fulfilled the DSM-IV criteria for RAD, and the current findings support the DSM-5 conceptualization of RAD and DSED as two separate dimensions of relational psychopathology, not fully accounted for by better-established dimensions of child mental health problems.

The results from Paper III indicate that signs of RAD (M 0.35, SD 0.37) were less common than signs of DSED (M 0.79, SD 0.45). The mean difference between the two scales was .44 (SD .46, 95% CI .53-.36, $t = 10.68$, $df = 121$, $p < .01$).

Furthermore, whereas the DSED scale score was relatively normally distributed, the RAD scale score was positively skewed with a possible floor effect. Bearing in mind the existence of methodological and analytical differences, these findings are in line with the findings of Kay and Green (Kay & Green, 2013), in which a higher percentage of youths in care had scores in the clinical range on the Disinhibited Indiscriminate subscale (58.0%) than on the Unpredictability subscale (20.0%). The latter contains 4 items that are also included in the current DAWBA RAD subscale. Comparisons between those results and this study are not straightforward, however, because the sample in the study of Kay and Green comprises both youths in care and low-risk samples. The findings from the Bucharest Early Intervention Project, which studies children with early rearing in Romanian institutions, also show a higher incidence of indiscriminately social/disinhibited RAD than the emotionally withdrawn/inhibited RAD (Gleason et al., 2011). In the study of Gleason (2001), signs of emotionally withdrawn/inhibited RAD declined as a function of improved

care, whereas signs of indiscriminately social/disinhibited RAD did not. Because we do not have longitudinal data, we do not know whether the lower mean scale scores on RAD relative to DSED in our study is an indicator of RAD being a more severe form of psychopathology occurring more infrequently, or whether it is a function of improved care conditions in the foster family, reducing signs of RAD but not the signs of DSED.

The conduct problem factor correlated significantly higher with the RAD factor than with the DSED factor. This is in line with previous findings on high-risk children reared in a family setting (Vervoort et al., 2013), but contrasts with the trends reported in studies on institutionalized samples, in which the DSED has been associated with externalizing problems (Zeanah & Gleason, 2015). However, cautiousness is warranted in the interpretation of these differences due to methodological differences and the younger age of the institutionalized sample.

The results in Paper III, which support the current operationalization of RAD and DSED as two independent constructs of psychopathology in foster children, have implications for the interpretation of the results from Paper II. Our finding that the SDQ has good to excellent discriminative value in our sample must be informed by the results in Paper III, which indicates that the constructs of RAD and DSED reflect independent dimensions of psychopathology. Additional measures with the ability to assess signs of RAD and DSED are needed when assessing foster children for mental health problems.

In the DSM-5, PTSD is now grouped with RAD and DSED under the category of stress- and trauma-related disorders. Given the high rate of adverse childhood experiences for the children in this study, one would expect a higher rate of PTSD than 5.0%. This is lower than the 15.0% (X^2 18.81, df 1, $p < .01$) reported from the US study of foster youths aged 17-18 years leaving care by Keller et al. (2010) but not substantially lower than the 8.0% (X^2 1.17, df 1, $p = .28$) for 17-year-olds in foster care reported by McMillen et al. (2005). Bearing in mind that these prevalence rates are derived from different assessment tools, one may speculate that a possible

explanation for the relatively low prevalence rates of PTSD in our study may be that the participants are young children. In a study evaluating new alternative criteria for PTSD considered for inclusion in the DSM-5 in a sample of 3-6 year olds, substantially higher prevalence rates (49.0%) were found in trauma-exposed children (N = 284) than when DSM-IV criteria were used (13%) (Scheeringa, Myers, Putnam, & Zeanah, 2012). This indicates that the DSM-IV criteria for PTSD are less appropriate for young children. Furthermore, the use of parents as informants may also have affected our findings because of the difficulties for the outside-observer in detecting core features of PTSD, such as the experience of intrusion, and avoidance of memories of the events (Kazdin, 2003).

4.2.4 Psychosocial Risk Factors

In Paper I, the results indicated that severe neglect, exposure to a broader range of violence, and more previous placements were associated with ADHD, and behavioural and attachment disorders. These findings are in line with previous research showing that maltreatment in the family of origin and an unstable placement history are risk factors for later psychopathology; and that most studies report a cumulative and relatively non-specific effect of childhood adversities (R. Gilbert et al.; Jones et al., 2011).

None of the risk factors included in Paper I was associated with emotional disorders. Because this main diagnostic group of internalizing disorders was composed of 10 single disorders, the negative results may be due to this very heterogeneous dependent variable. To explore this possibility, new analyses were conducted for the two most frequent single disorders (separation anxiety and PTSD) to rule out a possible effect of heterogeneity. However, these analyses yielded the same negative findings (Lehmann, Havik, Havik, & Heiervang, 2013). This contrasts with previous findings and reviews (R. Gilbert et al.; Norman et al., 2012). However, these reports are primarily retrospective studies that investigated the long-term consequences of maltreatment in adult samples (Norman et al., 2012). Longitudinal designs are needed to follow the developmental trajectories of foster children and to examine whether

types of mental disorders will vary through developmental stages for children exposed to maltreatment during early childhood.

In contrast with other studies (Cleaver & Unell, 2011; Kessler et al., 2010), we did not find significant associations between more indirect indicators of adverse care giving, such as parental mental disorders or alcohol and/or substance abuse, and child mental disorders, as presented in Paper I. With our use of dichotomous measures, we might have overlooked associations between these predictors and children's subclinical problems (Kessler et al., 2010). In line with this finding, it is worth noticing the correlation between the dimensional measures of RAD and DSED, and parental mental disorders in Paper III.

Furthermore, using these dimensional measures, the significant associations among severe neglect, exposure to a broader range of violence, more previous placements and the DSM-IV RAD reported in Paper I were not replicated in Paper III. One possible explanation is that a RAD diagnosis in Paper I used information from the entire Attachment Disorder section and from other sources, i.e., information in the free-text descriptions and a diagnosis from the CAMHS. This increased the sample size and statistical power in Paper I.

4.3 Methodological Considerations

4.3.1 Strengths of the study

The main strengths of this study are a relatively large and clearly defined sample; an overall high response rate; the use of a well-validated diagnostic instrument; multiple informants and independent reports from caseworkers in child protection services.

Compared to most previous studies reporting mental disorders in foster children (Allen et al., 2000; Dubner & Motta, 1999; McCann et al., 1996; Reams, 1999; Rosner et al., 2012), our sample size is in the upper range. Furthermore, the age range in our sample represents a particularly understudied group among foster children. Because this age group represents a large proportion of children in foster care, the

current findings have the potential to describe the functioning and needs of a large subgroup of foster children.

The DAWBA interview enables a detailed examination of child mental health. Throughout the study, data from this interview manual have provided the opportunity to report on single disorders, diagnostic groups, and dimensions of psychopathology. This made it possible to investigate not only the total prevalence but also the rates of specific diagnoses and patterns of comorbidity—information that has been lacking in this field.

The need for multiple informants in assessing child psychopathology has been advocated in the literature (De Los Reyes & Kazdin, 2005; Kerr, Lunkenheimer, & Olson, 2007). Multiple informants can give more nuanced and valid information from different, salient contexts in the child's daily life, e.g., the family setting and the school setting. Furthermore, independent ratings of proposed risk factors (care conditions before placement and placement history) and outcome measures (psychopathology) reduce the risk of mono-informant bias.

4.3.2 External validity: Representativity and selection bias

The external validity of a study is influenced by recruitment procedures and the representativeness of the study sample (Kazdin, 2003). There are several issues regarding the representativeness of the study sample for all three papers in this thesis that should be noted.

Selection includes both predefined criteria for inclusion and exclusions and the strategies used in recruiting participants. The sample should be selected according to scientific aims, not based on convenience or the availability of certain groups above others (Emanuel, Wendler, & Grady, 2000). The aim of this project was to contribute to the understanding of mental health and psychosocial functioning among school-aged children placed in foster families. The Regional Committee for Medical and Health Research Ethics West reviewed the protocol of the study and approved the inclusion of all foster children. This included children placed out-of-home either by

sanction of the county social welfare board or by consent of the biological parents. For this latter group, the biological parents still have the power to consent to their child's participation in research projects. This is not the case for children placed by the county social welfare board, for whom an exemption from confidentiality was given by the Ministry of Children, Equality and Social Integration. In the context of this study, the researchers did not have access to information about who the biological parents were and where they lived. To include children placed with consent from their parents, the municipal caseworkers would have to contact the parents to seek consent to participation on behalf of the children. This would have involved considerable economic and manpower resources, e.g., costs of travelling, being away from the office, and the need for repeated contact, because one would expect it highly probable that parents would refuse to consent. The research project also had to invite caseworkers to contribute to the project when including only those children placed in foster families by sanction of the county social welfare board—for example, by aiding in completion of the register from Bufetat, answering the CPQ, and providing contact information to the child's foster parents, school and teacher. The conclusion was that the children placed in foster families by consent of the parents were excluded as eligible because the project would not have the resources to support and follow up with the case workers' contact with the biological parents. As a consequence, the project lost the opportunity to include a substantial proportion of foster children, a sample that otherwise would have contributed to the generalization of the findings.

One should also note that for the children placed in foster families by order of the county social welfare board, there is no detailed, centralized information on out-of-home placements that describes regions, placement forms, and legal justifications in the national registers. According to figures from Statistics Norway (2012), approximately 500 foster children aged 6-12 years were living in foster families in the southern region of Norway by order of the county social welfare board. We obtained contact information for 396 children through the use of regional registers from BUFETAT and direct contact with the consenting municipalities. Accordingly,

there was an approximately 100-child discrepancy between the numbers derived from Statistics Norway and the number of children registered in regional and municipal files, and we do not know the degree of accuracy in either register. Therefore, we do not know the proportion of eligible foster children for whom we did not obtain information or whether they were a highly biased subsample that may have changed some of the reported findings. Based on this situation, an estimation of representativeness is difficult. However, comparison of the children with a completed CPQ but without DAWBA information (non-responders) ($n = 64$) with participating children with completed CPQs and DAWBAs ($n = 219$), showed no differences related to gender, age, age at first placement, numbers of foster placements, or time in the current foster family.

With these considerations in mind, we would still argue that the representativeness of the sample in this study is sufficient to provide information about the mental health of school-aged foster children in Norway.

4.3.3 Assessment of mental health

In this study, we used the DAWBA as a diagnostic tool to assess the presence of mental disorders in foster children. The aim of the study was to apply a multi-informant design in which the teacher, foster mother, and foster father completed the DAWBA independent of each other. The rationale for this multi-informant approach was that children's behaviour can vary with the context in which they are observed. Each informant may contribute with unique, but valid information on a child's functioning according to their perspective and context. From this perspective, variations in informants' reports may reflect variations in the child's display of behaviour across contexts, not measurement error or informant bias (De Los Reyes, Thomas, Goodman, & Kundery, 2013).

In this study, only 51 (18.3%) children had the DAWBA completed by all three possible informants. We did not find differences regarding the prevalence of mental disorders between children with the DAWBA completed by either combination of two informants and children with the DAWBA completed by only one informant

(Lehmann et al., 2013). However, the caregiver version of the DAWBA covers a broader range of diagnostic categories than does the teacher version. In Paper II, for the subsample comprising caregiver-completed DAWBA and SDQs, the prevalence of Any mental disorder was higher (57.0%, $n = 223$) than for the subsample comprising teacher-completed DAWBA and SDQs (48.0%, $n = 195$) (Lehmann, Heiervang, Havik, & Havik, 2014). This could reflect the differences in the DAWBA interviews administered to teachers and caregivers. However, in the same paper, which used the “two-informant” sub-sample with SDQs completed by both a foster parent and a teacher ($n = 141$), a direct comparison of the teacher and foster parent evaluations for each child was possible. Here, the mean Total Difficulties scores were higher for SDQs completed by foster parents (14.7, $SD\ 7.8$), than for SDQs completed by teachers (11.9, $SD\ 7.2$, $t = 4.8$, $df = 140$, $p < .01$) (Lehmann et al., 2014). Given that the SDQ Total Difficulties items and scaling are similar across the teacher and parent versions, the differences in mean scale scores are probably not due to measurement error. This may therefore be interpreted either as systematic contextual variations in the child’s display of aberrant behaviour or as systematic differences in perspectives between teachers and foster parents regarding the threshold for concern (De Los Reyes et al., 2015). In summary, children with only a teacher-completed DAWBA ($n = 63$) may have a systematic underreporting of mental disorders, both because the teacher version of the DAWBA is shorter and restricted to areas of functioning that are available to teachers in a school setting and because of systematic mono-informant bias.

For the analyses of dimensional measures of RAD and DSED in Paper III, we included only children with completed DAWBA Attachment Disorder sections. This reduced our sample size considerably and may have contributed to loss of power to the degree that any associations between risk factors and relational problems became insignificant, and thus increased the risk of Type II error. Due to the small sample size, however, results were examined to look for convergence problems and inadmissible parameter estimates in the CFA; and none were found. Furthermore, the robustness of the results from the CFA analyses were tested by rerunning the analyses

with a Bayesian estimator (with uninformative priors) because this estimator is less sensitive for low sample size (B. Muthén & Asparouhov, 2012; van de Schoot et al., 2013). The results were in line with that found using the weighted least squares means and variance adjusted estimators, thus adding to the reliability of our findings of RAD and DSED as separate dimensions of child mental health problems.

A limitation in the assessment of mental health in this study is the lack of self-reports and of observational data. Self-reports are widely accepted as a direct assessment of inner states, feelings and psychological problems, which are not always as accessible using other assessment techniques (Kazdin, 2003). The lack of self-reports may increase the risk of a systematic under-reporting of emotional disorders from the children's point of view and thus may be an explanation of the low prevalence rate of depression and PTSD in our sample. Conversely, the validity of self-reports from young children has been questioned. Children's responses are dependent on their cognitive, social and emotional development (Kendall & Ollendick, 2004). Given the young age in this sample, together with the children's vulnerability due to high exposure to maltreatment and instability, the costs of the children's involvement might be greater than the gain to the research project. Furthermore, this project was not based in a clinical setting. Child interviews would therefore demand more resources than were available. Consequently, based on both ethical considerations and the practical framework of the project, we chose not to involve the children directly in the clinical assessment.

Results from the CPQ indicate that at least half of the children in the sample had biological parents with an addiction disorder. This makes the possible consequences of prenatal exposure to drugs and alcohol relevant from a differential-diagnostic perspective. The DAWBA and the SDQ are not suitable for conducting a detailed examination of foetal alcohol-spectrum disorders (FASD) and therefore, we do not have information on the prevalence of FASD. Prevalence estimates as high as 28.5% has been reported among American foster children aged 4-18 years (N = 547) (Chasnoff, Wells, & King, 2015), thus indicating that children placed out-of-home are at considerable risk for FASD. Because of limitations in our assessment

methods, we cannot rule out the possibility that behaviour classified in our study as behavioural, emotional, attention deficit or relational disorders may have aetiologic mechanisms related to intrauterine exposure to alcohol and/or drugs.

4.3.4 Identification of maltreatment.

Prevalence estimates of child maltreatment are dependent on the sources available and the methods used. The prevalence and structure of self-reported childhood adversities are fairly similar across countries with different income status (Kessler et al., 2010). There are, however, large discrepancies between self-reported incidents of maltreatment and figures from official statistics for child protection. Some findings indicate that official registers might be as low as 1/10 of the figures from self-reports (R. Gilbert et al.).

The methodological strategy of making a valid identification of the presence of different forms of maltreatment has been subject to debate. Reports by parents, child self-reports, observational methods, and the use of records from child protective services are the most common methods (Cicchetti & Toth, 2005). For the purpose of this study, we relied on caseworkers in child protection services to mark the relevant information in the case files and to use their own knowledge of the child's care history. The advantage of this approach is that all maltreatment reports in official records have been legally accepted by the county board; decisions to identify an occurrence were not made by individuals who were involved in the research project or who were informed about the research aims. This renders the findings more credible and minimizes the risk of selective underreporting by caregivers, who risk prosecution when reporting harmful or illegal parenting practices. Nevertheless, it has been argued that the official records are more sources of information about factors leading to being "caught", rather than exhaustive information of the type, context and frequency of maltreatment (Cicchetti & Toth, 2005). For youths in foster care, self-reports have been found to identify more episodes of physical, psychological and sexual abuse than found in the case files (Hambrick, Tunno, Gabrielli, Jackson, & Belz, 2014). For the purpose of this study, it might be argued that the information we

have on child maltreatment in this study largely represents the arguments presented by the child protection services when the case was brought before the county social welfare board. Taken together, this study's use of caseworker reports to identify rates of maltreatment may have resulted in underreporting. However, the incidents that are reported may be considered trustworthy.

4.4 Ethical Considerations

Research projects in the field of medicine or psychology may be evaluated for the degree to which they lead to improved health or well-being (Emanuel et al., 2000). One possible outcome of epidemiological studies can be a better allocation of resources and the development of interventions that target the needs of a defined group. In Norway (Clausen & Kristoffersen, 2008) and other countries (Egelund & Lausten, 2009), register-based studies have contributed substantially to knowledge of foster children. For example, register data have been used to study how foster children fare as adults (Vinnerljung, Sundell, Lofholm, & Humlesjo, 2006). A limitation of these studies is that Norwegian registers do not contain detailed information about children's mental health and therefore may not facilitate a knowledge-based development of interventions to meet the needs of those children. An epidemiological approach using validated assessment methods may enable more detailed descriptions of child mental health and functioning, which can provide a basis for improved services. However, the advantages of epidemiological studies must be balanced against the negative consequences for the participants. One possible consequence of this study is that the results may have the unintended effects of contributing to the stigmatisation of a vulnerable group of children. This may be counterbalanced by the possible beneficial effects on future development and implementation of service provision to foster children.

4.5 Implications

4.5.1 Implications for Child Protection Service Policy

The current findings indicate that one of every two school-aged foster children in Norway have mental disorders. The children in the study were exposed to multiple and severe adverse care conditions in their families of origin. This raises the question of whether interventions aimed at improving parental skills should be more systematically compared with a child-centred practice that focuses on protecting vulnerable children from being exposed to harmful care. The current findings also invite a discussion of the priority of voluntary measures as a first choice in the face of adverse care conditions for children. This priority complies with the principles of *biology* and the use of the *least intrusive forms of interventions*. Still, the use of voluntary, family-focused interventions aimed at compensating for or improving parental deficits may conflict with the principle of the child's best interest. For some children, these priorities may lead to prolonged exposure to care conditions that are detrimental to their health and development.

The systematic and timely monitoring of child mental health outcomes should be the basis for continued emphasis on in-home interventions delivered by the child protective service. Such a practice would depend on the use of standardized measures of child health and functioning, which have been implemented in other countries, such as in Britain (A. Goodman & Goodman, 2012).

4.5.2 Clinical Implications: Services for Children at Risk

In Norway, there are no existing national procedures for assessing children's mental health when they are placed out of their homes. A recent survey of caseworkers (N = 316) in the Norwegian child protection services found that only approximately 40% of foster children in their care received mental health assessments (Backe-Hansen et al., 2013). This low frequency of mental health assessment in child protection contexts indicates that poor mental health goes unrecognized. Consequently, the child's development may be hindered. Furthermore, the risk of placement breakdown

may increase (Oosterman, Schuengel, Slot, Bullens, & Doreleijers, 2007).

Knowledge of child mental health at the time of placement is crucial to ensure appropriate support and treatment. Furthermore, the use of dimensional measures in regular follow-up after placement will enable the monitoring of outcomes and the effect of interventions on children's well-being.

Implementation of mental health screening is dependent on access to CAMHS for children needing further assessment and follow-up. In Norway, recent figures indicate that child protection services make relatively few referrals to CAMHS (Statens Helsetilsyn, 2012). This may indicate that foster children's mental disorders go undetected and/or that child protection services do not see CAMHS as meeting the needs of the children in their care. Conversely, priority guidelines in CAMHS note that adverse care conditions strengthen the criteria of seriousness and consequently, should lead to children's right to mental health services. Furthermore, the guideline emphasizes that the service provided must be adjusted to the child's life situation (Nygaard, 2009).

One central premise for improving foster children's access to mental health services is coordination of services and increased understanding both in child protection services and CAMHS about associations between adverse childhood experiences and child mental disorders, with serious relational problems and high comorbidity being part of the picture. High comorbidity has implications for the choice of measurement tools and for the planning of support and interventions in salient areas such as school, leisure activities and family contexts.

Foster parents are key agents in the work to secure change and development for foster children. To ensure developmentally supportive care and prevent new ruptures of attachment bonds, foster parents should be included as collaborative partners in the work on the repair and psychosocial development of the foster child. Counselling from day one based on knowledge of these children's needs in general, combined with clinical information for each individual child, is recommended. The strengthening of attachment bonds between foster parents and children, decreasing

emotional and behavioural problems, and focusing on the child's resources have been found to be central core components independent of counseling models (Leve et al., 2012).

4.5.3 Future Research

In line with findings in Anglo-American studies, this thesis has shown that foster children have a high risk for a broad range of mental disorders, which is partly related both to early care experiences prior to out-of-home placement and to placement history. Well-established screening tools for detecting mental disorders seem well-suited to detect broad categories of mental health problems.

The thesis is based on a cross-sectional study of a group of 6-12-year-olds. There is a need for longitudinal designs to identify and understand developmental trajectories for this high-risk group. This would strengthen our knowledge of the possible effects of foster care and interventions after placement. Furthermore, longitudinal designs enable investigations of whether different clusters of mental disorders act as early predictors of developmental outcomes later in life. For example, there is a need for more knowledge of the pattern of sequential comorbidity for this high-risk group (Caspi et al., 2014).

Throughout the three research papers, there has been a focus on risk factors and psychopathology. An important question is what constitutes protective factors in the face of multiple, serious adversity and risk for this group of children. Children's contribution to their developmental path is recognized in gene-environment interaction research (Caspi & Moffitt, 2006; Kim-Cohen et al., 2006). Findings from the area of individual differences in susceptibility (Belsky, Bakermans-Kranenburg, & Ijzendoorn, 2007) not only emphasize individual differences in vulnerability but also warrant an understanding of the variation in the beneficial effects of supportive environments. Future research examining other areas of functioning salient to the child's everyday life (such as school and leisure activities) and how these areas relate to mental health and development would extend the current knowledgebase.

Detecting children in need of interventions is crucial for providing services and treatment. Based on our finding, the SDQ seems promising as a first step in identifying vulnerable children. That notwithstanding, our results indicate a need for the further development and validation of assessment tools specially tailored to identify children with complex symptom patterns and relational difficulties.

4.6 Conclusions

Using data from the DAWBA and the SDQ administered to foster parents and teachers, along with the CPQ completed by caseworkers, this thesis has focused on the mental health of foster children. The high prevalence of mental disorders was found to be associated with care experiences in the biological family, along with placement history. The study also showed that a standardized instrument for mental-disorder screenings, developed and validated for community and clinic samples, also showed good screening properties for foster children. The DSM-5 conceptualization of the stress- and trauma-related dimensions of RAD and DSED were supported.

The findings underline the importance of a thorough mental health assessment for children in families that are in contact with child protection services. Further studies are needed to evaluate the effectiveness of interventions along the broad spectrum of mental health problems in foster children.

5. Appendix

Appendix A

Table A1

Overview of Procedure of the Systematic Literature Search on Prevalence of Mental Health Problems in Foster Children

Details of the literature search	Search in title, abstract, heading word, table of contents, key concepts
<p>#1 Search terms used for studies of mental health problems and disorders</p>	<p>mental health. Or exp Mental Health/ or exp Mental Disorders/ or mental disorder*. Or exp Adjustment Disorders/ or adjustment disorder*. Or exp Emotional Adjustment/ or Emotional maladjustment. Or social maladjustment. Or exp Emotional Development/ or exp Emotional Disturbances/ or emotional 65nglish65r65i*. Or psychiatric disorder*. Or exp Anxiety Disorders/ or anxiety. Or exp Child Psychopathology/ or psychopathology. Or exp Adolescent Psychopathology/ or exp Psychopathology/ or exp Psychiatric Symptoms/ or psychiatric symptom*. Or Diagnos*. Or psychiatric diagnos*. Or psychopathology. Or exp "Depression (Emotion)"/ or depression. Exp or Posttraumatic Stress Disorder/ or post-traumatic stress disorder. Or PTSD. Or internalizing problem. Or emotional development. Or exp Emotional Development/ or externalization. Or exp Externalization/ or externalizing problem. Or exp Hyperkinesia/ or 65nglish65r65ia*. Or attention deficit disorder with hyperactivity. Or exp Attention Deficit Disorder with Hyperactivity/ or hyperactivity. Or exp Oppositional Defiant Disorder/ or oppositional defiant disorder. Or attention deficit disorder. Or exp Attention Deficit Disorder/ or exp Anxiety/ childhood development. Or exp Childhood Development/ or child* development. Or emotion*development. Or psychological development. Or exp Psychological Development/ or psychosocial development. Or exp Psychosocial Development/ or exp Behaviour Disorders/ or 65nglish65r disorder*. Or behaviour disorder*. Or exp Behaviour Problems/ or 65nglish65r problem*. Or behaviour problem*. Or exp Conduct Disorder/ or conduct disorder*. Or self mutilation. Or exp Antisocial Behaviour/ or antisocial 65nglish65r. Or antisocial behaviour. Or exp Child Psychiatry/ or child psychiatry. Or social emotional. Or 65nglish65r problem.</p>
<p>#2. Search terms used for studies of Foster children</p>	<p>exp Foster Care/ or exp Foster Children/ or fostercare. Or foster-care.mp. or foster child*. Or foster-child*. Or family foster care. Or children looked after. Or looked after children. Or foster care.</p>

Terms for limitations**# 1 AND #2**

limit to (“ clinical case study” or “empirical study” or “experimental replication” or “follow up study” or “longitudinal study” or “prospective study” or “retrospective study” or “interview” or “literature review” or “systematic review” or meta analysis or “quantitative study or “treatment outcome/randomized clinical trial” or “twin study”) and “peer-reviewed journal” and human) (66english language and yr=“1990 –Current”)

Note: Search-words used in PsychINFO database are displayed. Some of the Thesaurus words differed from other data-bases depending on the labels used in each database. If there were differences between the databases in the use of Thesaurus words, the Thesauruses that had the most similar content were selected.

Appendix B

Table B1

Overview of Studies of Prevalence of Mental Disorders in Foster Children

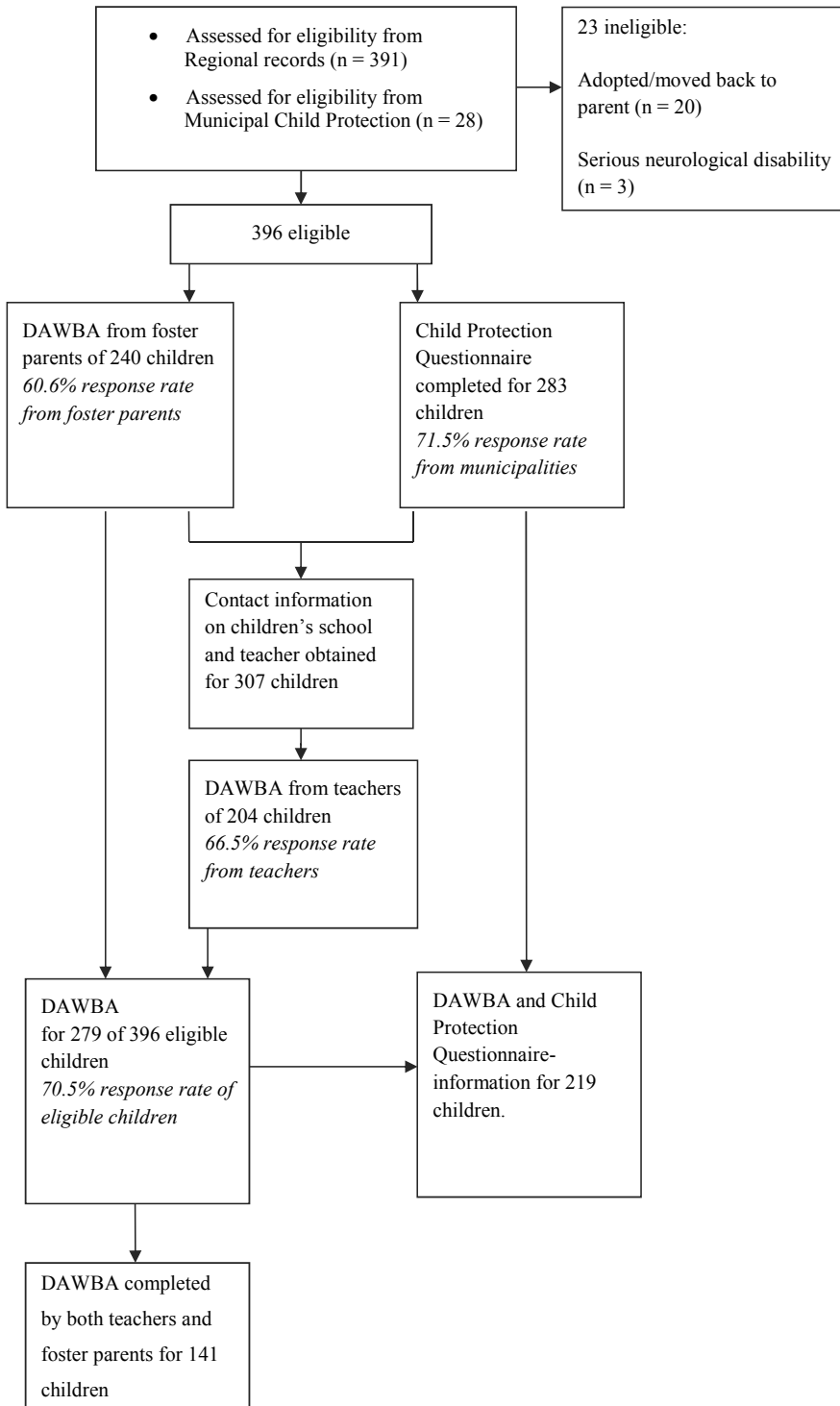
<i>First author (year) Country</i>	<i>Sample size (resp. rate) Female Age range</i>	<i>Method Informant</i>	<i>Outcome</i>	<i>Comparison group</i>	<i>Description of findings</i>
Mc Cann (1996) England	88 (66%) 63.6% 13-17 years In residential units and with foster caregivers	<i>Kiddie schedule Self-report</i>	Total DSM III R prevalence	Youths with no previous or current contact with any local authority, matched for age and sex.	The total prevalence rate of psychiatric disorder 67%, compared with 15% in the comparison group, with 96% in residential units and 57% in foster care. Main diagnostic groups reported only for total sample
Dubner (1999) USA	150 36% 8-19 years Entering foster care	<i>The Childhood PTSD Interview (CPI) Self-report</i>	DSM-III-R PTSD	No	Prevalence of PTSD estimated to 64% of the sexually abused group, 42% of the physically abused group, and 18% of the non-abused group.
Reams (1999) USA	144(72%) 47% 0-48 months	<i>Diagnostic Classification of Mental Health Disorders of Infancy and Early Childhood (DC: 0-3) Caregiver-report</i>	DC 0-3 Diagnose	No	23% Adjustment disorder 22% regulatory disorder 7% RAD 2% Multisensory developmental disorder 2% Traumatic stress disorder 19% Other 39% No Diagnose
Allen (2000) USA	160 (85%) 50% 8-16 years 83% African-American in foster care.	<i>Children's depression Inventory (CDI) Self-report</i>	Clinically significant depression: depressive symptoms CDI score ≥ 19	Urban, African-American school children (N =60)	Prevalence of 13.8% in foster care, 8.3% in the comparison group.
Mc Millen (2005) USA	373 (90%) 56% 17 years Youths in the custody and care of the Division. 115 in family foster care	<i>Diagnostic Interview Schedule for DSM-IV Self-report</i>	Past year of any DSM-IV disorder, PTSD, major depression, mania, ADHD, ODD/CD	No	For the total sample: 37% Any Disorder; 18% Major Depression; 6% Mania; 8% PTSD; 17% CD/ODD; 10% ADHD For non kin foster care: 33% Any Disorder; 15% Major Depression; 12% CD/ODD; 10% ADHD

<i>First author (year) Country</i>	<i>Sample size (resp. rate) Female Age range</i>	<i>Method</i>	<i>Outcome</i>	<i>Comparison group</i>	<i>Description of findings</i>		
Ford (2007) Britain	839 42.6% 5-17 years Looked after by local authorities in England, Scotland and Wales	<i>The Development and Well-Being Assessment (DAWBA) Caregiver report and Self-report from age 11</i>	Point prevalence of ICD-10 Any Disorder, Emotional disorder, Conduct disorder, and Hyperkinetic disorder	Yes: deprived and non-deprived children living in private households (n = 10428)	For the total sample: 45.3% Any Disorder; 12.4% Emotional disorder; 37.7% Conduct disorder; 8.4% Hyperkinetic disorder For non kin foster care: 38.6% Any Disorder; 9.7% Emotional disorder; 32.3% Conduct disorder; 8.5% Hyperkinetic disorder		
Keller (2010) USA	485 (95%) 51.5% 17-18 years Youth leaving care in three states, potential participants identified from state child welfare records	<i>Composite International Diagnostic Interview (CIDI) Self-report</i>	Lifetime diagnosis of PTSD, major depression, alcohol abuse/dependence and substance abuse/dependence diagnoses			Kin 12.1 6.0 8.5 1.3	Non Kin 16.1 12.4 11.5 7.3
Rosner (2012) Germany	36 (not reported) 10-18 years 44% Living for at least one month in a foster family, in Bavaria, no retardation	<i>The Clinician Administered PTSD Scale for Children and Adolescents (CAPS-SA) Self-report</i>	DSM –IV PTSD ICD-10 PTSD	No	11% met diagnostic criteria for PTSD according to the DSM-IV, 44% met diagnostic criteria for PTSD according to the ICD-10.		

Appendix C

Figure C1

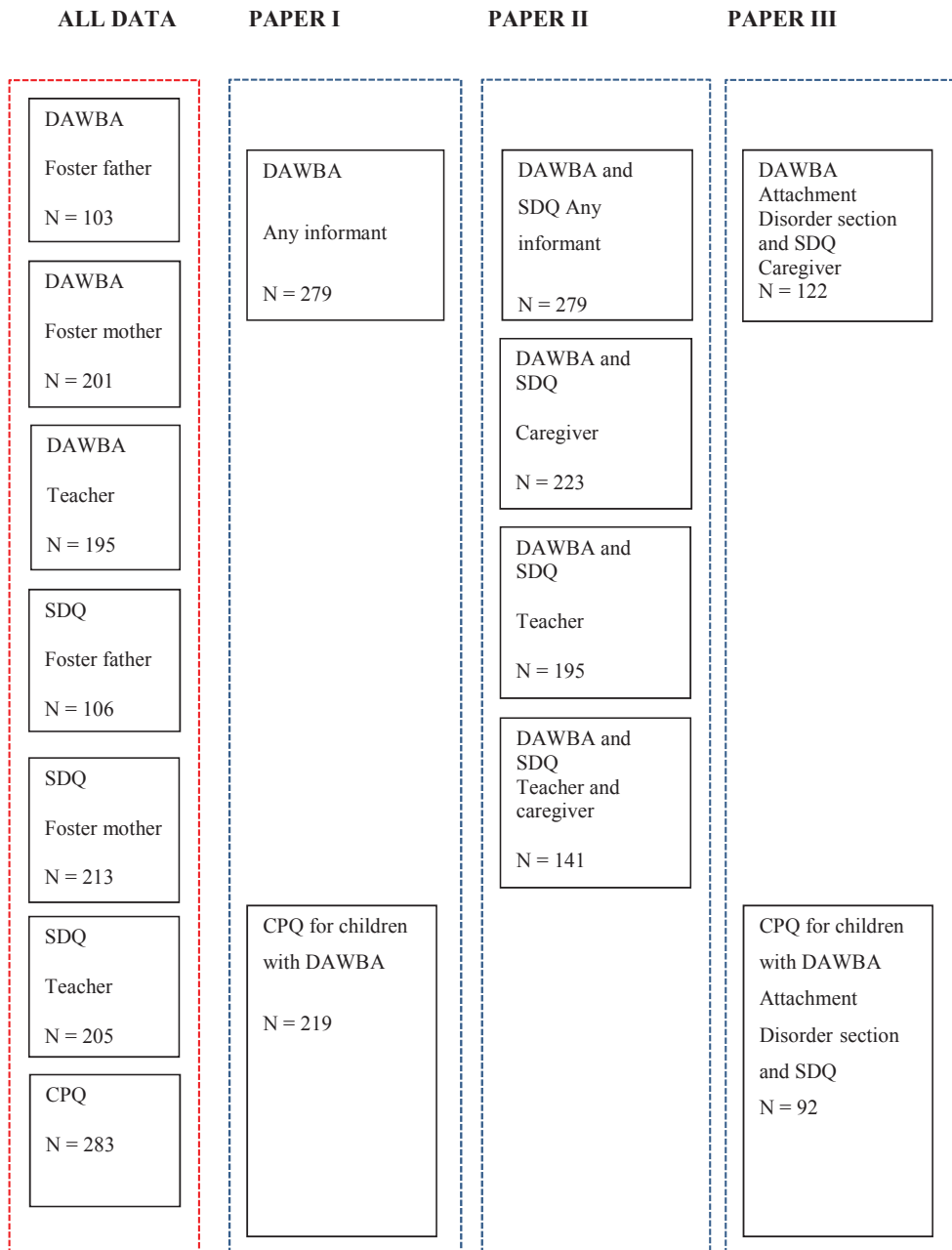
Flow Chart of Data Collection



Appendix D

Figure D1

Illustration of the Use of Data in the Three Papers in the Thesis



Appendix E

Table E1

Combinations of Informants on the DAWBA

Combination of Informants	Number of Children
Foster mother	201
Foster father	103
Teacher	195
Foster mother + Foster father	31
Foster mother + Teacher	128
Teacher + at least one Foster parent	141
Foster father + Teacher	66
All three	51
Two informants	123
Two or three informants	174
Only one informant	128
At least one informant	300

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RESEARCH

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Mental disorders in foster children: a study of prevalence, comorbidity and risk factors

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Abstract

Background: The aim of this study is to examine the prevalence of mental disorders in 6- to 12-year-old foster children and assess comorbidity and risk factors.

Methods: Information on mental health was collected from foster parents and from teachers using Developmental and Well-Being Assessment (DAWBA) Web-based diagnostic interview. Child welfare services provided information about care conditions prior to placement and about the child's placement history.

Results: Diagnostic information was obtained about 279 (70.5%) of 396 eligible foster children. In total, 50.9% of the children met the criteria for one or more DSM-IV disorders. The most common disorders were grouped into 3 main diagnostic groups: Emotional disorders (24.0%), ADHD (19.0%), and Behavioural disorders (21.5%). The comorbidity rates among these 3 main groups were high: 30.4% had disorders in 2 of these 3 diagnostic groups, and 13.0% had disorders in all 3 groups. In addition, Reactive attachment disorder (RAD) was diagnosed in 19.4% of the children, of whom 58.5% had comorbid disorders in the main diagnostic groups. Exposure to violence, serious neglect, and the number of prior placements increased the risk for mental disorders.

Conclusions: Foster children in Norway have a high prevalence of mental disorders, compared to the general child population in Norway and to other societies. The finding that 1 in 2 foster children presented with a mental disorder with high rates of comorbidity highlight the need for skilled assessment and qualified service provision for foster children and families.

Background

In Western societies, the number of children placed out of home converged at approximately 5 per 1000 in 2006-2007 [1]. In Norway [2], as in most western societies [3], parental neglect endangering a child's development and health is the primary reason for out-of-home placement, and families receiving services from the child welfare system are often characterised by low socioeconomic status [4]. Child welfare services in Norway are typically family-oriented, emphasising voluntary and preventive home-based interventions. After a family's first contact with child welfare services, children continue to stay, on average, 3 years with their biological families receiving home-based services, before they are placed out of home [5]. However, once the child has been placed in

a foster family, the placements tend to last longer than in Anglo-American countries [3].

The prevalence of mental health problems in foster children has primarily been investigated using symptom checklists, providing an overall estimated prevalence of mental health problems in the range of 42.7% to 61.0% [6-11]. Because questionnaires do not allow for detailed enquiry into symptom patterns, duration, or functional impact, these estimates may not be equated with estimates based on diagnostic assessments. Furthermore, symptom checklists do not take into account comorbidity rates.

Standardised diagnostic interviews are seen as the best way to achieve reliable prevalence estimates for mental disorders in different populations. However, only a few studies so far have used such diagnostic interviews to estimate the prevalence of mental disorders among foster children. One early study reported a point-prevalence of DSM-III-R disorders of 57.0% in foster youth [12]. A rather similar overall prevalence rate of 50.0% has been found in a more recent study of foster youth aged 11-

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17 years. [13] McMillen et al. [14] reported a somewhat lower past-year prevalence of 33.0% in a comparable sample, with 17.0% having Conduct Disorders (CD) or Oppositional Defiant Disorder (ODD), 15.0% Major depression, and 10.0% Attention Deficit Hyperactive Disorder (ADHD). Consistent with other studies, [12,15,16] the prevalence was higher for youths placed in congregate care [14]. In a study of foster youths aged 17 years and older, Keller, Salazar and Courtney [15] reported a lifetime prevalence of DSM-IV disorders of 10.5% for Major Depression and 16.1% post-traumatic stress disorder (PTSD).

These interview-based diagnostic studies all assessed older foster youths, using self-report only. The only sample that included younger foster children was the study by Ford, Vosansis, Meltzer and Goodman [16]. They reported a point-prevalence of 38.6%, where 9.7% suffered from Emotional disorders, 32.3% had CD/ODD and 8.5% had Hyperactivity. In this study, the diagnostic information was obtained from teachers, caregivers, and youths from 11 years of age. A higher prevalence rate was found in boys than in girls, and the rates increased with age. Whether this age-related increase could be attributed to later placement and longer exposure to neglect and abuse was not explored. Furthermore, the prevalence was only reported for broader diagnostic groups and not for single disorders among children living in foster families.

In contrast to the general agreement regarding the diagnostic criteria and methods of assessment for most mental disorders in children, the validity and relevance of the criteria for the diagnosis of Reactive Attachment Disorder (RAD) have been more controversial, especially regarding how these features should be characterised and assessed after the age of 5 years old [17,18]. Some longitudinal studies have continued to use the Strange Situation Procedure up until school age, in combination with parental reports and standardised investigator ratings of child behaviour [19,20], while others have developed their own semi-structured interviews and rating scales [21].

Findings indicate that children exposed to early adverse childhood experiences in general [22] and more specifically children placed in foster care have a heightened risk of attachment difficulties [23,24]. Further, attachment difficulties have been related to other mental health problems both among foster and adopted children [25,26]. It is therefore important to include measures of attachment disorders when assessing mental disorders of foster children.

Recently, a RAD section was added to the Developmental and Well-Being Assessment (DAWBA) structured diagnostic interview manual [27], developed from the corresponding section of the Child and Adolescent Psychiatric Assessment interview [28]. The first study

using the DAWBA-RAD section reported a very high RAD point-prevalence of 63.0% (96/153) in a sample of looked after youth in a variety of placement forms [29]. In this study however, RAD was not defined according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [30] criteria, but as a symptom score 2 standard deviations greater than the mean. There is therefore a need for further studies of the prevalence of RAD among school-aged children living in foster families, as this age range and placement form are the most common in child protection services.

Age, sex, and learning difficulties [31,32], as well as low socioeconomic status [33,34], are well-established predictors of mental health problems in children in general. Foster children are exposed to a range of other risk factors as well [35]. Adverse childhood experiences, such as psychological and physical abuse and neglect, parental substance abuse and mental illness, all increase the risk of both physical and mental health problems, as well as health risk behaviours [36-41]. In addition, older age at placement, frequent placement changes, the number of placements and persistent adverse events after placement pose additional risks for these children [42,43]. However, few studies so far have examined whether such risk factors show specific associations with certain types of mental disorders [44].

In summary, previous studies have converged on the finding that foster children represent a high-risk group for mental health problems and that these problems might be associated with experiences of early neglect, abuse, and other adverse childhood experiences. However, only a few studies have used diagnostic interviews, covering the full range of mental disorders, and only one of these studies included school-aged foster children who were still living in foster families.

The purpose of this study was to estimate the point-prevalence and comorbidity of DSM-IV disorders in school-aged foster children. Further, we aimed to investigate the predictive value and specificity of risk factors related to adverse childhood experiences prior to placement, and placement history with regard to mental disorders in these children.

Because most foster children have been exposed to neglect and abuse before placement, we expected them to show increased rates of mental disorders compared to the general population [32]. We expected greater exposure to risk factors to be related to a higher prevalence of mental disorders, and in line with existing research findings, we expected that psychological and physical abuse, parental substance abuse and mental illness in the family of origin would be positively associated with mental disorders. Further, we expected to find associations between the prevalence of mental disorders and an unstable placement history.

Methods

Sample: eligibility and recruitment

The inclusion criteria were children aged 6 to 12 years old, living in foster families encompassed by the Southern Regional Office for Children, Youth and Family Affairs for at least 5 months following legally mandated placement. According to records from the Regional Office for Children, Youth and Family Affairs, there were 391 eligible children living in the 63 municipalities of the region.

Informational letters were sent to the head of each municipal child welfare office. The office heads were asked to review the list from the regional register of foster children and to complete the list by adding eligible children who were not registered. This process led to the identification of 28 additional eligible children. Of the registered children, the municipalities reported that 20 had either returned to their biological families or had been adopted. Three additional children were deemed ineligible because of serious neurological disabilities. Thus, the final number

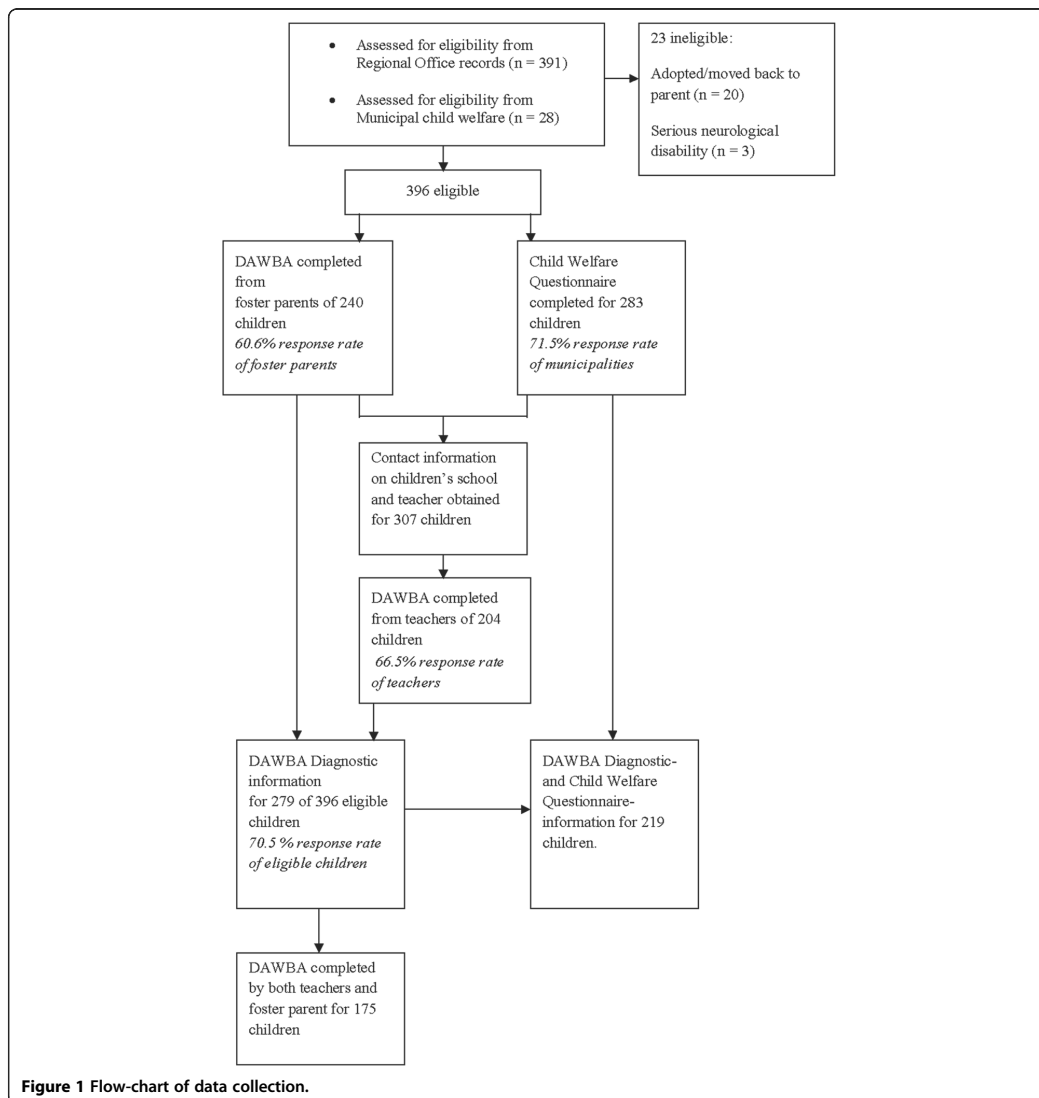


Figure 1 Flow-chart of data collection.

of eligible children was 396. The child welfare offices in the municipalities were asked to provide contact information for these children's schools and teachers. They were also asked to answer a short purpose-made questionnaire about the children's care conditions prior to placement and their placement histories. The caseworkers did not provide any diagnostic information, so the diagnoses are based on the DAWBA from the foster parents and the child's teacher.

Foster parents of the 396 eligible children received postal letters with detailed information about the study, as well as instructions on how to complete the DAWBA interview online. They were also asked to return contact information for the children's schools and teachers. In total, contact information was obtained for 307 teachers, who were then contacted by postal mail and asked to complete a version of the DAWBA diagnostic interview online. Figure 1 provides a flowchart of the entire data collection.

Ethics

The study was approved by the Regional Committee for Medical and Health Research Ethics, Western Norway. The Ministry of Children, Equality and Integration provided exemptions from confidentiality for caseworkers, foster parents, and teachers participating in this study. In accordance with Norwegian ethics requirement, oral assent is required from children aged 12 years old. The children and their foster parents were instructed about this in the information letters that included a version especially adapted for children. If the child did not assent, the foster parents were instructed not to participate in the survey.

Measurements and diagnostic rating procedures

We used the Developmental and Well-Being Assessment (DAWBA) [27] interview to assess DSM-IV mental disorders. The DAWBA is a Web-based diagnostic interview that combines structured questions on symptoms and impairment with open-ended questions in which the respondents describe the child's problems in their own words. The DAWBA administered to parents or caregivers has a total of 17 sections, covering diagnostic areas, child and family background, and child strengths. The time needed to complete the interview by carers vary from 30 minutes to several hours, depending on the amount of problems reported. Due to skip-rules included in the web-based interview, the interview becomes shorter if no problems are reported in the initial questions of a section. Teachers respond to a shorter version of the interview, which typically can be completed in 15-30 minutes.

The task of the clinical rater is to judge the answers from the different informants. For most disorders, the

diagnostic criteria only require that problems are evident in one setting (e.g. at home or at school). The different informants are usually treated as complementary adding to the understanding of the child. Where informants give contradictory information, the rater has to use her judgment as to which informant is the most reliable. The DAWBA interview has shown good ability to discriminate between children from community and clinical settings [27], and it has generated realistic prevalence estimates of mental disorders when used in public health services [32,45].

In this study, all of the available DAWBA information from both foster parents and teachers were reviewed by first and last author, who separately assigned diagnoses according to the DSM-IV criteria. Both raters are clinical specialists in child and youth mental health. Last author has documented high inter-rater agreement with Robert Goodman, who developed the DAWBA [32]. The agreement between the 2 raters regarding the presence/absence of a disorder was excellent (Kappa = 0.95, 95% CI: 0.88-1.00).

If informants reported a definitive impairment in function but not sufficient symptoms to fulfill a specific diagnosis, an "other" or NOS diagnosis was given. A previously given ADHD diagnosis by a specialist in child mental health services was accepted, even if the ADHD interview section reported sub-threshold symptoms and impairment, because the symptoms might have been suppressed by medication. For children from the age of 11 years, the RAD section is not a part of the DAWBA interview. For the children aged 11-12 years old, we therefore used free-text description of symptoms and impairments meeting the DSM-IV criteria to assess RAD. A previously given RAD diagnosis by a specialist in child mental health services was also accepted for this age group.

A short child welfare questionnaire was developed for the study to obtain information from caseworkers in the child welfare services, about 12 possible care conditions in the biological family; the caseworker could mark any number of these conditions, corresponding to their records of characteristics of the child's care experiences. The questionnaire also asked about placement history and the country of birth of both the child and biological parents.

Procedures

The data collection started in September 2011 and lasted for 6 months. If foster parents or teachers had not responded within 2 weeks after the first information letter, a reminder was sent. Consenting foster parents who still had not completed the DAWBA within 2 months were offered a telephone interview. Thirty-one DAWBA interviews were completed over the phone. Teachers

were compensated with NOK 250 (31 Euro) for their participation, while foster parents were not offered compensation for participating.

Analysis

Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 19 for Windows. Comparison between subsamples was performed with *t*-tests and Chi-square tests. The prevalence of disorders was calculated by frequency analyses with 95% confidence intervals (CIs). In subsequent analysis, single disorders were clustered into 3 main diagnostic groups. Due to the relatively low prevalence of depression, this disorder was grouped together with all of the anxiety disorders and with undifferentiated anxiety/depression in the main diagnostic group of Emotional disorders (see Table 1). Diagnoses related to ADHD were grouped into ADHD disorders. Similarly, CD, ODD, and other disruptive disorders were grouped into the diagnostic group of Behavioural disorders. This grouping of disorders corresponded to that used in Ford et al.'s study of looked-after children [16]. Further, the RAD group comprised only that diagnosis. The group labelled "Any disorders" comprised all single disorders referred to in Table 1, except for the NOS diagnosis.

Cross-tabulations were used to examine patterns of comorbidity, first between each of the 3 main diagnostic groups — Emotional disorders, ADHD and Behavioural disorders — and all other disorders, and then among these 3 main diagnostic groups only. These 3 groups were further recoded into 1 variable to examine the overlap between RAD and any of these 3 main diagnostic groups. Estimates of the odds of comorbidity between any 2 of 4 diagnostic groups (Emotional disorders, ADHD disorders, Behavioural disorders, and RAD) were calculated with logistic regression analyses.

In the analyses of associations between possible risk factors and mental disorder, the 5 diagnostic groups (Emotional disorders, ADHD disorders, Behavioural disorders, RAD and Any disorders) were included as the dependent variables in separate binary logistic regression analyses. To reduce the number of predictors, the associations between single risk factors and diagnostic groups were examined in preliminary analyses (see Table 1 for information about the included predictors). Among the demographic variables, Age, but not Gender or Parents ethnicity, was related to at least 1 of the 5 diagnostic groups. Variables related to the child's placement history (Age at first placement, Number of placements, and Time in current foster home) were all related to at least 1 diagnostic group. Time in current foster home and Age at first placement were highly inter-correlated ($r = -0.69$). To avoid collinearity, only Age at first placement was included in the subsequent analyses.

Table 1 Characteristics of foster children with both DAWBA and municipal care history information (n = 219)

	%	Mean	SD
Age (years)		8.97	2.04
Female gender	47.0		
Former placements		0.90	0.85
0	32.0		
1	52.2		
2	12.5		
3-5	3.1		
Age at first placement		3.74	2.98
0-6 months	16.0		
7 months-2 years	26.0		
3-5 years	28.8		
6-12 years	29.2		
Years in current foster home		5.08	3.06
0-2	23.5		
3-5	25.3		
6-7	25.3		
8-12	25.8		
Number of adverse childhood experiences ¹		3.00	1.60
Violence exposure (range 0-4) ²		0.71	1.14
0	64.1		
1-2	26.2		
3-4	9.7		
Serious neglect	86.3		
Parent's drug/alcohol abuse	55.3		
Parent's mental disorder	52.3		
Parent's mental disability	9.6		

¹Experiences in family of origin; ²Violence exposure = the sum of witnessing domestic violence; exposure to physical violence; exposure to emotional abuse; witnessing emotional abuse.

Among the possible risk factors reflecting care experiences in the family of origin, as reported by the child welfare services, Parental substance abuse, Mental illness and Mental disability were unrelated to any of diagnostic groups. Five variables — Serious neglect, Exposure to physical violence, Witnessing domestic violence, Exposure to emotional abuse (threats, hostility, rejection, harsh verbal punishment), and Witnessing emotional abuse towards other family members — all had a significant associations with at least one diagnostic group. These 5 variables were then included in an exploratory principal component analysis with oblimin rotation. The latter 4 of the 5 variables were loaded on one factor with an eigenvalue of 2.18, explaining 43.7% of the total variance, whereas Serious neglect was loaded as a separate factor, with an eigenvalue of 1.08, explaining 21.1% of the total variance. Based on these findings, the 4 variables loading on Factor 1 were added

into a continuous variable termed Violence exposure, with a range of 0–4 ($M = 0.89$, $SD 1.22$) and Cronbach's $\alpha = 0.72$. Thus, in the final logistic regression analyses, the following predictors were included: Age; Age at first placement; Number of placements; Violence exposure; and Serious neglect. All of the predictors were used as continuous variables, except for Serious neglect, which was defined as a dichotomous variable (no = 0, yes = 1), using a simple contrast with no serious neglect as the reference category. We first ran unadjusted logistic regression analyses for each of the predictors. Next, each predictor was included in an adjusted model to control for the 4 other predictors. The results are presented as un-adjusted and adjusted odds ratios (ORs) with 95% CIs. If a predictor only had a significant contribution in the adjusted model and not in the unadjusted model, a suppressor effect was suspected. Here, a Wald backward stepwise regression procedure (exit criterion $p = 0.05$), starting with all of the predictors in the model, was used to identify the suppressor variables.

Results

Study sample

DAWBA interviews were completed for 279 of the 396 eligible children (70.5%), and 175 of these 279 children (62.7%) had information from both a foster parent and a teacher. The DAWBA sections most frequently completed were ADHD (91.0%), ODD/CD (89.6%), and Depression (87.1%), a completion rate in line with previous studies using DAWBA [46].

The child welfare questionnaire was completed for 283 of the 396 eligible children (71.5%). Of the 279 children with DAWBA information, 219 (78.5%) also had information from caseworker questionnaires (See Figure 1).

The calculation of the prevalence of disorders and comorbidity included all of the children with completed DAWBAs ($N = 279$). Demographic characteristics and associations between possible risk factors and mental disorders were analysed for the subsample with information from both DAWBA and the child welfare questionnaire ($n = 219$). This subsample and the subsample with only child welfare information ($n = 64$) showed no significant differences regarding child sex, age, age at first placement, number of former placements, or time in current foster home. No differences between children with DAWBA completed by both carer and teacher ($n = 141$) and children with DAWBA completed by only one informant were found regarding prevalence of Any disorders, Emotional disorders, ADHD, Behavioural disorders or RAD.

Table 1 shows the demographic characteristics, placement history, and care experiences, as reported by municipal child welfare, of the children with DAWBA and child welfare information ($n = 219$). According to the information from child welfare, the mean number of aversive

childhood experiences before first placement was 3.0 ($SD 1.6$). Among the children, 42.9% had at least one biological parent born in a non-Western country. Seven children (2.5%) were born outside Norway.

Prevalence of disorders

Among the 279 children with DAWBA information, a total of 142 children (50.9% CI 45.2–57.0%) met the criteria for at least one DSM-IV disorder (Table 1). Among these, 115 (41.2%) had a disorder in one of the main diagnostic groups: Emotional disorders (24.0%), ADHD disorders (19.0%), or Behavioural disorders (21.5%). The criteria for RAD were met by 19.4%. Of the children aged 6–10 years old ($n = 198$), where the RAD interview section were included in the DAWBA, 23.2% ($n = 46$) met criteria for RAD. Additional 4.3% had Pervasive developmental disorders and 2.1% had Tic disorders. No children met the criteria for Panic disorder, Agoraphobia, Selective mutism or Eating disorders (Table 2).

Comorbidity

Among the 142 children with mental disorders, 63.4% (90/142) had more than 1 disorder, with a mean of 2.36 disorders ($SD 1.52$, range 1–7). The rate of comorbidity was 64.2% (43/67) for Emotional disorders, 69.8% (37/53) for ADHD disorders and 81% (49/60) for Behavioural disorders.

Regarding comorbidity between the 3 main diagnostic groups, a total of 30.4% (35/115) had disorders in 2 of the groups, and 13.0% (15/115) had disorders in all 3 groups. The comorbidity between Emotional disorders and either of the 2 other diagnostic groups was 53.7% ($n = 36/67$). For ADHD disorders, the comorbidity with the 2 other diagnostic groups was 67.9% ($n = 36/53$), whereas the comorbidity rate between Behavioural disorders and the 2 other groups was 71.7% ($n = 43/60$).

Of the 54 children with RAD diagnoses, a total of 70% (38/54) had at least one comorbid disorder. The comorbidity rate between RAD and the 3 main diagnostic groups was 68.5% (37/54). Thus, only 1 of the children with RAD had a comorbid disorder outside of the 3 main diagnostic groups.

The logistic regression analyses showed that all of the associations between the 3 main diagnostic groups and RAD were significant, except between RAD and ADHD disorders (OR 1.89, CI 0.95–3.77; $p = 0.070$). See Table 3 for details.

Logistic regression analyses run separately for boys and girls, showed that the association between ADHD disorders and Emotional disorders was significant in boys (OR 3.83, CI 1.66–8.87; $p = 0.002$) but not in girls (OR 1.85, CI 0.67–5.08; $p = 0.235$). Furthermore, the association between ADHD disorders and Behavioural disorders was almost twice as high for boys (OR 10.18, CI

Table 2 Point prevalence of DSM-IV disorders in foster children (N = 279)

DSM-IV Disorder ^a	n	%	95% CI
Any disorder	142	50.9	[45.2, 57.0]
Emotional disorders	67	24.0	[19.0, 29.4]
Separation anxiety disorder	21	7.5	[4.7, 10.8]
Specific phobia	19	6.8	[3.9, 9.7]
Social phobia	3	1.1	[0.0, 2.5]
Posttraumatic stress disorder	14	5.0	[2.5, 7.9]
Obsessive compulsive disorder	1	0.4	[0.0, 1.1]
Generalized anxiety	7	2.5	[1.1, 4.7]
Other anxiety	17	6.1	[3.2, 8.6]
Major depression	3	1.1	[0.0, 2.5]
Other depression	8	2.9	[1.1, 5.0]
Undifferentiated Anxiety/Depression	6	2.2	[0.7, 3.9]
ADHD disorders	53	19.0	[14.7, 24.0]
ADHD Combined	38	13.6	[10.0, 17.9]
ADHD Inattentive	8	2.9	[1.1, 5.0]
ADHD Hyperactive-impulsive	5	1.8	[0.4, 3.6]
Other Hyperactivity NOS	2	0.7	[0.0, 1.8]
Behavioral disorders	60	21.5	[16.8, 26.2]
Oppositional defiant disorder	39	14.0	[10.3, 18.3]
Conduct disorder	18	6.5	[3.6, 9.3]
Other disruptive disorder NOS	3	1.1	[0.0, 2.2]
Reactive attachment disorder	54	19.4	[15.1, 24.0]
Pervasive developmental disorder	12	4.3	[2.2, 6.8]
Tic disorder	6	2.1	[0.7, 3.9]
"Not otherwise specified" disorders	24	8.6	[5.7, 12.2]

^aNo children met criteria for Panic disorder, Agoraphobia, Selective mutism, or Eating disorders.

4.12–25.20, $p < 0.001$) than for girls (OR 5.41, CI 2.03–14.46; $p = 0.001$), while the association between Behavioural disorders and RAD showed the opposite tendency, with girls having triple the risk of boys (OR 12.40, CI 4.60–33.46; $p < 0.001$) for comorbidity between the 2 disorders (OR 4.23, CI 1.79–10.01; $p < 0.001$).

Risk factors

The unadjusted and adjusted associations between risk factors and disorders are presented in Table 4. In the

unadjusted model, older child age decreased the risk of RAD. After controlling for the other risk factors in the adjusted model, however, this association disappeared. Logistic regression analysis, entering 1 of the other 4 predictors at the same time as age, showed that when controlling for Number of placements, the association between age and RAD became significant. Thus, the effect of age on RAD seemed to be mediated by the number of placements, and age in itself was not a risk factor for RAD.

Younger age at first placement increased the risk of ADHD disorders, both in the unadjusted and adjusted analyses.

The number of placements was associated with both RAD and ADHD in unadjusted and adjusted analyses but with opposite effects: A higher number of placements were associated with RAD, whereas lower number of placements was associated with ADHD.

Serious neglect was associated with Behavioural disorders, but only in the adjusted analysis. A backward stepwise (Wald) logistic regression analysis indicated that Violence exposure had a suppressor effect on the association between Serious neglect and Behavioural disorders. After controlling for Violence exposure, Serious neglect increased the risk for Behavioural disorders.

Violence exposure increased the risk for Behavioural disorders and RAD, both in unadjusted and adjusted analyses. Furthermore, Violence exposure also increased the risk of ADHD, but only after controlling for all of the other risk factors in the adjusted model. A backward stepwise (Wald) logistic regression analysis indicated that Age at first placement and Number of placements acted as suppressors on the relationship between Violence exposure and ADHD. After controlling for these 2 risk factors, Violence exposure increased the risk for ADHD.

None of the included predictors was related to the Emotional disorders or Any disorders groups.

Discussion

Prevalence of mental disorders

Our findings clearly indicate that foster children constitute a high-risk group for a variety of mental disorders. Our point-prevalence of 50.9% was high, compared to the recent 33.0–38.6% range reported by US and British studies [14,16], and it was closer to the 66.0% rate recently

Table 3 Odds ratio (and 95% Confidence Interval) for comorbid DSM-IV disorders (N = 279)

	Emotional			ADHD			Behavioral		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
ADHD	2.85	[1.51, 5.39]	.001						
Behavioral	4.46	[2.41, 8.24]	.000	7.60	[3.93, 14.71]	.000			
RAD	3.05	[1.62, 5.74]	.001	1.89	[0.95, 3.77]	.070	6.50	[3.39, 12.67]	.000

Table 4 Unadjusted and adjusted binary logistic regression analyses of associations between risk factors and disorders (n = 219)

Risk factor	Any disorder		Emotional disorders		ADHD disorders		Behavioral disorders		RAD	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age										
Unadjusted	0.99	[0.88, 1.11]	1.06	[0.93, 1.22]	1.07	[0.93, 1.25]	1.01	[0.88, 1.16]	0.81	[0.70, 0.95]**
Adjusted	1.01	[0.88, 1.16]	1.08	[0.92, 1.27]	1.18	[0.98, 1.42]	1.03	[0.86, 1.23]	0.84	[0.70, 1.02]
Age at first placement										
Unadjusted	0.97	[0.89, 1.07]	1.06	[0.96, 1.17]	0.84	[0.73, 0.96]**	0.97	[0.87, 1.08]	0.99	[0.89, 1.11]
Adjusted	0.97	[0.87, 1.07]	1.07	[0.96, 1.20]	0.76	[0.64, 0.89]***	0.88	[0.77, 1.02]	1.00	[0.87, 1.15]
Number of placements										
Unadjusted	0.92	[0.67, 1.25]	1.05	[0.74, 1.50]	0.38	[0.21, 0.67]***	1.26	[0.88, 1.81]	1.55	[1.08, 2.22]*
Adjusted	0.91	[0.66-1.26]	1.13	[0.78, 1.63]	0.30	[0.16, 0.58]***	1.27	[0.86, 1.87]	1.56	[1.06, 2.29]*
Serious neglect										
Unadjusted	0.82	[0.38, 1.79]	0.75	[0.32, 1.75]	0.48	[0.20, 1.13]	4.10	[0.94, 18.00]	1.30	[0.47, 3.62]
Adjusted	0.84	[0.38, 1.84]	0.70	[0.29, 1.66]	0.45	[0.17, 1.20]	5.33	[1.18, 24.20]*	1.53	[0.52, 4.48]
Violence exposure										
Unadjusted	1.05	[0.86, 1.30]	0.95	[0.74, 1.21]	1.06	[0.88, 1.37]	1.35	[1.08, 1.70]**	1.34	[1.06, 1.70]**
Adjusted	1.05	[0.83, 1.32]	0.86	[0.65, 1.13]	1.48	[1.08, 2.05]*	1.64	[1.23, 2.18]***	1.40	[1.06, 1.83]*

OR = odds ratio; CI = Confidence interval; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Significant results are highlighted in bold.

reported for children referred to by specialist mental health services in Norway [47].

Although different diagnostic measurements were used in this study (DAWBA) and in the previous study from the US (DISC) [14], this difference probably does not explain the high prevalence reported here, because DAWBA actually generated lower rates in a direct comparison study that included these 2 measurements [48]. The high prevalence can also not fully be explained by the inclusion of RAD among the diagnoses assessed, because RAD contributed to only 6.1% of the total prevalence in the study sample.

Regarding the main diagnostic groups, the prevalence of ADHD disorders, Behavioural disorders, and Emotional disorders was nearly 10 times greater than what has been reported in epidemiological studies of Norwegian children [32,49]. These 3 main diagnostic groups had fairly equal rates of prevalence in our sample, contrasting the findings from the study of Ford et al. [16], in which Behavioural disorders (32.3%) were more than 3 times more frequent than Emotional disorders (9.7%) and Hyperkinetic disorders (8.5%) [16]. In community samples of children, Behavioural disorders have been found to be more prevalent in the UK than in Norway [50]. One might speculate whether Norwegian children react with more emotional symptoms as a response to neglect and abuse, while British children respond with a stronger tendency to act out. It is also possible that differences in the values, theoretical models and training provided to new foster parents makes Norwegian foster

parents more sensitised to emotional symptoms in their foster children than British foster parents.

Our estimated RAD prevalence lies between the prevalence estimate found in a large sample of 6- to 8-year-old, socioeconomically deprived children [51], and the prevalence in severely maltreated toddlers in foster care [52]. Compared to another study on RAD using DAWBA in high-risk foster youths [29], our estimate was quite moderate. Comparisons are difficult, however, due to differences in the criteria used and the sample compositions. Although the overlap between RAD and the other 3 main diagnostic groups was high (68.5%), RAD did not stand out as a disorder with particularly high comorbidity in our study. Thus, our findings contribute to the understanding of RAD among school-aged foster children without institutional backgrounds. However, our present findings should be interpreted with caution and should be validated in other studies including other measurements for assessing RAD.

Comorbidity among the main diagnostic groups

In the present study, the overall comorbidity among the 3 main diagnostic groups — Emotional disorders, ADHD disorders and Behavioural disorders (43.4%) — was approximately twice as high as that reported for Norwegian children in general [32], and it was even higher than in children referred to specialist mental health services [47]. The high exposure to a broad range of risk factors might, to some extent, explain the differences in comorbidity between foster children and

children referred to mental health clinics in general. On average, the children in our study had been exposed to 3 different adverse childhood experiences in their families of origin. Our findings indicate a somewhat different pattern of comorbidity depending on sex, with girls showing a strong overlap between Behavioural disorders and RAD, whereas boys with Behavioural disorders were more likely to have ADHD disorders; however, this difference should be interpreted with caution, due to the small sample size and wide confidence intervals.

Overall, our findings regarding comorbidity highlight the importance of broad assessment approaches covering a wide range of mental health problems to tailor the services addressing the complex symptoms and problem patterns seen among foster children. A recent multilevel meta-analysis on the effects of evidence based treatments, compared to care as usual, indicated that for children and youths with complex, diagnosed disorders, the fixed manual-based treatment had low or non-significant effect sizes [53]. This finding supports the need for treatment planning to be flexible and individually tailored for this high-risk group of children.

Predictors of mental disorders

It is noteworthy that risk factors only showed associations with externalising and not internalising disorders. Because the Emotional disorders diagnostic group consisted of a total of 10 different single disorders (see Table 2), compared to 3-4 disorders in the two other main diagnostic groups, one could speculate that the former group was too heterogeneous to yield significant results in the analyses of risk factors. However, separate analyses for the two most frequent disorders within the group of Emotional disorders — Separation anxiety and PTSD — yielded the same negative results, indicating that diagnostic heterogeneity cannot explain why Emotional disorders proved to be unrelated to the present risk factors. A recent review of family factors in the development of anxiety disorders concluded that both sexual and physical abuse during childhood appeared to be less strongly linked with anxiety disorders than with other forms of psychopathology, whereas the risk of having an anxiety disorder increased if the parents had anxiety disorders themselves, or the relationship to the child was characterised by overprotection and control [54]. Thus, the content of the child welfare questionnaires might be less relevant for anxiety disorders.

In contrast to previous studies of foster youth [15,16,55] and of Norwegian children in general [32], sex was not related to the prevalence of mental disorders in this study. Our findings are in line with those of McMillen et al.'s study of foster youth [14]. An explanation might be that in samples of children with prolonged exposure to

multiple risk factors, the effect of sex will be less pronounced.

Finally, we did not find the increase we expected in mental disorders with increasing age [16]. This finding might be due to the relatively young age and small range of ages in our sample, for which all placements had occurred well before adolescence. Also, additional analysis showed that the association between age and RAD became insignificant when controlling for the number of placements, indicating that it is not age, as such, that is important but the effects of unstable and ruptured attachments.

Somewhat surprisingly, older age at first placement and a higher number of placements decreased the risk for ADHD disorders. This finding might be understood as an ecological correlation, as the temperamental and behavioural problems related to ADHD might increase the probability of parenting problems and thus contribute to early out-of-home placement. It could also be that foster children with ADHD receive more support and have greater access to special education and mental health services, contributing to more stable placements for this group of children. In Norway, it has been documented that children with ADHD disorders have better access to mental health services and special education, compared to children with emotional disorders [32].

Regarding the occurrence of adverse childhood experiences prior to foster placement, Serious neglect was the factor reported most often by the municipalities, with almost 9 out of 10 children having this experience in their family of origin. One might argue that with this very high baseline frequency, this factor lost its predictive power in this sample. Serious neglect was, however, related to an increased prevalence of Behavioural disorders, but only in the adjusted model, in which Violence exposure acted as a suppressor variable.

In our study, Exposure to violence in the family of origin stood out as the most pervasive risk factor for mental disorders, predicting an increased prevalence of 3 of the 4 diagnostic groups: ADHD disorders, Behavioural disorders, and RAD.

It is worth noting that the 4 items of violence exposure included in this factor describe threatening or abusive qualities of the caregiver's interactions with the child, in which the child's physical and psychological safety can be seen as endangered by those persons the child depends upon to feel loved and protected. In contrast, parental substance abuse and mental disorders were unrelated to any of diagnostic groups in our sample. Although we were not able to show direct associations between these parental problems and child mental health in this study, parental addiction and mental disorders often co-occur with parental behaviour placing the child's development in danger, and cannot be ruled out

as important risk factors for child development on basis of this study.

Strengths and limitations

The relatively high overall response rate supports the validity of our findings, although participation bias cannot be ruled out. In other surveys, non-participants have been found to be at higher risk for mental disorders [32], and our estimates might therefore be considered conservative. General strengths of online interviews include ease of participation (not needing to travel or take time off from work for parents), the possibility for obtaining detailed information from multiple informants, and more valid responses to sensitive questions, compared to face-to-face interviews [56]. An obvious strength of the present study was that the information about risk factors and the diagnostic information came from different and independent sources and thus were blinded to each other.

Some of the informants completed only parts of the DAWBA. This limitation might have led to underreporting of disorders. However, according to a recent report from Goodman [57], the completion rate in the present study seemed to be in line with other studies using the DAWBA in epidemiological research. According to Goodman [57], informants primarily completed the sections they identified as relevant to their children and skipped other sections. The high prevalence rate in our study might indicate that foster parents and teachers completed sections that they saw as relevant to the child.

The informants in this study were foster parents and teachers, who are usually aware of the high-risk backgrounds of the children. This fact might have sensitised the informants to look for problems and symptoms in the child, as they know the child has been subjected to neglect and abuse, thus contributing to the high prevalence in this study. However, such an overestimate should then also have been the case for the study of British foster children [16], and it would not explain the discrepancy between the prevalence in these 2 samples.

The present study was based on cross-sectional data, in which placement for at least 5 months was one of the inclusion criteria. The sample might therefore include a disproportionate number of children with long-term placements. In the Norwegian context, this group primarily consists of children with the most severe reasons for placement and thereby represents a high-risk group of foster children. In contrast, national register data indicate that children placed before the age of 13 years old, as in our sample, tend to fare better than those with later out-of-home placements [58]. The young age of the sample might therefore have contributed to a moderate prevalence, which might have been higher had adolescents been included.

Although mean duration of stay in the current foster home was 5.8 years, 23.5% of the children had stayed between five months and two years in their current foster home. In some instances therefore, the foster parents may have limited ability to accurately describe behaviour and emotional development of the child in the DAWBA interview.

Another limitation is the lack of self-report from foster children. This may have led to underreporting of emotional disorders, as they may not be as readily observable by others as behavioural disorders. Further, the study did not include assessment through clinical observation of the children themselves. Still, given the children's young age and being in a vulnerable position due to problems and conflicts leading to out of home placement, we decided not to interview the children in the study, nor require them to take part in a setting that allowed for direct clinical observation through experts in the area of mental health.

Our study is the first to report on the prevalence of RAD using DAWBA in a sample of school-aged foster children. The fit between the items in the DAWBA RAD section and the DSM-IV criteria has not yet been firmly established. Further studies using this section of the DAWBA are needed to confirm the validity of our findings.

Clinical implications

Findings have indicated that Norway has a relatively low overall prevalence of child mental disorders [32]. The high prevalence observed in the present study could indicate that the Norwegian welfare-oriented and supportive socioeconomic structure does not offer general buffering effects to this group of children. In contrast, some specific characteristics of the Norwegian child welfare legislation and policies might inadvertently contribute to this high prevalence [3]. Contrary to many other western societies, The Norwegian child welfare-services are not divided into two discrete family-oriented and child-protective services. The child welfare services in Norway, while unifying these two mandates, have traditionally been a distinctly family-oriented service, aiming to support families at risk through preventive and therapeutic programs. Legislation has given priority to interventions within the family before placements out of home are considered. The present study indicates that this family-oriented, partnership approach might need balancing with a stronger child-protection focus, due to the documented detrimental consequences of prolonged exposure to abuse and neglect for the children's health and development.

Our findings could also shed some light on the reasons for the observed poor effects of traditional mental health services on foster children [59]. High comorbidity and

prolonged exposure to a broad range of adverse childhood experiences that are less common among children regularly referred to mental health services might require more specialised mental health services, which are tailored to meet the emotional and practical needs of foster children and their caregivers.

Conclusions

Our results demonstrated a high prevalence of mental disorders in school-aged foster children, as well as a high rate of comorbidity. The findings also indicated strong associations between indicators of early deficits in care, placement history, and mental disorders. With one in two foster children having a mental disorder; the findings highlight the need for a thorough mental health assessment when a child is placed out of his or her home. To reduce children's prolonged exposure to adverse childhood experiences, a more child-oriented child welfare policy might need to be considered in Norway.

Competing interests statement

On behalf of all authors, the corresponding author declares that they have no competing interests.

Authors' contributions

SL was responsible for the design of the study, data collection, rating the data, statistical analysis, and manuscript writing. OEH participated in the design of the study, statistical analysis, and commented on the written drafts. TH participated in the design of the study, and commented on the written drafts. ERH participated in the design of the study, rating of data, and commented on the written drafts. All authors read and approved the final manuscript.

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Screening Foster Children for Mental Disorders: Properties of the Strengths and Difficulties Questionnaire

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Abstract

Background: High prevalence of mental disorders among foster children highlight the need to examine the mental health of children placed out of home. We examined the properties of the Strengths and Difficulties Questionnaire (SDQ) in screening school-aged foster children for mental disorders.

Methods: Foster parents and teachers of 279 foster children completed the SDQ and the diagnostic interview Developmental and Well-Being Assessment (DAWBA). Using the diagnoses derived from the DAWBA as the standard, we examined the performance of the SDQ scales as dimensional measures of mental health problems using receiver operating characteristic (ROC) analyses. Recommended cut-off scores were derived from ROC coordinates. The SDQ predictive algorithms were also examined.

Results: ROC analyses supported the screening properties of the SDQ Total difficulties and Impact scores (AUC = 0.80–0.83). Logistic regression analyses showed that the prevalence of mental disorders increased linearly with higher SDQ Total difficulties scores ($X^2 = 121.47$, $df = 13$, $p < .001$) and Impact scores ($X^2 = 69.93$, $df = 6$, $p < .001$). Our results indicated that there is an additive value of combining the scores from the Total difficulties and Impact scales, where scores above cut-off on any of the two scales predicted disorders with high sensitivity (89.1%), but moderate specificity (62.1%). Scores above cut-off on both scales yielded somewhat lower sensitivity (73.4%), but higher specificity (81.1%). The SDQ multi-informant algorithm showed low discriminative ability for the main diagnostic categories, with an exception being the SDQ Conduct subscale, which accurately predicted the absence of behavioural disorders (LHR = 0.00).

Conclusions: The results support the use of the SDQ Total difficulties and Impact scales when screening foster children for mental health problems. Cut-off values for both scales are suggested. The SDQ multi-informant algorithms are not recommended for mental health screening of foster children in Norway.

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Introduction

The high prevalence and comorbidity of mental disorders in foster children [1–3] highlight the need to examine the mental health of children entering foster homes. However, child welfare services often have limited competence and resources for conducting in-depth assessments of mental health. Therefore, shorter screening tools may be useful as a first step in identifying children in need of further specialised assessments. We examined the screening properties of the Strengths and Difficulties Questionnaire (SDQ) [4] with a sample of school-aged foster children in Norway.

The SDQ is a brief mental health questionnaire measuring symptoms and impairments in the child's daily life. Both a Total difficulties scale and an Impact scale may be considered

dimensional measures of mental health [5]. Used this way, the SDQ Total difficulties score has shown good predictive ability in community samples in Britain ($n = 18,415$, of whom 983 had a mental disorder) [5], Sweden ($n = 478$, of whom 221 were clinical cases) [6], and the US ($n = 1,0367$, where 9% were high scorers) [7], and in British looked-after children ($n = 1391$, of whom 38.6% had a mental disorder) [8]. The Impact score has also been found to be a strong predictor of mental disorders in community samples ($n = 4,479$, where 7% had a mental disorder) [9], service use in child welfare samples ($n = 292$, where 29% of these had contact with mental health care) [10], and to discriminate well between a community ($n = 467$) and clinical sample ($n = 232$) [11].

By combining the SDQ Symptom scores and the Impact score from different informants, multi-informant algorithms have been developed to estimate the probability that a child has a mental

disorder [12]. In Britain, these algorithms have demonstrated acceptable levels of accuracy when predicting the type of disorder in a clinical sample ($n = 101$, of whom 74% had a mental disorder) [12], and in a sample of looked-after children with mental disorders ($n = 539$) [13]. In a community sample, these algorithms adequately discriminated between children with ($n = 698$) and without ($n = 2,286$) mental disorders, but were not suitable to discriminate between specific types of disorders [14]. In Norway, the algorithms have shown high sensitivity and specificity when screening children with chronic physical illness ($n = 559$, 11% high scorers) for Any mental disorder and disorder subtype [15]. However, this finding has not been confirmed in youth who have been referred to community mental health services ($n = 286$, of whom 66% had a mental disorder) in Norway [16].

R. Goodman, Renfrew, et al. [12] state that (the SDQ) “algorithms are... likely to work best in the sample on which they are developed” (p. 130); therefore, it is important to study the SDQ predictive algorithms in the settings in which they are to be used [17]. According to Goodman and Scott [18], the rather narrow range of problems measured by the SDQ limits its suitability in samples with broad psychopathology and high comorbidity. However, the SDQ is currently implemented as part of the annual follow-up of looked-after children in Britain [8]. Given that populations and child welfare systems differ substantially across societies [19], there is a need to examine the screening properties of the SDQ with foster children outside of Britain.

The present study examined the screening properties of the SDQ for categories of mental disorders in school-aged foster children in Norway. The following research questions were addressed: How well do the Total difficulties scale and the Impact scale discriminate between foster children with and without mental disorders? Can optimal cut-off values for use of the SDQ with foster children be recommended? Do the SDQ scales have equal validity across the full continuum of severity? Previous studies have demonstrated good predictive values for both the Total difficulties scale and the Impact scale, yet these scales have always been analysed separately. Will a combination of scores from the Total difficulties scale and the Impact scale yield additional predictive value? How accurate are the UK-based multi-informant algorithms for predicting mental disorders in foster children in Norway?

Methods

Measures

The SDQ is a 25-item mental health questionnaire for 3- to 16-year-olds that may be completed by parents and teachers, and as a self-report beginning at the age of 11 years [20]. The SDQ, originally developed in English, is currently available for downloading in 75 authorized translations from its official website run by Youthinmind (<http://www.sdqinfo.org/>). The SDQ consists of a prosocial subscale, a peer problems subscale and three symptom subscales, measuring Emotional symptoms, Conduct problems and Hyperactivity-Inattention symptoms. Each subscale consists of five items that are rated on a scale (0–1–2), providing a total score range of 0–10. A Total difficulties score is computed by summing the three symptom and the peer problem subscales, giving a total score ranging from 0–40. The two-page version of the SDQ also includes an Impact scale, measuring distress to the child and the interference of symptoms and problems in the child’s daily life [11]. The parent version of the Impact scale consists of 5 items, providing a total score range of 0–10, whereas the teacher version consists of 3 items, providing a total score range of 0–6. In a recent review of 18 studies

concerning the psychometric properties of the SDQ [21], the SDQ was found to have a satisfactory internal consistency, test-retest reliability and inter rater agreement. The current five factor structure was supported by 15 of the 18 reviewed studies, two of these 15 studies presenting data from Norwegian community samples.

The multi-informant algorithms combine scores from the three SDQ symptom subscales and the Impact scale when these scales have been completed by at least two types of informants [12]. The algorithms estimate the following probabilities for the presence of a disorder: Unlikely, Possible and Probable. Independent estimates are provided for Emotional, Behavioural and Hyperactivity-Inattention disorders, and an overall estimate is provided for Any mental disorder.

The DAWBA [22] is a structured interview for the diagnostic assessment of mental disorders that may be rated according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [23], or the International Classification of Diseases (ICD-10) [24]. The DAWBA may be completed by parents or caregivers, and children can complete it themselves beginning at the age of 11. There is also a shorter teacher version. Trained clinicians rate the interviews after reviewing all of the information from the informants, which is presented through a separate scoring program. The DAWBA adequately discriminates between children from community and clinical settings [22] and generates realistic prevalence estimates for mental disorders when used in public health services [25,26]. The SDQ has been validated against the DAWBA in a number of studies [5,8,9,13–17].

Procedure

The data collection started on September 1st 2011, and lasted until the end of February 2012. In this prospective study, eligible participants were foster children between the age of 6 and 12 years who had lived for at least 5 months in foster homes in the 63 municipalities encompassed by the Southern Regional Office for Children Youth and Family Affairs (BUFETAT), following legally mandated placement. According to the central register of BUFETAT, a total of 391 children were eligible in the 63 municipalities. Information letters were sent to the head of each municipal child welfare office. The office heads were asked to review the list of foster children from the central register, and add potentially eligible children, if any; to those in the register. This search process identified 28 additional eligible children. Twenty children who had been returned to biological families or who had been adopted were removed from the list. Another three children were deemed ineligible because of serious neurological disabilities. The final number of eligible children was therefore 396. The municipal child welfare offices were asked to provide contact information for schools and teachers of these children.

Foster parents received a postal letter with detailed information about the study, and instructions on how to complete the SDQ and DAWBA interview online. They were also asked to return contact information for the children’s school and teacher. In total, contact information was obtained for 307 teachers, who were then contacted by postal mail and asked to complete SDQ and DAWBA interview online. The data collection is illustrated in figure 1.

The first and second authors, both specialists in child mental health, rated the DAWBA according to the DSM-IV criteria [23] and were blind to the SDQ scores. All available DAWBA information from both foster parents and teachers were used in the diagnostic assessment. For the present analyses, mental disorders were grouped into the following categories: Any mental disorder (includes all diagnoses), Emotional (i.e., Depression and Anxiety),

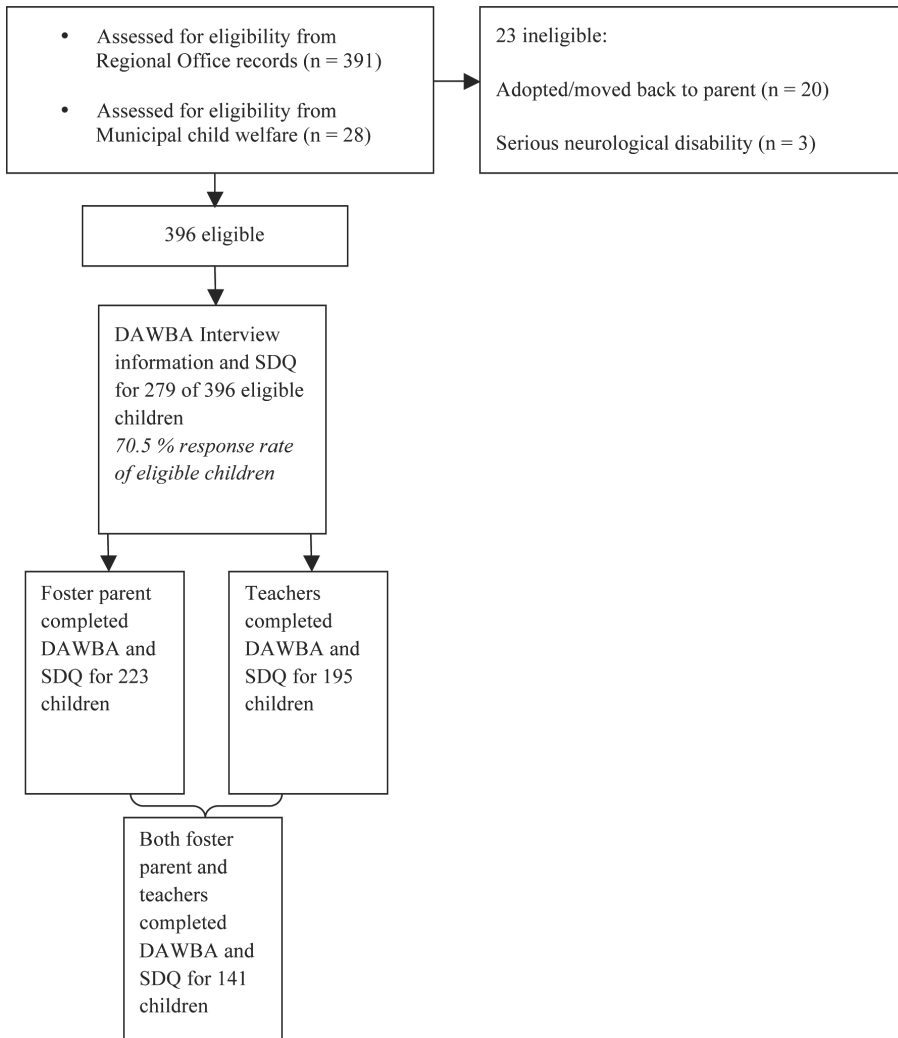


Figure 1. Flow chart of data collection.
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Behavioural (i.e., Conduct and Oppositional Defiant disorders) and Attention Deficit/Hyperactive disorders (ADHD). Further details regarding diagnostic ratings are reported in Lehmann et al. [3].

Ethics

The Regional Committee for Medical and Health Research Ethics for West Norway approved this study. In accordance with Norwegian ethics requirements, assent was obtained from children who were at least 12 years old. According to Norwegian legislation, foster parents do not have the mandate to consent on behalf of their foster children. The study were therefore reviewed by the Ministry of Children, Equality and Integration, who

provided caseworkers, foster parents and teachers with exemption from confidentiality for the current study. The study is reported in compliance with the STARD guidelines [27].

Study Sample

The study sample, hereafter referred to as the “All data” sample comprised 279 of 396 eligible children (70.5%), such that at least one informant, i.e. a foster parent or teacher, had completed the SDQ and DAWBA.

Analyses of the SDQ Total difficulties scale showed similar predictive values for foster fathers ($n = 103$: AUROC = .86, $p < 0.001$, 95% CI .79–.93) and foster mothers ($n = 201$: AUROC = .84, $p < 0.001$, 95% CI .78–.89). Therefore, we

combined foster fathers and foster mothers into one group of informants, hereafter referred to as the “caregivers” ($n = 223$), prioritizing information from the foster mothers when available.

For the multi-informant algorithms, we used data from a subset of children who had their SDQs completed by caregivers and teachers ($n = 141$), hereafter referred to as the “Two informants” sample.

Statistical Analysis

We used SPSS version 19 for Windows for data analyses, with the exception of the receiver operating characteristic (ROC) analyses, which were conducted using STATA 12.

The Total Difficulties and Impact scales. We conducted ROC analyses on the Total difficulties scale, the three symptom subscales and the Impact scale. Area under the receiver operating characteristics (AUROC) values were estimated for the scores reported by caregivers ($n = 223$) and by teachers ($n = 195$) separately.

The association between the SDQ scale scores and Any mental disorder were analysed by two separate logistic regression analyses using different definitions of the scales. In the first analysis, we estimated the relative increase in the prevalence of Any mental disorder with increasing scores on the Total difficulties and Impact scales. As in a previous study of SDQ as a dimensional measure [5], the scores from both SDQ scales were recoded into broader score categories in order to prevent unstable estimates due to the small number of children, i.e., $n < 10$; at some scale scores. For the Total difficulties scale, scores 0 to 3 were collapsed into one single category “0–3”. For the SDQ score from 4–25, two and two SDQ scores were combined – e.g., scores 4 and 5 into “4–5”, 6 and 7 into “6–7” and so on. Scores from 26 and higher were recoded into “26+”. The original 40 steps in the scale were thus reduced to 13 categories. The same procedure was used for the Impact scale: Scores 0–10 were recoded into 6 categories, starting with 0, and then values 1 and 2 were collapsed into one category “1–2” and so on. In a second logistic regression analysis, the Total difficulties and Impact scales were treated as continuous variables in order to obtain Odds Ratios (OR) for mental disorders, as a consequence of a single step increase in the scales. We did run logistic regression analyses both for the recoded version and the original version of the scales.

Coordinates of the ROC curves were used to select optimal cut-off values for the Total difficulties and Impact scales. We calculated Sensitivity and Specificity, together with Positive and Negative predictive values. As these measures are dependent on the prevalence of disorder in the sample [28], we also calculated likelihood ratios (LHR), to express the probability that more children with a disorder would test positive relative to those without a disorder [29]. For more details regarding the use of LHR estimates, see Fisher et al [30], McGee [31], and Marasco, Doerfler and Roschier [32]. Predictive values were interpreted with use of Bayes theorem nomogram [33]. The added value of combining the Total difficulties and Impact scales was examined using logistic regression analyses.

Probabilities based on the multi-informant algorithms. Chi-square analyses were used to estimate the goodness of fit between the three probability levels derived from the multi-informant algorithms, and the prevalence of mental disorders. The three probability levels were then dichotomised into a conservative “Probable” cut-off level and a more liberal “Possible” cut-off level for receiving a positive test result. As for the Total difficulties and Impact scales, predictive values for the algorithms were estimated for the two cut-off levels separately.

Results

For the “All data” sample ($N = 279$), the mean age of children was 9.0 years ($SD 2.0$), with 47.0% being female. As described in a previous report [3], 50.9% ($n = 142$) of the sample had one or more DSM-IV disorders, in the following categories: Emotional (24.0%), Behavioural (21.5%), ADHD (19.0%) and Reactive attachment disorders (RAD) (19.4%). The comorbidity rate was high with 63.4% of children with disorders having more than one mental disorder.

In the sub sample used to calculate accuracy for carer completed SDQs ($n = 223$), the prevalence of any disorder was 57.4%. In the subsample used to calculate accuracy for teacher completed SDQs, the prevalence of any disorder was 48.7%.

In the “Two informants” sample ($n = 141$), the prevalence of any disorder was 47.5%. The caregivers reported a mean SDQ Total difficulties score of 14.7 ($SD 7.8$), whereas the teachers reported a mean of 11.9 ($SD 7.2$, $t = 4.8$, $df = 140$, $p < .001$). The mean SDQ Impact score was 2.8 ($SD 2.8$) for the caregiver reports, and 1.8 ($SD 1.9$) for the teacher reports. As the Impact scale for foster parents comprised more items (5 vs 3 items) than the Impact scale for teachers, statistical analysis of the difference in mean score for the two samples could not be performed. No significant differences were evident between the “All data” and “Two informant” samples regarding age, gender, SDQ Total difficulties score or DAWBA disorder prevalence (results not shown).

AUROC and Dimensional Properties of the Total Difficulties and Impact Scales

The Total difficulties and Impact scores predicted the presence of disorders at greater than chance rates for both groups of informants (Table 1). For these scales, the results indicate excellent accuracy for caregivers and acceptable accuracy for teachers, according to criteria suggested by Hosmer Jr et al. [34]. Overall, the predictive values for the three SDQ subscale scores were comparable to those for the Total difficulties and Impact scores. Figure 2 displays the ROC curve for the Total Difficulties and Impact scales completed by caregivers ($n = 223$).

The level of agreement between the increase in recoded Total difficulties scores and the increase in prevalence of mental disorders was strong ($X^2 = 121.47$, Kendall’s tau-b.47, $df = 13$, $p < .001$) for the “All data” sample, as illustrated in Figure 3. The recoded scores of “10–11” and “16–17” represented a break in the linear trend.

An increase in the recoded carer completed SDQ Impact scores corresponded to an increased prevalence of Any mental disorder ($X^2 = 69.93$, Kendall’s tau-b.46 $df = 6$, $p < .001$) (Figure 4).

In the logistic regression analyses, the Total difficulties scale and the Impact scale was entered as continuous scales to estimate the ORs for the risk for Any mental disorder related to one step increase on the relevant scale. The ORs were nearly identical for the recoded and original scale versions: Total difficulties scale: recoded: OR = 1.24 (95% CI 1.18–1.30), original: OR = 1.23 (95% CI 1.17–1.29). The Impact scale: recoded: OR = 1.68 (95% CI 1.42–1.98), original: OR = 1.69 (95% CI 1.44–1.98).

Cut-Off Values for the Total Difficulties and Impact Scales

Table 2 presents the sensitivities and specificities of the different Total difficulties scores, which were derived from the ROC analysis. Given equal weight to specificity and sensitivity, a cut-off score of 13 is optimal for both caregivers (82.8% sensitivity, 73.7% specificity) and teachers (86.4% sensitivity, 77.3% specificity).

Table 3 presents the sensitivities and specificities of the different Impact scale scores, which were derived from the ROC analysis.

Table 1. Area Under the Receiver Operating Curve for SDQ Scales.

SDQ scales on DAWBA diagnostic groups	Caregiver SDQ (n = 223)	Teacher SDQ (n = 195)
	AUROC 95% CI	AUROC 95% CI
Total difficulties on Any disorder	.83 [.78, .88]	.77 [.71, .86]
Impact on Any disorder	.80 [.75, .86]	.75 [.68, .82]
Emotional subscale on Emotional disorder	.82 [.76, .88]	.74 [.66, .82]
Conduct subscale on Behavioral disorder	.89 [.84, .93]	.86 [.80, .93]
Hyperactive subscale on ADHD	.81 [.74, .87]	.80 [.72, .87]

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Given equal weight to specificity and sensitivity, a cut-off score of 2 (80.0% sensitivity, 70.0% specificity) is suggested for caregiver’s SDQ whereas a cut-off score of 1 (77.9% sensitivity, 67.0% specificity) is optimal for teacher’s SDQ.

AUROC values revealed overlapping confidence intervals for males and females, and the coordinates for the curves indicated similar cut-off points across genders.

Table 4 illustrates the distribution of cases and non-cases for test positives and test negatives according to the recommended cut-offs, for carer completed SDQ and teacher completed SDQ respectively.

As shown in table 5, we estimated the possible additive value of combining the Total difficulties and the Impact scales when

interpreting the SDQ reports, using the recommended cut-off scores for both scales on SDQs completed by caregivers. With foster children scoring below the suggested cut-offs on both scales serving as a reference group, a score above the cut-off on either of the two scales increased the risk for Any mental disorder (adjusted OR 4.70, 95% CI 1.98–11.10, $p < .001$), predicting Any mental disorder with 89.1% sensitivity and 62.1% specificity. Scores above the cut-offs on both scales predicted Any mental disorder with 73.4% sensitivity and 81.1% specificity. Post-hoc tests revealed a significant increase in the risk for Any mental disorder for children who scored above the cut-offs on both scales compared to those who scored above the cut-off on only one of the scales.

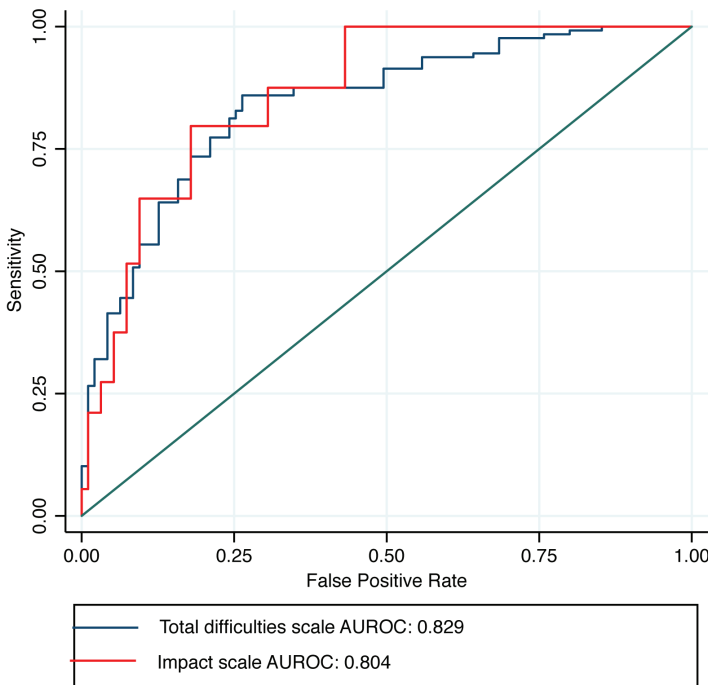


Figure 2. Receiver operating characteristics (ROC) curve for caregiver completed SDQ; Total difficulties scale and Impact scale (n = 223). AUROC = area under the curve. doi:10.1371/journal.pone.0102134.g002

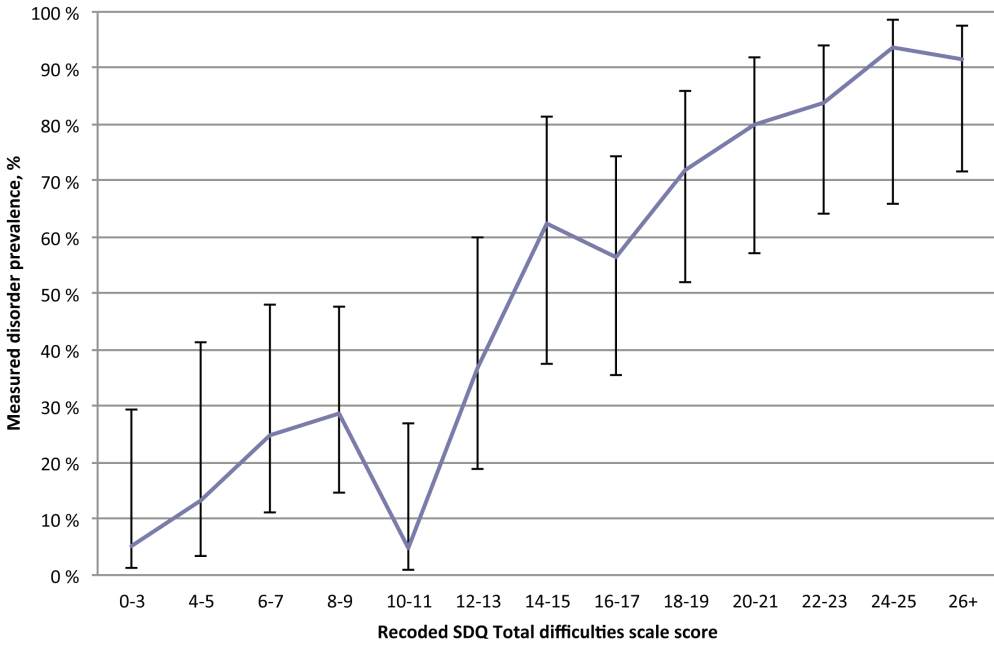


Figure 3. SDQ Total difficulties scale score and prevalence of mental disorders (95% CI) in foster children (N = 279).
doi:10.1371/journal.pone.0102134.g003

Table 6 shows the predictive values of recommended cut-offs for each scale of carer completed SDQs, separately and combined. The likelihood ratios indicate that a cut-off at 13 on the Total

difficulties score will increase the post-test probability of any disorder to 81.0%, from the pre-test probability of 57.4%. A negative test will decrease the post-test probability to 23.0%. The

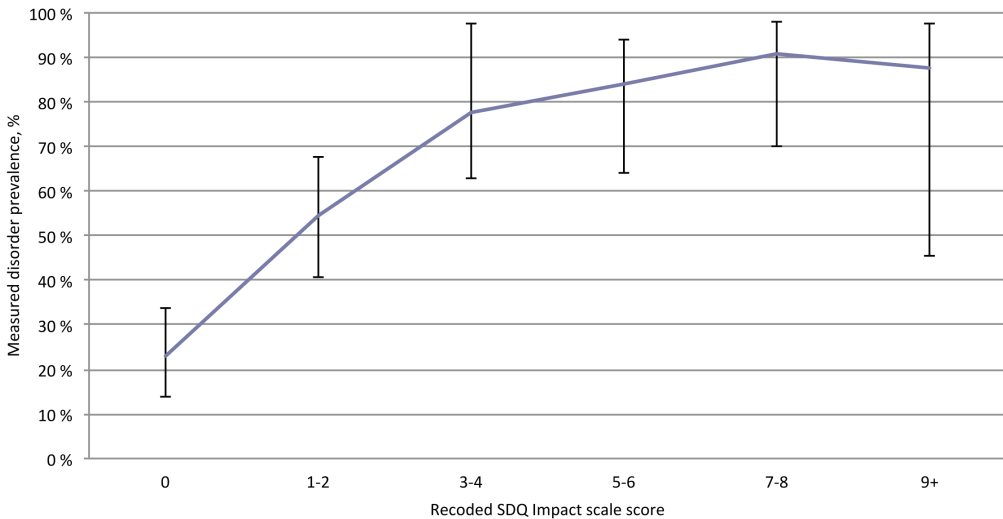


Figure 4. Caregivers SDQ Impact scale score and prevalence of mental disorders (95% CI) in foster children (n = 223).
doi:10.1371/journal.pone.0102134.g004

Table 2. Receiver Operating Characteristics Analyses for the SDQ Total Difficulties Scale.

Score	Any Mental disorder			
	Caregiver (n = 223)		Teacher (n = 195)	
	Sensitivity	Specificity	Sensitivity	Specificity
7	0.945	0.316	0.949	0.386
8	0.938	0.358	0.949	0.455
9	0.914	0.442	0.949	0.477
10	0.875	0.505	0.915	0.500
11	0.875	0.611	0.881	0.545
12	0.859	0.653	0.864	0.705
13	0.828	0.737	0.864	0.773
14	0.813	0.747	0.831	0.795
15	0.773	0.758	0.797	0.795

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predictive value of the Impact score was somewhat lower for test positive scores. Using the combination of Total difficulties and Impact score, scoring above cut-off on both scales will increase the post-test probability to 84.0%, but with a decreasing predictive value for negative tests to a post-test probability of 30.0%. By defining test positives as scoring above cut off on one of the scales, the probability of disorder will increase to only 76.0%, while test-negatives by will decrease their probability of disorder to 19.0%, from the pre-test probability of 57.4%.

The Multi-Informant Algorithms: Testing the Predictive Values of Two Different Cut-Off Scores

In the “Two informants” sample (n = 141), the multi-informant algorithm predicted that Any mental disorder was “Unlikely” for 32.3% of the children, “Possible” for 24.7% and “Probable” for 43.0%. The level of agreement between the SDQ algorithms’ results and the prevalence of Any mental disorder from DAWBA, as presented in table 7, was strong ($X^2 = 37.15$, Kendall’s tau-b = .49, 95% CI = .35–.62, $p < .001$). A similar level of agreement was observed for the algorithmic predictions derived from the three SDQ symptom subscales and their corresponding diagnostic categories. The agreement was strongest for Behavioural disorders ($X^2 = 46.87$, Kendall’s tau-b = .55, 95% CI = .44–.65, $p < .001$) and somewhat more moderate for ADHD disorders ($X^2 = 27.68$, Kendall’s tau-b = .37, 95% CI = .22–.51, $p < .001$) and Emotional disorders ($X^2 = 24.27$, Kendall’s tau-b = .39, 95% CI = .23–.54, $p < .001$).

Table 8 presents the accuracy of the algorithms in predicting the corresponding DAWBA diagnostic groups based on the two cut-offs “Probable” and “Possible”. Sensitivity was highest when the “Possible” cut-off was used. However, this cut-off had relatively low specificity. Using the stricter “Probable” cut-off for positive cases, sensitivity declined and specificity increased. Although this latter cut-off demonstrated sufficient ability to include only those children with a disorder, the relatively low sensitivity renders this cut-off level unsuitable for screening purposes.

Based on the LHR+ values, only the SDQ Emotional subscale with the “Probable” cut-off had the potential to identify emotional disorders without including too many false positives. Findings in a previous report [3] indicate that the pre-test probability of having an Emotional disorder is 24.0% for Norwegian foster children. An LHR+ value of 5.35 for the SDQ Emotional subscale signifies an increased post-test probability of disorder of 62.0% for Emotional disorders in children who scored above the cut-off. However, an LHR– value of 0.74 suggests that scoring below the cut-off decreases the probability of disorder only slightly, to a post-test probability of 19.0%.

Only the “Possible” cut-off for the Conduct subscale showed potential predictive usefulness, as no child scoring below this cut-off had Behavioural disorders, compared with a pre-test prevalence of 21.5%.

Table 3. Receiver Operating Characteristics Analyses for the SDQ Impact Scale.

Score	Any Mental disorder			
	Caregiver (n = 223)		Teacher (n = 195)	
	Sensitivity	Specificity	Sensitivity	Specificity
0	1	0.000	1	0.000
1	0.875	0.568	0.779	0.670
2	0.797	0.695	0.653	0.740
3	0.648	0.821	0.537	0.850

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Table 4. Children Scoring Under and Above Recommended Cut-offs, and Prevalence of Mental Disorders According to the DAWBA interview for Carer-completed SDQ (n = 223) and Teacher-completed SDQ (n = 195).

	Carer completed SDQ				Teacher completed SDQ			
	Any mental disorder				Any mental disorder			
	Yes	No	n	%	Yes	No	n	%
Low S	22	70	31.4	16.9	33	77	39.5	
High S	106	25	11.2	31.8	62	23	11.8	
Low I	26	66	29.6	10.8	21	57	29.2	
High I	102	29	13.0	37.9	74	43	22.1	

Low S = Below symptom cut-off; High S = Above symptom cut-off; Low I = Below impact cut-off; High I = Above impact cut-off.
doi:10.1371/journal.pone.0102134.t004

Discussion

The Total Difficulties and Impact Scales

The ability of the Total Difficulties and Impact scales to discriminate between children with and without Any disorder, according to the ROC analyses, is in the upper range compared to results from previous studies on SDQ used with school-aged children [21]. Furthermore, the AUROC for these two scales revealed discriminative ability superior to that reported for Norwegian pre-school children [35], especially as measured by the Impact scale. Examining an older age group with a higher prevalence of disorders may have contributed to the present findings for foster children compared to the pre-school community sample.

Our findings regarding the screening properties of the SDQ as a dimensional measure are generally consistent with previous reports with community samples [5,17], clinical samples [11] and looked-after children [8]. This suggests that the Total difficulties and Impact scales are appropriate for use across samples with different disorder prevalence rates. Our findings also suggest that SDQ used as a dimensional measure is valid across a continuum of severity and thereby suitable for screening purposes in foster children with a broad range of mental health problems.

One purpose of screening is to identify children who are in need of more in-depth mental health assessments. To aid in this decision, a cut-off value is often preferred. Here, the consequences of not detecting mental disorders must be weighed against the costs of extensive assessments of children who do not have a disorder. Although a cut-off of 13 on the carer-completed Total difficulties scale may provide the best balance between sensitivity and specificity, it is important to note that children with Total difficulties scores in the low range from 4 to 9 had a prevalence of disorders ranging between 13.0 and 29.0% (Figure 3).

In line with this finding, the high prevalence of mental disorders in foster children warrants a general alertness in child welfare settings. False positives may still have vulnerabilities that do not manifest until children are exposed to new situations, demands and expectations, e.g., starting school. Furthermore; one cannot rule out the possibility that false positives in this high risk group are children with substantial mental health problems, just below the requirements of diagnostic criteria. For example, in a newly reported study on mental health screening in a foster-care sample from New Zealand (N = 577), Tarren-Sweeny [36] found that a majority of false-positive children had at least one mental health score in clinical range as measured with Child Behaviour Checklist [37]. Post-hoc analyses of our data support this finding. Depending on the subscale, 52.0–88.0% of false positives were high-scorers (defined as one SD + above mean score using British norms). Therefore, cut-offs with higher sensitivity may be preferable, in spite of their lower specificity.

An optimal balance between sensitivity and specificity was obtained when the cut-offs for both scales were combined. Defining test positives as a score above the cut-off on one of the two scales identified 89.1% of the children with a disorder. Of the test positives, 37.9% did not have a mental disorder. The added predictive value when combining these two scales indicate that the Impact scale and the Total difficulties scale are not parallel; rather, they complement each other by measuring different but equally relevant aspects of child mental health. In high-risk samples, not only a high prevalence rate; but also a broad range of symptoms and high comorbidity may contribute to these results, which render the Impact scale equally important as the Total difficulties scale for screening purposes.

Table 5. Applying recommended cut-offs for SDQ: Total Difficulties Scale and Impact Scale for Caregiver SDQs (n = 223).

	Sample		Disorder		OR	95% CI
	N	%	N	%		
Low S – Low I	73	32.7	14	19.2	Reference group	
Low S – High I	19	8.5	8	42.1	3.10	[1.04, 9.04]*
High S – Low I	19	8.5	12	63.2	7.22	[2.41, 21.69]**
High S – High I	112	50.2	94	83.9	22.00	[10.18, 47.56]**

Note: Low S = Below symptom cut-off; High S = Above symptom cut-off; Low I = Below impact cut-off; High I = Above impact cut-off.

**p < .001;

*p < .05.

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To sum up, if the main purpose of screening is to reduce the number of undetected (false negative) children with a need for more detailed mental health examination, then we recommend cut-offs at either 13+ on the Total difficulties scale or 2+ on the Impact scale to be defined as test positives. The low negative likelihood ratio for this combination indicates a decrease in post-test probability of having a disorder from 57.4% to 19.0% for test-negatives. If on the other hand, an equal emphasis on positive and negative predictive values is preferred, then test positives could be defined by scoring above cut-off on Total difficulties scale only, regardless of score on the Impact scale. We cannot recommend scoring above cut-off on both Total difficulties and Impact scale as a requirement to be defined as test positive, as 30.0% of test negatives here have a post-test probability of having a disorder. For teacher-completed SDQs, the threshold for the Impact scale should be lowered to 1+, while the recommended cut-off for the Total difficulties scale remains 13.

The Multi-Informant Algorithms

Although estimates derived from the algorithms showed some discriminative ability (Table 7), the predictive values for the four diagnostic categories used in the present study were moderate to low, according to Fisher’s guidelines [30]. However, the algorithmic estimates for Behavioural disorders showed markedly more sensitivity compared to those for Emotional disorders.

Goodman et al. [13] found 85.0% sensitivity and 80.0% specificity for the “Probable” prediction of Any mental disorder in looked-after British children. Given that the overall rates of disorder in our sample were comparable to those of that sample; our lower sensitivity is somewhat surprising. However, a previous study of the predictive value of the multi-informant algorithms in a Norwegian clinical sample reported results similar to ours [16]. The algorithms are calculated using a fixed combination of scores, derived from a British normative sample [25]. Finnish norms for

SDQ suggests a cut-off 2–3 points lower than that derived from the British norms [38], illustrating that the UK multi-informant algorithms are based on cut-offs that may not fit populations in other countries. Furthermore, when the algorithms were examined with a British clinical sample [12], the algorithms were modified by increasing the threshold for identifying emotional disorders. For both the clinical sample and the looked-after British children, behavioural disorders were reported almost three times as often as emotional disorders. By contrast, in our sample of Norwegian foster children, there were similar prevalence rates of these two disorders, with a lower rate of behavioural disorders and a higher rate of emotional disorders than in the British samples [3].

Limitations

The statistical analyses presented for the Total difficulties scale, the Impact scale and the multi-informant algorithms are all based on dichotomous diagnostic outcomes. However, individuals differ not only in the presence or absence of a disorder but also in the severity and number of symptoms experienced, their duration and their impact on daily life [39]. In a high-prevalence sample, the size of this sub-threshold group would be larger than in the general population, which would decrease the predictive value of a screening instrument with a defined cut-off value.

In addition, when a sample is divided into subgroups, the sample size determines the degree of vulnerability for random errors in the values of the target variable. In our study, the relatively small sample size may have influenced the fit between the Total difficulties score and the prevalence of disorders, as illustrated in Figure 3. Here, a relatively steadily ascending curve is interrupted by sudden drops that occur at scores “10–11” and “16–17”, suggesting need for caution when interpreting our results. The relatively large confidence intervals add to this reservation. Nevertheless, Chi-square analyses with corresponding ORs suggest that there is a relatively good correspondence between

Table 6. Properties of SDQ Total Difficulties and Impact Scales with Recommended Cut-offs for Any Disorder According to the DAWBA interview for Carer Completed SDQ (n = 223).

Carer completed SDQs	PPV	NPV	LHR+	LHR–
SDQ Total difficulties score 13+	0.81	0.76	3.15	0.23
SDQ Impact score 2+	0.78	0.72	2.61	0.29
Combined, above both cut-offs	0.84	0.69	3.88	0.33
Combined, above one cut-off	0.76	0.80	2.35	0.18

Note: PPV = Positive predictive value; NPV = Negative predictive value; LHR+ = Positive likelihood ratio; LHR– = Negative likelihood ratio.

doi:10.1371/journal.pone.0102134.t006

Table 7. Estimated Probability for Mental Disorders from the Multi-informant Algorithms, and Prevalence of Mental Disorders According to DAWBA.

SDQ Prediction	Observed Mental Disorders											
	Any			Emotional			Behavioral			ADHD		
	n	%		n	%		n	%		n	%	
Disorder unlikely	13/48	27.1	11/87	12.6	0/71	0.0	5/67	7.5				
Disorder possible	13/27	48.1	14/37	37.8	8/30	26.7	3/31	9.7				
Disorder probable	55/66	83.3	11/17	64.7	22/40	55.0	28/43	46.5				

Two Informants Sample (n = 141).
doi:10.1371/journal.pone.0102134.t007

Table 8. Properties of SDQ Multi-informant Algorithms for SDQ Total Difficulties Scale and Subscales, for Corresponding Diagnostic Groups According to the DAWBA interview (n = 141).

SDQ prediction of corresponding DAWBA disorders	Sensitivity		Specificity		PPV		NPV		LHR+		LHR-	
	Prob	Poss	Prob	Poss	Prob	Poss	Prob	Poss	Prob	Poss	Prob	Poss
	SDQ Total- DAWBA Any disorders	0.68	0.84	0.82	0.58	0.83	0.73	0.65	0.73	3.70	2.02	0.39
SDQ Emotional - DAWBA Emotional disorders	0.30	0.69	0.94	0.72	0.65	0.46	0.80	0.87	5.35	2.51	0.74	0.42
SDQ Conduct - DAWBA Behavioral disorders	0.73	1.00	0.84	0.64	0.55	0.43	0.92	1.00	4.52	2.78	0.32	0.00
SDQ Hyperactive - DAWBA ADHD disorders	0.71	0.82	0.80	0.55	0.47	0.31	0.92	0.92	3.51	1.82	0.36	0.33

Note. Prob = Dichotomized on Probable level; Poss = Dichotomized on Possible level; PPV = Positive predictive value; NPV = Negative predictive value; LHR+ = Positive likelihood ratio; LHR- = Negative likelihood ratio.
doi:10.1371/journal.pone.0102134.t008

the increase in SDQ scores and the prevalence of mental disorders. Furthermore, the nearly identical ORs for the recoded and original version of the Total difficulties and the Impact scales support the validity of SDQ used as a dimensional measure across a continuum of severity.

Clinical Implications

The good fit between the increased SDQ scores and the prevalence of disorders suggests that the SDQ is a useful measure for guiding service plans and for comparing child welfare groups with regard to intervention needs. Furthermore, the use of brief mental health questionnaires, such as the SDQ, may both improve communication between child welfare and mental health services, and facilitate the description of children's needs across these relevant services.

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If a cut-off for further assessment is preferred, we recommend the use of an interpretation that is based on a combination of the Total difficulties score and the Impact score. Our findings suggest that either a Total difficulties score of 13+ or an Impact score of 2+ for the carer-completed SDQ may indicate the presence of a mental disorder and warrants a follow-up with the child. Based on our findings, we cannot recommend the use of the predictive algorithm to screen foster children in Norway for mental disorders.

Author Contributions

Conceived and designed the experiments: SL ERH TH OEH. Performed the experiments: SL ERH. Analyzed the data: SL OEH. Wrote the paper: SL ERH TH OEH.

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Reactive Attachment Disorder and Disinhibited Social Engagement Disorder in School-Aged Foster Children - A Confirmatory Approach to Dimensional Measures

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Abstract This study aimed to investigate the factor structure and external correlates of the constructs Reactive Attachment Disorder (RAD) and Disinhibited Social Engagement Disorder (DSED) from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). The following were addressed: First, do our data support the DSM-5 conceptualization of RAD/DSED as two separate constructs? Second, are RAD and DSED distinct from other well-established dimensions of child psychopathology? Third, what are the external correlates of RAD/DSED in this sample? The study sample included 122 foster children aged 6–10 years. Foster parents completed the Strengths and Difficulties Questionnaire (SDQ), and the RAD/DSED-scale from the Developmental and Well-Being Assessment. Child protection caseworkers completed a questionnaire regarding exposure to maltreatment and placement history. Confirmatory factor analysis (CFA) of the RAD/DSED items identified a good fit for a model with a two-factor structure, which is congruent with the DSM-5 definition of RAD and DSED. A new CFA model, which

included the RAD and DSED factors together with the four problem factors of the SDQ (emotional, conduct, hyperactivity-inattention, and peer problems), also demonstrated a good fit with our data. RAD and DSED were associated with the SDQ Impact scale and help seeking behavior. This was partly explained by the SDQ externalizing and peer problem subscales. Our findings lend support for the DSM-5 conceptualization of RAD and DSED as separate dimensions of child psychopathology. Thus, the assessment of RAD and DSED provides information beyond other mental health problems.

Keywords Reactive attachment disorder · Disinhibited social engagement disorder · Foster children · Confirmatory factor analysis · Maltreatment

The concept of attachment disorder is central in the description and understanding of social malfunctioning in institutionalized children and represents a major psychological etiological model that links early maltreatment to later psychopathology (Goldfarb 1945a, b; Tizard and Rees 1975). Attachment disorder is defined in terms of markedly disturbed and developmentally inappropriate social relatedness in most social contexts which begins before the age of 5 years, persists over time, and it is assumed to originate from very depriving and pathogenic care conditions (Rutter et al. 2009). Both the *International Classification of Diseases* (ICD-10; World Health Organization 1992) and the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5, American Psychiatric Association 2013) organize the symptoms of attachment disorder into two different but related disorders: an inhibited type termed Reactive Attachment Disorder (RAD) in both the ICD-10 and the DSM-5; and a disinhibited type termed Disinhibited Attachment Disorder (DAD) in the ICD-10 and Disinhibited Social Engagement Disorder (DSED) in the DSM-5. In this

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paper the term *attachment disorder* will be used to denote the general concept, while RAD and DSED refer to the two disorders as described in the DSM-5.

In the DSM-5, both disorders are described under the section Trauma- and Stressor-Related Disorders. Exposure to traumatic or stressful events is a shared criterion for disorders in this section. More specifically, social neglect and the absence of adequate caregiving during childhood are criteria for both RAD and DSED. The concept of attachment disorders has a long history in the study of psychopathology in school-aged children with an early and very deprived institutional background. Less is known regarding the structure and correlates of attachment disorders in foster children who have experienced neglect, but have not been institutionalized (Zeanah and Gleason 2010). In this study, we address three questions related to the understanding of attachment disorders: First, is there statistical support for the conceptualization of attachment disorders as two separate dimensions as described by the DSM-5, among school-aged foster children without institutional rearing? Second, are the dimensions of RAD and DSED distinguishable from other established dimensions of more common child psychopathology? Third, what are the correlates of RAD and DSED among characteristics of the placement history, exposure to risk factors in the biological family, functional impairment, and help-seeking behavior?

In a review of research covering the period from the introduction of attachment disorder in the DSM-IV in 1994 until the planning of the DSM-5, Zeanah and Gleason (2010) argued that despite the assumed similarities in etiology, research findings indicate that the two subtypes of attachment disorders should be understood as separate disorders: The inhibited subtype has been associated with depressed mood, whereas the disinhibited subtype has been associated with externalizing problems. Furthermore, a lack of social and emotional reciprocity and difficulties with emotion regulation are seen in the inhibited type, whereas the disinhibited type is characterized by a lack of developmentally appropriate discretion and restraint around strangers. Furthermore, children with the inhibited pattern appear to lack selective attachments and exhibit disinterest in interaction with adults, but they are responsive to enhanced caregiving. These considerations led to the current revision in the DSM-5 that classified the two patterns as separate disorders – RAD and DSED.

The main empirical support for this conceptualization of attachment disorder into RAD and DSED originates from two longitudinal studies on children raised in extremely deprived institutional contexts: the English and Romanian Adoptees Study (O'Connor et al. 1999) and the Bucharest Early Intervention Project (BEIP) (Smyke et al. 2002). Findings from the BEIP study support the two sub-patterns of attachment disorders as associated but distinct syndromes (Gleason et al. 2011). In a sample of 136 children (age range 6 to 54 months), both patterns demonstrated stability over

2 years and were distinguishable from more well-established disorders such as depression and externalizing disorders. The two syndromes contributed independently to functional impairment among the children in the study. Because the majority of empirical studies on attachment disorders is based on institutionalized children raised in extraordinary conditions in very deprived orphanages, caution is warranted regarding the generalization of these findings to children who have experienced maltreatment but who have not been raised in deprived institutions (Glowinski 2011).

In looked after children without institutional rearing, relatively strong associations between measures of attachment disorders and indicators of more general psychopathology have been reported (Kay and Green 2013; Millward et al. 2006). This may be rooted in a high prevalence of mental health problems and comorbidity in these samples, possibly inflating the associations. Together with findings that indicate high interrelations between the inhibited and the disinhibited syndromes (Zeanah et al. 2004), the question arises whether these behavioral patterns are best seen as distinct constructs that comprise two independent disorders, or if they should be understood as a part of a common pathway for serious pathology that hinders children's abilities to relate socially.

Another central question is whether other harmful care conditions in addition to institutional rearing, could result in the same developmental pathology as seen in these samples from extreme child populations. In a U.S. study, DSM-IV RAD was identified in 38 % of maltreated foster children 10–47 months of age ($N=94$), based on interviews with the clinicians treating the children. Using the ICD-10 criteria, findings indicated that 35 % had the inhibited type, 22 % had the disinhibited type, and 17 % had a mixed version (Zeanah et al. 2004). The inhibited and disinhibited types from ICD-10 were not related to gender, ethnicity, or time in foster care. Mental disorders in biological mothers were associated with both inhibited and disinhibited patterns, whereas mothers' substance abuse was associated only with the disinhibited type.

Attachment disorders have also been identified in older maltreated children (Kay and Green 2013; Kočovská et al. 2012; Millward et al. 2006; Minnis et al. 2002, 2009). We previously reported a point prevalence of 19 % for DSM-IV RAD in 6–12 year-old foster children ($N=279$), assessed with the Developmental and Well-Being Assessment (DAWBA) (Goodman et al. 2000) diagnostic interview (Lehmann et al. 2013). Here, having a RAD diagnosis was associated with more exposure to violence in biological family and more previous placements. These findings suggest that the constructs of RAD and DSED may also be relevant for school aged non-institutionalized children with a history of maltreatment in their biological family. The same study reported high comorbidity between attachment disorders and other mental disorders (Lehmann et al. 2013). This is consistent with reports of high correlations between attachment disorder scales and general

measures of child psychopathology, such as the Strengths and Difficulties Questionnaire (SDQ) (Millward et al. 2006) and the Child Behavior Checklist (CBCL) (Kay and Green 2013). Therefore, the unique contribution of RAD/DSED in describing mental health problems beyond what is captured by other dimensions of mental health problems, should be examined.

In three studies of children without early institutional rearing, the factor structures of different attachment disorder symptom scales have been examined with principal component analyses (PCA) (Kay and Green 2013; Minnis et al. 2007; Oosterman et al. 2010). Only one study, using the Disturbances of Attachment Interview in a sample of foster children aged 2–7 years ($N=60$), reported a two-factor solution congruent with an inhibited and a disinhibited dimension (Oosterman and Schuengel 2007). In a sample of 10–16 year-old looked-after children ($N=153$), Kay and Green (2013) identified four factors in the 24-item version of the attachment disorder scale of the DAWBA interview: disinhibited indiscriminate, attention seeking, superficial relationships, and unpredictability. They reported an association between disinhibited symptoms and peer relationship problems, in line with the findings from the BEIP study reported by Gleason et al. (2011). Kay and Green (2013) also reported associations between the DAWBA subscales derived from the PCA analyses and CBCL subscales. The third study was conducted in a large community sample of 8-year-old twins ($N=13,472$) (Minnis et al. 2007). Using an 18-item version of the Relationship Problems Questionnaire, four factors of relationship problems were identified, one of them resembling disinhibited attachment behavior.

Together, these studies yielded inconclusive results regarding the factor structure of attachment disorders in non-institutionalized children. One should note however, that all three studies used PCA as their analytic approach. PCA is based on a formative indicator model which assumes causal indicators that are measured without error. Thus, PCA is not optimal for identifying latent common factors that are believed to determine imperfectly measured items. Here, exploratory factor analysis and confirmatory factor analysis (CFA) with focus on common factors should be applied instead (Markus and Borsboom 2013; Schmitt 2011).

In a recent study, a modified 10-item version of the Relationship Problems Questionnaire was used in a clinical sample of children aged 5–10 years ($N=152$) (Vervoort et al. 2013). Here, exploratory and confirmatory factor analyses supported a two-factor structure that corresponded to the inhibited and disinhibited patterns, respectively. The generalizability of these findings needs to be assessed, as their sample comprised mainly boys (87 %) with severe mental health problems attending special education schools. The family care conditions for these children were also not reported. The findings in the Vervoort study did not address the uniqueness of these

attachment problems. That is, would the inhibited and the disinhibited dimensions still be identified as two unique factors when measures of more common dimensions of child psychopathology are included in the CFA?

In the present study, we examine the validity of the construct of attachment disorder for school-aged, non-institutionalized foster children. More specifically, is the factor structure of attachment disorders as assessed with the DAWBA RAD/DSED scale (Goodman et al. 2000), consistent with the DSM-5 operationalization of two separate patterns of RAD and DSED? Alternatively, should this inhibited/disinhibited behavior be considered as a more general expression of impaired social functioning reflecting the consequences of a wide range of child mental problems? With the use of CFA, we compare two alternative structural models of attachment disorder: Model 1 hypothesizes one general factor of attachment disorder, whereas Model 2 hypothesizes two factors consistent with the two patterns of RAD and DSED as defined in the DSM-5. In accordance with previous findings (Vervoort et al. 2013), we hypothesize a better fit for Model 2. We also investigate whether RAD and DSED are distinct from other dimensions of mental health problems using a third model that adds the four problem subscales of the SDQ to the RAD and DSED factors used in Model 2. Finally, we examine potential correlates of RAD and DSED, including indicators of neglect, maltreatment, placement history, functional impairment, and help-seeking behavior.

Methods

Measures

The DAWBA RAD/DSED scale is one of 17 sections in the parent version of the DAWBA diagnostic interview (Goodman et al. 2000; Heiervang et al. 2007; Meltzer et al. 2003). The 14-item DAWBA RAD/DSED scale used here is a further development from the Child and Adolescent Psychiatric Assessment-Reactive Attachment Disorder questionnaire (Minnis et al. 2009), and a previous 24-item DAWBA attachment disorder scale used in the Kay & Green study. This older 24-item version of the attachment disorders scale is not included in the standard version of the DAWBA anymore (Goodman, personal communication, February 13, 2014). All the 14 items in the current DAWBA version were part of the earlier 24-item version.

The DAWBA RAD/DSED scale may be completed by parents and caregivers for children up to 10 years of age. It comprises 14 questions that describe social behaviors that cause concern for carers. The items are rated on a three-point scale: *No* (0), *A little* (1), *A lot* (2). They are organized into a RAD subscale of five items, with score range 0–10 (e.g., “Does he avoid emotional closeness with adults he knows

well?”), and a DSED subscale of nine items, with score range 0–18 (e.g., “Is he worryingly overfriendly with strangers?”).

The SDQ (Goodman 1997) is a 25-item mental health questionnaire for 4–16 year-olds that can be completed by parents, teachers, and as a self-report from age 11 years (Goodman et al. 1998). The SDQ consists of five subscales measuring prosocial behavior, peer problems, emotional symptoms, conduct problems and hyperactivity-inattention symptoms. Each subscale comprises five items rated on a 3-point scale (0-1-2), with a total subscale score range of 0–10. A Total Difficulties score is computed by summing the three symptom subscales and the Peer Problem subscale; resulting in a score range of 0–40. The two-page version of the SDQ also includes an Impact scale, for assessing distress to the child and interference of symptoms and problems with the child’s everyday life (Goodman 1999). The parent version of the Impact scale comprises five items and has a total score range of 0-10. The SDQ subscales have shown good internal consistency and good to excellent discriminative validity in the current population (Lehmann et al. 2014).

A 10-item Child Protection Questionnaire was developed for the current study, in order to obtain information from the child’s caseworker at the child protection services. In Norway, out-of-home placements are sanctioned by the county board and information used in the case for custody is later available to the child’s caseworker in municipal child protection service. The questionnaire asks about care conditions in the biological family, placement history, and contact with child and adolescent mental health services (CAMHS) or school psychology services. Regarding care conditions, the caseworker was asked about the following information from the case file: serious neglect, exposure to physical violence, witnessing physical violence, exposure to emotional abuse (threats, verbal punishment, harsh criticism, hostility), witnessing emotional abuse, parental rejection of the child, parental physical or mental disability, parental serious somatic or mental disorder, parental drug or alcohol abuse, and parental death. The child’s caseworker was asked if any of the above care conditions were present prior to the out-of-home placement.

Ethics

The Regional Committee for Medical and Health Research Ethics, Western Norway, approved the study. The Ministry of Children, Equality and Social Inclusion provided exemption from confidentiality for the caseworkers and foster parents who participated in the study.

Sampling and Procedure

In Norway, most children in long-term foster care live in private households, as group homes are rare. If there are other

children in the family, these are most often siblings of the foster child, or the biological children of the foster parents. Data collection started on September 1 2011, and lasted until end of February 2012. Children were eligible if they were between 6 and 12 years of age and had lived in their current foster home for at least five months following legally mandated placement. The sample was recruited from the 63 municipalities served by the Southern Regional Office for Children, Youth and Family Affairs (Bufetat) in Norway. According to the Bufetat register, there were 391 eligible children in these municipalities. Informative letters were sent to the heads of each municipal child protection office. The office heads were asked to review the list of foster children from the regional register and to add potentially eligible children, if any, to the list. This identified 28 additional eligible children. Furthermore, 20 children from the regional register had been returned to their biological families, or had been adopted and were therefore no longer eligible. Another three children were deemed ineligible because of serious neurological disabilities. Thus, the final number of eligible children was 396.

The municipal caseworker of each child was contacted by postal mail with information letters about the study, asking them to complete and return the Child Protection Questionnaire for the child/children of their responsibility. The Child Protection Questionnaire takes about 10–20 min to complete. The caseworkers were not offered any compensation for participating.

Foster parents of the 396 eligible children received a postal letter with detailed information about the study and instructions on how to complete the SDQ and DAWBA measures online from home. Consenting foster parents logged on to a secure website, where they first completed the SDQ for the child before going on to the DAWBA interview. Foster parents were asked to answer all the 17 sections of the DAWBA, covering relevant DSM-IV disorders. While the SDQ normally takes about 10 min to complete, the full DAWBA may take up to several hours depending on the amount of problems reported. The DAWBA RAD/DSED scale usually takes only around 5 min to complete. Foster parents were not offered compensation for the participation in the study.

Study Sample

Of the 396 eligible children, SDQ and DAWBA completed by foster parents were obtained for 223 children (56.3 % response rate). Of these, 198 children were 10 years or younger. All foster parents did not complete every section of the DAWBA. A completed DAWBA RAD/DSED section was only available for 122 of the 198 children. There were no significant differences between children with ($n=122$) and without ($n=76$) this section completed, either regarding age, gender, or SDQ scores. In this final study sample of 122

children, a completed Child Protection Questionnaire was available for 92 children (75.4 %).

Analytical Procedure

Due to features of the online administration system, there were no missing SDQ data or DAWBA RAD/DSED data for the study sample of 122 children. Frequency distributions and correlations were analyzed with the IBM SPSS Statistics for Windows, Version 22.0. Mean scale scores were computed by dividing the sum score of each scale by the number of items in the scale.

Confirmatory Factor Analysis (CFA) was performed using Mplus 7.1. (L. K. Muthén and Muthén 2012). The CFA models were estimated using a robust weighted least squares estimator with mean and variances adjusted (WLSMV), to account for the nature of the skewed categorical data (ordinal data with three options). All 14 DAWBA RAD/DSED items were treated as ordinal categorical variables in the models and their estimations.

To investigate our hypothesis of a two-factor structure consistent with the DSM-5 conceptualization, model fit for three alternative models were tested. Model 1 hypothesized one general factor for all 14 items (5 RAD and 9 DSED items). Model 2 hypothesized a two-factor solution based on the two DAWBA subscales and consistent with the DSM-5 distinction between RAD and DSED. Comparative tests of nested alternative models were based on the diff-test option (Brown 2006). In Model 3, we further tested the construct of attachment disorders. Here, Model 2 was expanded by including the four problem factors from the SDQ (Goodman 2001; He et al. 2013; Muris et al. 2003; Van Roy et al. 2008). Model 3 thus hypothesized six factors: RAD, DSED, Peer Problems, Emotional Symptoms, Conduct Problems, and Hyperactivity-Inattention Problems. For the SDQ Hyperactivity-Inattention factor, the item “Fidgety” was allowed to correlate with the item “Restless” based on previous findings in Norwegian samples (Ronning et al. 2004; Van Roy et al. 2008).

Finally, to explore the discriminant validity for the different psychopathology constructs, we estimated trait correlations between the six factors in Model 3. For these correlations, an upper limit of 0.85 has been suggested for the interpretation of factors as representing different traits (Brown 2006).

For the analysis of external correlates of RAD and DSED, the two subscale scores were treated as continuous variables, and associations were tested with age, gender, and selected placement variables. The variables Serious Neglect, Parental Mental Disorder and Parental Alcohol- or Drug Abuse were treated as dichotomous variables. Help seeking behavior was represented by two dichotomous variables: “School Psychology Services”; indicating previous assessment by psychologist at school, and “Contact with CAMHS”. For the variable “Contact with CAMHS” a confirming answer to any of three

items (each coded no=1, yes=2) resulted in a positive value: currently receiving treatment in CAMHS; previously received treatment in CAMHS; or assessed by CAMHS. The continuous variable “Violence Exposure” (0–4) was an index comprising the sum of the following four dichotomous items (each coded no=0, yes=1): exposure to physical violence, witnessing domestic violence, exposure to emotional abuse (threats, hostility, rejection, or harsh verbal punishment), and witnessing emotional abuse towards family members (Lehmann et al. 2013). Due to the inclusion of binary variables in the analysis (i.e., gender, serious neglect, parent’s mental disorder, parent’s drug or alcohol abuse, contact with CAMHS, contact with school psychologist), correlation analyses were conducted with both parametric and non-parametric (Spearman’s rho) approaches. Findings were equivalent and results of parametric analyses are reported.

The unique effects of RAD and DSED on functional impairment, as measured with the SDQ Impact scale, were examined by multiple regression analyses in two different ways. First, the unique effects of the RAD and DSED scales on functional impairment were estimated when controlling for each of the SDQ scales Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, and Peer Problems one by one, in four separate multiple regression-analyses. Second, the RAD and the DSED scales and the four SDQ subscales were entered simultaneously in two separate multiple regression analyses with SDQ Impact scale as the dependent variable. The goal was to examine the effect of each of the five scales on the SDQ Impact scale when controlling for the other four subscales. The unique effect of RAD and DSED on help-seeking behavior was examined in logistic regression analyses controlling for each of the SDQ scales, one at a time.

Results

Table 1 shows the characteristics of the study sample ($N=122$). Table 2 shows the mean scale scores for SDQ Total Difficulties - and subscales, the DAWBA Total RAD/DSED and RAD-, DSED- subscales, as well as the maximum possible scale scores and Cronbach’s alpha for each scale. There was a significantly higher mean scale score on the DSED scale compared to the RAD scale, with a mean difference of 0.44 ($SD\ 0.46$, 95 % CI [0.53, 0.36], $t=10.68$, $df=121$, $p<0.001$). One should note that whereas the DSED scale was rather normally distributed, the RAD scale was positively skewed with a possible floor effect. This implies that the behaviors measured by RAD scale are quite rare in this sample, compared to the behaviors measured by the DSED scale, possibly indicating more deviant behavior among children with an elevated score on the RAD scale.

The fit of the three CFA models were evaluated according to the following standard fit indices (Jackson et al. 2009): chi-

Table 1 Characteristics of the study sample ($N=122$)

	%	Mean	<i>SD</i>
Gender: Girls	57.0		
Age		8.00	1.54
Age at first placement (years) ^a		3.11	2.76
Age when placed in current foster home ^a		3.88	2.87
Years in current foster home ^a		3.84	2.87
Sum previous placements ^a		1.25	1.26
Violence exposure (range 0–4) ^{a*}	44.6	0.91	1.26
Serious neglect ^a	90.2		
Parent's mental disorder ^a	57.6		
Parent's drug/alcohol abuse ^a	56.5		
Contact with CAMHS ^a	52.2		
School psychology services ^a	41.0		

^a = information from Child Protection Questionnaire available for 92 children. * = percentage represent the proportion reporting any value higher than 0

CAMHS child and adolescent mental health services

square, comparative fit index (CFI), and root mean square error of approximation (RMSEA). The recommended cut-offs for good fit are $CFI \geq 0.95$, and $RMSEA < 0.06$ when using the WLSMV estimator (Yu and Muthen 2002). Model 1, which hypothesized an one-factor structure with an overall attachment disorder factor, did not yield a good fit with our data ($\chi^2=130.59$, $p < 0.001$, $df=77$, $RMSEA=0.08$, 95 % CI [0.05, 0.10], $CFI=0.92$). Model 2, which hypothesized a two-factor structure that measured RAD and DSED behaviors separately, indicated a better fit ($\chi^2=101.20$, $df=76$, $p=0.028$, $RMSEA 0.05$, 95 % CI [0.02, 0.08], $CFI=0.96$). As shown in Table 5, a chi-square test identified a significantly better model fit for the two-factor compared with the one-factor model.

Table 3 displays the means, *SDs*, response frequencies, and factor loadings on the two factors for each of the 14 items. One should note that items in the RAD scale had a very low prevalence of responses in the “A lot” category compared to the items in the DSED scale, consistent with the skewedness of this scale. All items had factor loadings that were good to excellent according to the criteria proposed by Tabachnick and Fidell (2007).

The two factors from the 14 DAWBA RAD/DSED items were then included with the four problem subscales of the SDQ in a third model. As shown in Table 5, this model exhibited a good fit with the data ($\chi^2=623.69$, $df=511$, $p < 0.001$, $RMSEA 0.04$, 95 % CI [0.03, 0.05], $CFI 0.95$). The item loadings on the six factors shown in Tables 4 and 5 were all moderate to strong (0.53–0.86) for the DSED items. The item loadings on the DSED factor did not change substantially from the two-factor model, shown in Table 3. For the RAD factor, Item 10 (“unpredictable in reunions”) and item 4 (“avoids emotional closeness”) had a somewhat weak, but still fair, loading of 0.44 in the two-factor model. In the six-factor model, the loading for item 4 dropped to 0.37.

Given the relative small sample size, great care was taken to check for convergence problems and inadmissible parameter estimates. Furthermore, for sensitivity analyses we tested the robustness of the results of the CFA analyses for the three models, by rerunning the analyses with a Bayesian estimator (with uninformative priors) as this estimator is less sensitive for small sample sizes (B. Muthén and Asparouhov 2012; van de Schoot et al. 2014). The fit of the CFA models when using the Bayesian estimator was assessed by the Posterior Predictive p-values (PPP), a direct measure of the true discrepancy between data and the predicted model (Gelman et al. 1996). A low PPP value (e.g., 0.01) indicates poor fit, while an excellent fitting model is expected to have a PPP value of

Table 2 Mean scores with standard deviation, range, skewness, Kurtosis and Cronbach's alpha for the four problem subscales and Impact scale in the Strengths and Difficulties Questionnaire (SDQ), the DAWBA RAD subscale, DSED subscale and total RAD/DSED Scale ($N=122$)

Scale	N of items	Max score	Mean score	<i>SD</i>	Skewness	Kurtosis	α
SDQ Total Difficulties	20	40	0.75	0.41	0.14	-0.81	0.88
SDQ Emotional Symptoms	5	10	0.71	0.48	0.23	-0.82	0.69
SDQ Conduct Problems	5	10	0.58	0.48	0.66	-0.25	0.75
SDQ Hyperactivity-Inattention	5	10	1.19	0.58	-0.36	-0.87	0.82
SDQ Peer Problems	5	10	0.53	0.47	0.72	-0.14	0.70
SDQ Impact	5	10	0.51	0.53	0.69	-0.74	0.79
DAWBA RAD	5	10	0.35	0.37	1.26	1.46	0.60
DAWBA DSED	9	18	0.79	0.45	0.28	-0.60	0.82
DAWBA RAD/DSED	14	28	0.64	0.37	0.47	0.02	0.82

Mean score computed by dividing the sum score of each scale by the number items in the scale. Possible range of mean score: 0–2 for all scales. *SDQ* Strengths and Difficulties Questionnaire, *DAWBA* Developmental and Well-Being Assessment, *RAD* reactive attachment disorder, *DSED* disinhibited social engagement disorder

Table 3 Confirmatory factor analysis of the DAWBA RAD and DSED Items ($N=122$)

Item #	Label	M	SD	Response frequencies %			Factor loadings			
				No	A little	A lot	F1		F2	
DAWBA RAD items							Est	SE	Est	SE
2	Resists being helped	0.42	0.64	66.4	25.4	8.2	0.72	0.11		
4	Avoids emotional closeness	0.23	0.48	79.5	18.0	2.5	0.44	0.12		
6	Gaze aversion	0.48	0.70	63.1	25.4	11.5	0.69	0.09		
10	Unpredictable in reunions	0.30	0.60	77.9	14.8	7.4	0.44	0.14		
13	On the lookout for danger	0.33	0.57	72.1	23.0	4.9	0.67	0.10		
DAWBA DSED items										
1	Needs to be center of attention	1.59	0.67	9.8	21.3	68.9			0.88	0.07
3	Desperate for adult attention	1.15	0.79	24.6	36.1	39.3			0.79	0.06
4	Singles out adult in charge	1.16	0.75	21.3	41.0	37.7			0.59	0.08
5	Many shallow relationships	0.68	0.75	49.2	33.6	17.2			0.65	0.07
7	Overfriendly with strangers	0.57	0.72	55.7	31.1	13.1			0.73	0.06
8	Superficial affection	0.32	0.55	72.1	23.8	4.1			0.82	0.05
9	Wanders away	0.48	0.70	63.1	25.4	11.5			0.56	0.07
11	Intrusive questions	0.42	0.64	66.4	25.4	8.2			0.71	0.07
12	Hangs on to adults	0.77	0.80	45.9	31.1	23.0			0.59	0.08

DAWBA Developmental and Well-Being Assessment., RAD reactive attachment disorder, DSED disinhibited social engagement disorder

approximately 0.50 (B. Muthén and Asparouhov 2012). In the present study we used PPP values less than 0.05 to indicate a poor fit (Zyphur and Oswald 2013).

Somewhat in contrast to findings when using the WLMSV estimator, both Model 1 and 2 had an acceptable fit ($PPP > 0.05$), when using the Bayes estimator. But Model 2 (PPP value 0.29, 95 % CI for the difference between the observed and replicated χ^2 values [- 41.71, 57.72]) had a somewhat better fit than Model 1 (PPP value 0.23, 95 % CI for the difference between the observed and replicated χ^2 values: [- 28.94, 66.78]), also when using this estimator. Model 3 had also an adequate fit to the data (PPP value 0.10, 95 % CI for the difference between the observed and replicated χ^2 values: [-41.29, 179.58]) when using the Bayes estimator. In these analyses, the model parameter values (factor loadings etc.) were in all cases very similar to what was found when using the WLMSV estimator. In sum, the Bayesian estimation confirmed our findings with use of the WLMSV estimator.

Table 6 shows the trait correlations for the general CFA model with six factors. All factors were positively correlated (0.50–0.89). The results showed a rather strong inter-correlation between the RAD and the DSED factors (0.59). A Wald test of parameter constraints showed that the Conduct Problem factor correlated significantly stronger with the RAD factor than with the DSED factor (5.34, $df=1$, $p=0.023$).

Table 7 shows the correlations between the RAD and DSED scale scores and selected external variables. The variable Serious Neglect was highly positively skewed, and therefore not included in this analysis. Male Gender and Parental

Mental Disorders were associated with higher scores on the RAD scale, but the RAD and DSED scales were unrelated to the other indicators of aversive care conditions, as well as placement history. However, in the correlation analyses, both the RAD and DSED scales were associated with functional impairment, measured with the SDQ Impact scale, and help-seeking operationalized by Contact with School Psychology Service and CAMHS.

As presented in Table 8, the associations between the RAD scale and functional impairment remained significant when controlling for three of the SDQ subscales (Emotional -, Hyperactivity - and Peer Problems), but not when controlling for Conduct Problems ($\beta=0.13$, $p=0.102$). Also, the association between RAD and functional impairment became insignificant ($\beta=0.03$, $p=0.621$) in the analysis including all five scales.

In the parallel analyses of the DSED scale, the association between DSED and functional impairment became insignificant when controlling for any of the four SDQ problem scales. However, in the analysis including all five scales, DSED had a significant negative association ($\beta=-0.17$, $p=0.023$) with the SDQ Impact scale score. One should note that in the analyses entering all five scales together, the scales assessing more externalizing problems, (i.e., Peer Problems, Conduct Problems and Hyperactivity Problems); were all associated with functional impairment.

The associations between RAD/DSED and Contact with CAMHS and School Psychologist were investigated in binary logistic regression analyses with RAD/DSED scale scores as

Table 4 Confirmatory factor analysis of the RAD and DSED items and items from the four subscales-assessing child mental health problems in the Strengths and Difficulties Questionnaire (SDQ) ($N=122$).

	F1		F2		F3		F4		F5		F6	
	Est	ES	Est	ES	Est	ES	Est	ES	Est	ES	Est	ES
SDQ emotional items												
Somatic	0.47	0.12										
Worries	0.62	0.08										
Unhappy	0.68	0.08										
Clingy	0.68	0.08										
Afraid	0.75	0.07										
SDQ conduct items												
Throws tantrums			0.81	0.06								
Obeys			0.77	0.05								
Fights			0.80	0.07								
Steals			0.72	0.08								
Lies			0.69	0.07								
SDQ hyperactivity-inattention items												
Restless					0.71	0.06						
Fidgety					0.78	0.06						
Distracted					0.82	0.06						
Reflect					0.83	0.06						
Attend					0.81	0.04						
SDQ peer problems items												
Is a loner							0.64	0.08				
Has friends							0.52	0.10				
Popular							0.81	0.07				
Bullied							0.69	0.08				
Better with adults than with children							0.83	0.06				
DAWBA RAD items												
Resists being helped									0.76	0.09		
Avoids emotional closeness									0.37	0.13		
Gaze aversion									0.66	0.08		
Unpredictable at reunion									0.63	0.11		
On the lookout for danger									0.53	0.10		
DAWBA DSED items												
Needs to be center of attention											0.86	0.07
Desperate for adult attention											0.79	0.06
Singles out adult in charge											0.53	0.09
Many shallow relationships											0.65	0.08
Overfriendly with strangers											0.64	0.07
Superficial affection											0.81	0.07
Wanders away											0.58	0.08
Intrusive questions											0.77	0.07
Hangs on to adults											0.68	0.08

SDQ Strengths and Difficulties Questionnaire, DAWBA Developmental and Well-Being Assessment, RAD reactive attachment disorder, DSED disinhibited social engagement disorder

predictors. Both RAD (crude OR 1.48, 95 % CI [1.12, 1.96], $p=0.006$) and DSED (crude OR 1.15, 95 % CI [1.03, 1.29], $p=0.011$) were associated with increased probability of contact with CAMHS, also when controlling for SDQ Emotional-

Table 5 Model fit results from the confirmatory factor analyses of the three models

Model	Chi-square			RMSEA	95 % CI	CFI		Diff test		
	X ²	df	p					X ²	df	p
1	130.59	77	0.00	0.08	0.05–0.10	0.92				
2	101.20	76	0.03	0.05	0.02–0.08	0.96	Model 1 vs Model 2	19.33	1	0.00
3	623.69	511	0.00	0.04	0.03–0.05	0.95				

Model 1: one-factor model of DAWBA RAD/DSED items. *Model 2:* Two-factor model of RAD and DSED items. *Model 3:* Six-factor model of items in RAD, DSED, SDQ Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention Problems and Peer Problems subscales

Bold: Met the recommended cut-offs for fit indices

and Peer Problems subscales. This association did however not remain significant when controlling for SDQ Conduct- and Hyperactive subscales. Neither the RAD nor DSED subscales significantly predicted Contact with School Psychology Services. No interaction effects were found between the independent variables.

Discussion

In this school-aged sample of foster children without an early institutional rearing, our findings support the DSM-5 categorization of RAD and DSED as two conceptually and statistically separate dimensions of psychopathology. The RAD and DSED dimensions are distinguishable from other common mental health problems, indicating that they capture variations in interpersonal psychopathology not accounted for by measures of more general psychopathology, i.e., the SDQ subscales. The similarity of the results when using the two estimators in the CFA indicates that the WLSMV estimator gave trustworthy results despite the relatively low sample size in the present study.

Our analytic approach to the factor structure of attachment disorders represents a development from the three previous studies of the internal structure of attachment disorders that used PCA (Kay and Green 2013; Minnis et al. 2007; Oosterman et al. 2010). The good model fit obtained in CFA

procedures, suggests that the DAWBA RAD/DSED items measure patterns of behavior that correspond well with the construct of RAD and DSED in DSM-5. To a large extent, our findings of a two-factor structure in the CFA are consistent with the findings reported by Vervoort et al. (2013). Furthermore, the present results expand the findings of Veervort, by preserving a two-factor structure in a more exacting model including four major dimensions of child psychopathology. The good model fit supports the argument that the behavior patterns seen in attachment disorders are not merely cross-dimensional side effects of more common psychopathology, but constructs in their own right, and should be assessed accordingly in foster children.

Despite overall moderate to strong factor loadings for the two factors in model 2, item 4 (avoids emotional closeness) and item 10 (unpredictable at reunions) had rather low (but still acceptable) loadings on the RAD factor. This indicates that these two items do not distinguish particularly well between children with high versus low levels of inhibited behavior. Furthermore, these two items have a low frequency of confirming answers from foster parents (Table 3). It is possible that these items are less developmentally appropriate for school-aged children. Because our sample comprised the older end of the age range for the DAWBA RAD/DSED scale, the discriminative ability of these items should also be tested in younger samples.

Table 6 Correlations between latent factors for SDQ subscales and DAWBA RAD/DSED scales (N=122)

Factor	F1	F2	F3	F4	F5	F6
F1 SDQ Emotional Symptoms	1.00					
F2 SDQ Conduct Problems	0.69	1.00				
F3 SDQ Hyperactivity-Inattention	0.73	0.89	1.00			
F4 SDQ Peer Problems	0.68	0.80	0.69	1.00		
F5 DAWBA RAD	0.57	0.79	0.77	0.62	1.00	
F6 DAWBA DSED	0.50	0.53	0.70	0.60	0.59	1.00

SDQ Strengths and Difficulties Questionnaire, *DAWBA* Developmental and Well-Being Assessment, *RAD* reactive attachment disorder, *DSED* disinhibited social engagement disorder

Table 7 Correlations between gender, age, impairment, care conditions before placement, placement history, and help seeking behavior, SDQ subscale scores and the DSED and RAD scale scores ($N=122$)

	DSED <i>r</i>	RAD <i>r</i>
Gender	0.00	-0.18 ^a *
Age	-0.03	0.05
Age at first placement (years) [#]	0.19	0.11
Age when placed in current foster home [#]	0.23*	0.16
Years in current foster home [#]	-0.08	-0.19
Sum previous placements [#]	-0.01	-0.04
Violence exposure [#]	0.11	0.20
Parent's mental disorder [#]	-0.02	0.21*
Parent's drug/alcohol abuse [#]	-0.05	-0.04
Contact with CAMHS	0.27**	0.31**
School psychology services	0.26**	0.21*
SDQ impact scale	0.31**	0.44**

[#] =variables derived from the Child Protection Questionnaire: $n=92$. Contact with CAMHS assessed and/or received treatment by Child and Adolescent Mental Health Services, SDQ Strengths and Difficulties Questionnaire, RAD reactive attachment disorder, DSED disinhibited social engagement disorder. ^a boy=1, girl=2. * $p<0.05$; ** $p<0.01$

Whereas the DSED scale was rather normally distributed, the RAD scale was positively skewed. This implies that the behaviors measured by the RAD scale are rare in this sample, compared to the behaviors measured by the DSED scale, and this may indicate more deviant relational behavior among children whose scores are elevated on the RAD scale. The

finding that the conduct problem factor in SDQ had a higher trait correlation with the RAD factor than with the DSED factor, are in line with the interpretation that children with elevated scores on the RAD scale may be at higher risk of also having conduct problems.

The correlation between the RAD and DSED factors was strong ($r=0.60$), but comparable to correlations with and between other dimensions of psychopathology assessed with the SDQ. The high inter-correlations between the six psychopathology factors in Model 3 are consistent with the high comorbidity in this sample (Lehmann et al. 2013), and correspond to the relatively high associations between measures of attachment disorders and indicators of more general psychopathology reported in previous studies (Kay and Green 2013; Millward et al. 2006). This high interconnectedness may not be present in community samples with lower prevalence rates and less comorbidity. The present findings may be relevant to the argument for the use of dimensional assessment scales for symptom patterns that allow for profiles of symptom scores that may cross diagnostic boundaries (Rutter 2011) in high-risk samples. Still, our results show that these factors are separable into six distinct factors, corresponding to established dimensions of pathology.

Our results provide support for the conceptualization of attachment problems in two separate constructs describing aberrant social relatedness. However, a key question is whether the two constructs identified in the present study really represent disordered attachment, or rather some other psychological or social problem. The importance of social relationships in psychological development and for the understanding

Table 8 Contribution of RAD and DSED scale scores on functional impairment after controlling for SDQ Subscale scores of emotional symptoms, conduct problems, hyperactivity-inattention and peer

problems in four separate regression analyses; and contribution of each subscale score after controlling for all other subscale scores in a multiple regression analysis

		Carer rated level of functional impairment			
		DAWBA RAD / DSED controlled for one SDQ subscale at a time		All five subscales entered simultaneously	
DAWBA	SDQ	β	<i>p</i>	β	<i>p</i>
RAD $r=0.439$					
	Emotional Symptoms	0.29	0.000	0.036	0.622
	Conduct Problems	0.13	0.102	0.098	0.024
	Hyperactivity- Inattention	0.16	0.032	0.249	0.008
	Peer Problems	0.25	0.002	0.325	0.000
DSED $r=0.305$					
	Emotional Symptoms	0.14	0.107	0.213	0.008
	Conduct Problems	0.05	0.472	-0.170	0.023
	Hyperactivity-Inattention	-0.10	0.244	0.108	0.150
	Peer Problems	0.07	0.382	0.251	0.005
				0.411	0.000
				0.251	0.002

SDQ Strengths and Difficulties Questionnaire, DAWBA Developmental and Well-Being Assessment, RAD reactive attachment disorder, DSED disinhibited social engagement disorder. Functional Impairment is measured by the SDQ Impact scale

of mental disorders is well recognized (Rutter et al. 2009). Nevertheless, the diagnostic criteria for attachment disorders have been criticized for focusing on aberrant social behaviors and not specifically on attachment behaviors (O'Connor and Zeanah 2003). It has been argued that the defining feature of attachment disorders is a disturbance in the child's use of a primary caregiver as a source of safety and security. Studies of non-institutionalized children have led to the proposal of a distinction between "nonattachment" and "disordered attachment"; the latter referring to existing, but severely disturbed attachment relationships (Zeanah and Boris 2000). This distinction may be useful in framing the empirical findings of RAD and DSED behavior in both institutionalized children and in children reared in a context with a primary caregiver where the relationship poses danger and insecurity for the child.

Nevertheless, both higher age and the lack of institutional experience leave uncertainty about the validity of the concept of RAD and DSED in our sample. Also, given that the information about disordered attachment behavior are collected from foster parents, this behavior could be an expression of more general and broad pathology, caused by high comorbidity. However, if this was the case, one would then expect the third CFA model, where the RAD and DSED factors are analyzed together with four other different problem areas, to show substantial correlations between the RAD/DSED factors and the more established SDQ factors. Further, the model would present significant cross-loadings between the items of the RAD/DSED factors and the items of the SDQ factors. This was not the case in our sample, and this implies that that the concept of RAD and DSED are relevant for older foster children with a high prevalence of comorbidity.

A stronger trait-correlation between RAD and SDQ Conduct Problems, suggests a higher probability of developmental pathology for children with elevated RAD scores, relative to children with elevated DSED scores. However, we cannot rule out a negative effect of DSED that is mediated through concurrent internalizing or externalizing behavior.

In line with our findings of rather strong zero-order correlations between RAD and DSED behavior and functional impairment, the results also indicate positive associations between the two scales and use of mental health services. However, the multiple regression analyses clearly indicate that relations between the RAD and the DSED scales and help-seeking behavior and functional impairment seem to be explained by the associations between RAD /DSED behavior and externalizing and peer problem behaviors. These findings are in line with other studies indicating that externalizing behavior are more often detected, and receive adequate treatment (Chavira et al. 2004; Heiervang et al. 2007). Thus, it is possible that RAD and DSED behavior in children may be overlooked by carers in the presence of more externalizing problems. The negative association between DSED score

and SDQ Impact score in the model including all SDQ scales is somewhat surprising. This result needs to be replicated in further studies to test its validity.

The lack of associations between external correlates and measures of RAD/DSED is not in accordance with our previous findings, where both violence exposure and the number of previous placements were associated with the a binary indicator of the presence of DSM-IV attachment disorder (Lehmann et al. 2013). This could be a result of differences in the operationalization of attachment disorders and the statistical approaches used in the two studies. In the currently study, we used continuous DSED and RAD scale scores, rather than a dichotomous diagnostic classification.

Strengths and Limitations

The strength of this study lies in the use of structured, clinically relevant instruments in a large sample that is representative for children placed out of home due to maltreatment. Nonetheless, of the total sample of 198 children aged 6-10 years old, the foster parents completed the DAWBA RAD/DSED section for only 122 children. This may decrease the generalizability of our findings, by increased risk for non-response bias. However, the children with DAWBA RAD/DSED information did not differ from the children without a completed DAWBA RAD/DSED section in terms of age, gender or measures of mental health problems.

The size of our sample reduces the power of some statistical analyses. Our results regarding the external correlates may have been affected by our relatively small sample size and prevented us from demonstrating the associations identified in previous studies (Kay and Green 2013; Minnis et al. 2002). Therefore, our results should be replicated in a larger sample. However, great care was taken to control for whether the analyses caused inadmissible parameters (i.e., negative variances); and none were identified.

The use of SDQ yield rather broadly measured domains of child mental health problems. One might argue that more direct and detailed measures of central symptom dimensions would target the testing of the RAD/DSED constructs with more precision. Nevertheless, with relatively few items on each subscale, the good model fit for six factors in this study indicate that the SDQ subscales capture distinct and independent areas of pathology, and that they measure constructs different from that measured by the DAWBA RAD and DSED scales. This is of clinical relevance, as the SDQ is widely used as a screening instrument both in CAMHS and in the child protection services.

As indicated by the relatively low mean and standard deviation on the RAD scale scores in this study, the full range of RAD behaviors were probably not observed in the present sample. This may be due to low frequency of these relational problems in foster children, or low sensitivity for the DAWBA

RAD scale. Further studies with similar samples and alternate measures of RAD/DSED are needed to evaluate this.

In this study, we did not have access to observational data. Therefore, we do not know the correspondence between the carer information and the child's actual behavior. Nevertheless, moderate convergence has been identified between caregivers' reports of inhibited behavior and observed attachment behavior with the caregiver through the Strange Situation procedure (Zeanah et al. 2005). Furthermore, a caregiver's report on a child's "willingness to go off with a stranger" has shown a substantial convergence with the "Stranger at the Door procedure" (Zeanah and Smyke 2008). These findings lend support to the use of survey data based on caregiver reports to measure RAD/DSED behavior in children.

There is also a risk of common rater bias, as the foster parents were the sole informants on mental health disorders in this study, both on SDQ and the DAWBA RAD/DSED scale. On the other hand, our measures of adverse childhood experiences and placement variables were independent of foster parent rating.

Information on adverse childhood experiences was collected from caseworkers based on the children's case files. The advantage of this method is that all maltreatment reports in official records are legally evaluated and identification of the occurrence is not done by individuals that are involved in the research project, or are informed about the research aims. Nevertheless, it has been argued that the official records represent sources of information about factors leading to being "caught", rather than being a source of exhaustive information of maltreatment itself (Cicchetti and Toth 2005). Further, these data represent broad and general categories of exposure to maltreatment. The content of these indicators will vary from case to case regarding the onset or duration of the different types of exposure. For future studies, a standardized questionnaire or interview administered to foster parents and/or to the children themselves may be a supplement to the information found in the case files of the child protection offices.

Future Research Questions and Clinical Implications

Our report is consistent with an emerging literature showing that the concept of attachment disorders, originating from studies of extremely deprived children raised in orphanages, is also relevant to foster children without institutional rearing. Along with previous studies, our results strongly indicate that the constructs of RAD and DSED are valid and discrete dimensions of child malfunctioning. Further research in this area is needed, including longitudinal studies evaluating the predictive validity of RAD and DSED constructs regarding mental health outcomes in later developmental stages. Also needed are studies of intervention effects on RAD and DSED behaviors.

The current study indicates that the assessment of school-aged foster children should include not only screening of

internalizing and externalizing problems (e.g., with the SDQ), but also assessment of their relational functioning. More specifically, clinical alertness is warranted for children scoring positively on the DAWBA – RAD/DSED scale.

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Conflict of Interests The authors declare that they have no conflict of interest.

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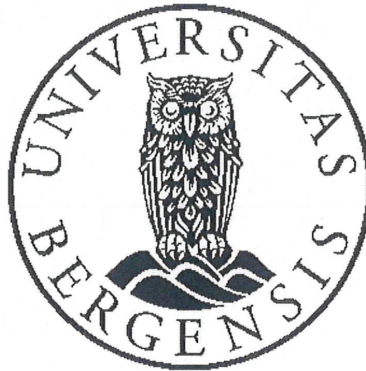
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**Errata for
Mental Disorders in Foster Children: A study of
Prevalence, Comorbidity and Risk Factors.**

Stine Lehmann



Thesis for the degree philosophiae doctor (PhD)
at the University of Bergen

Stine Lehmann

(signature of candidate)

P. Einar Biele

(signature of faculty)

27.05.2015

Errata

1. In Paper I: *Mental disorders in foster children: a study of prevalence, comorbidity and risk factors*, p.6, under the heading **Prevalence of disorders**; line 9:

“..section were included in the DAWBA, 23.2% (n = 46)” should read:

“..section were included in the DAWBA, 22.2% (n = 44)”.

Doctoral Theses at The Faculty of Psychology,
University of Bergen

1980	Allen, H.M., Dr. philos.	Parent-offspring interactions in willow grouse (<i>Lagopus L. Lagopus</i>).
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 socioeconomic Status. A survey among the adult population in Norway.
	Underlid, K., Dr. philos.	Arbeidsløse 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.	Antisocial 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.	Psychoimmunological 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 asymmetry 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 kjønnen. 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, N., 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
	Øygaard, 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.
	Dundas, Ingrid, Dr. psychol.	Functional and dysfunctional closeness. Family interaction and children's adjustment.
	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 tilnæringsmåte.
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.	Kvinnens 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	Ihlebak, 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	Thomsen, Tormod, Dr. psychol.	Localization of attention in the brain.
H	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: Experiential, 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	Mathisen, Gro Ellen, PhD	Climates for creativity and innovation: Definitions, measurement, predictors and consequences.
H	Sævi, Tone, Dr. philos.	Seeing disability pedagogically – The lived experience of disability in the pedagogical encounter.
	Wium, 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 consciousness 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 Knowledge 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 Kjellevoid	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 processes 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 psykoterapeutens 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-occurring 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 Sørebo	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)
	Leveresen, 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 pasientagresjon 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 heterogeneity 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 innvandererdommer og norskfødte med innvanderforeldre 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	« <i>The cancer treatment was only half the work!</i> » 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 Abaniami	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»

