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Astrid Røsland Seim

# Reactive Attachment Disorder and Disinhibited Social Engagement Disorder in Adolescence:

Construct validity, prevalence, comorbidity, and self-esteem among adolescents living in Norwegian residential youth care

**NTNU**  
Norwegian University of Science and Technology  
Thesis for the Degree of  
Philosophiae Doctor  
Faculty of Medicine and Health Sciences  
Department of Mental Health



Norwegian University of  
Science and Technology



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Trondheim, November 2021

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## Norsk sammendrag

### Reaktiv (RAD) og udiskriminerende (DSED) tilknytningsforstyrrelse hos ungdommer: Validitet, forekomst, samsykelighet og selvbilde blant ungdommer i barneverninstitusjoner

Reaktiv og udiskriminerende tilknytningsforstyrrelse i ICD-10 tilsvarer det som i DSM-5 betegnes som henholdsvis reactive attachment disorder (RAD) og disinhibited social engagement disorder (DSED). RAD og DSED er relativt hyppig forekommende blant barn utsatt for alvorlig omsorgssvikt i tidlige barneår. Feildiagnostikk er imidlertid vanlig, og kunnskap om RAD og DSED i ungdomsalder er svært mangelfull. Selv om symptomer på RAD og DSED kan vedvare, er det ukjent hvorvidt RAD og DSED bør betraktes som gyldige diagnoser i ungdomsalder, eller om symptomene da forklares bedre av andre psykiske lidelser. Kunnskap er også mangelfull om forekomsten av RAD og DSED i høy-risiko grupper, og samsykeligheten med andre psykiske vansker, lidelser og psykososiale problemer. Fordi selvbilde har betydning for ungdommers utvikling og helse, og kan mediere sammenhengen mellom omsorgssvikt i barndommen og senere psykiske helseplager, kan kunnskap om ulike aspekter av selvbilde gi viktig rettleiding i valg av behandling og tiltak for ungdommer som har opplevd omsorgssvikt. Selvbilde og dets ulike aspekter har imidlertid ikke tidligere vært undersøkt i ungdommer med RAD og DSED.

Formålet med studien var derfor å undersøke høy-risiko ungdommer for å kartlegge RAD og DSED i ungdomsalderen med tanke på diagnostisk gyldighet, forekomst, samsykelighet, og selvbilde. Data fra forskningsprosjektet *Psykisk helse hos barn og unge i norske barneverninstitusjoner*, innsamlet mellom 2011 og 2014, ga informasjon om RAD og DSED for 381 av totalt 400 deltagere i alderen 12 til 20 år. Spørreskjema og psykiatriske dybdeintervju med ungdommene og deres hovedkontakter i institusjonen ble benyttet. Tilgang til data fra Ung i Norge studien innsamlet i 1992 muliggjorde sammenligning av selvbilde mellom ungdommer med RAD eller DSED og 10 480 ungdommer i den generelle befolkningen.

Resultatene viste at symptomer på RAD og DSED var relativt hyppige blant ungdommer i norske barneverninstitusjoner, og forekomsten av diagnoser i henhold til DSM-5 kriterier var henholdsvis 9% RAD og 8% DSED. Symptomer på RAD og DSED utgjorde to distinkte diagnostiske fenomener og skilte seg både fra hverandre og fra andre vanlige psykiske lidelser i ungdomsalderen. RAD og DSED viste høy grad av samsykelighet med andre psykiske vansker, lidelser, og psykososiale problemer. Selvbilde for skolefungering var generelt lavt blant ungdommer i norske barneverninstitusjoner, uavhengig av RAD og DSED. Mange andre aspekter av selvbilde var imidlertid lavere blant ungdommer med en DSED diagnose, og sank med et økende antall RAD symptomer.

Oppsummert tyder studien på at RAD og DSED er gyldige diagnostiske fenomener i ungdomsalderen, og at høy-risiko ungdommer bør tilbys lett tilgang til bred psykiatrisk kartlegging av høy kvalitet, som inkluderer RAD, DSED, annen psykopatologi, psykososiale vansker, og ulike aspekter av selvbilde. I møte med høy-risiko ungdommer utsatt for tidlig omsorgssvikt, bør man forvente komplekse tilstandsbilder og høy grad av samsykelighet, og tilpasse behandling og tiltak deretter.

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## **English Abstract**

### **Reactive Attachment Disorder and Disinhibited Social Engagement Disorder in Adolescence: A study of construct validity, prevalence, comorbidity, and self-esteem among adolescents living in Norwegian residential youth care**

Reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) are relatively prevalent in children with a history of early inadequate care. However, misdiagnosis of RAD and DSED is common, and there is knowledge scarcity concerning RAD and DSED in adolescence. Controversy persists concerning the construct validity of RAD and DSED in adolescence, and little is known about their prevalence and comorbid psychopathology and psychosocial problems. Furthermore, because self-esteem predicts important life outcomes and mediates the relationship between childhood maltreatment and later psychopathology, knowledge is needed about the previously unstudied global and domain-specific self-esteem in individuals with RAD and DSED.

To promote adequate assessment and interventions for high-risk adolescents, this thesis aimed to investigate RAD and DSED in adolescents living in residential youth care (RYC) with respect to construct validity, prevalence rates, co-occurrence with other psychopathology and psychosocial problems, and global and domain-specific self-esteem. To do so, this study accessed data from the research project *Mental Health in Adolescents Living in Residential Youth Care*, collected between 2011 and 2014, which included 400 participants aged 12 to 20 years, among whom 381 had information available about RAD and DSED. In-depth semi-structured psychiatric interviews and questionnaires with the adolescents and their primary contacts in the RYCs were conducted to determine mental health problems, psychiatric symptoms and diagnoses, psychosocial problems, and global and domain-specific self-esteem. Access to data from the Young in Norway Study (YiN) of 10,480 adolescents in the general population permitted comparison of self-esteem between adolescents with RAD or DSED and adolescents in the general population.

The results revealed that RAD and DSED symptoms were relatively frequent in adolescents living in RYC, with a prevalence of 9% RAD and 8% DSED diagnosis. Further, RAD and DSED symptom clusters were distinct from each other and from those of other common psychiatric disorders. Nevertheless, adolescents with RAD or DSED symptoms or diagnoses displayed high degrees of co-occurring emotional and behavioural psychopathology and psychosocial problems. The self-esteem of scholastic competence was low in adolescents living in RYCs regardless of

whether they had RAD and DSED. Additionally, having a DSED diagnosis or a high number of RAD symptoms increased the risk of low self-esteem in several domains.

In conclusion, the results support the construct validity of RAD and DSED in adolescence and indicate the importance of providing high-risk adolescents with high quality comprehensive mental health assessment, including RAD, DSED, psychopathology, and psychosocial problems. This assessment should include measures of global and domain-specific self-esteem. Notably, efforts should be made to grasp and acknowledge the complexity and co-occurrence of individual mental health problems in high-risk adolescents, and treatment plans should be adjusted accordingly.



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- (1) *Mental Health in Adolescents living in Residential Youth Care* (RYC study), for which data collection was funded by the Norwegian Directorate for Children, Youth and Family Affairs, the Norwegian Directorate of Health, and RKBU at NTNU.
- (2) The *Young in Norway* study (YiN study), for which data collection was supported by grants from the Norwegian Research Council.

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## List of Papers

### Paper I

Seim, A.R., Jozefiak, T., Wichstrøm, L., & Kayed, N. S. (2020). Validity of reactive attachment disorder and disinhibited social engagement disorder in adolescence.

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### Paper II

Seim, A. R., Jozefiak, T., Wichstrøm, L., Lydersen, S., & Kayed, N. S. (2020). Reactive attachment disorder and disinhibited social engagement disorder in adolescence: co-occurring psychopathology and psychosocial problems. *European Child & Adolescent Psychiatry*, 1-14.

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### Paper III

Seim, A. R., Jozefiak, T., Wichstrøm, L., Lydersen, S., & Kayed, N. S. (2021). Self-esteem in adolescents with reactive attachment disorder or disinhibited social engagement disorder. *Child Abuse & Neglect*, **118**, 105141.

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## **Scientific environment**

The dissertation is presented at the Norwegian University of Science and Technology (NTNU).

Main supervisor: Nanna Sønnichsen Kayed, Department of Mental Health, Faculty of Medicine and Health Sciences, NTNU

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## Abbreviations

ADHD	Attention-Deficit/Hyperactivity Disorder
ASD	Autism Spectrum Disorder
CAPA	Child and Adolescent Psychiatric Assessment
CBCL	Child Behaviour Checklist
CD	Conduct Disorder
CFA	Confirmatory Factor Analysis
CI	Confidence Interval
CPS	Child Protective Services
DSED	Disinhibited Social Engagement Disorder
DSM	Diagnostic and Statistical Manual of Mental Disorders
ICD	International Classification of Diseases
IWM	Internal Working Model
LPA	Latent Profile Analysis
ODD	Oppositional Defiant Disorder
OR	Odds Ratio
PAPA	Preschool Age Psychiatric Assessment
PTSD	Posttraumatic Stress Disorder
RAD	Reactive Attachment Disorder
RYC	Residential Youth Care
SPPA	Self-Perception Profile for Adolescents
UNCRC	United Nations' Convention on the Rights of the Child

## Key Concepts

**Alternative care:** All forms of placement in non-parental care, which in Norway mainly includes kinship care, foster care, and residential youth care.

**Attachment:** The attachment relationship refers to an emotional bond primarily developed between a child and its caregiver(s). Depending on the quality of the caregiver–child interactions, the child embarks on a balance between exploratory behaviour and attachment behaviour and develops a pattern of how it relates to the caregiver when feeling distressed, categorised as either secure (style B) or insecure attachment (style A, C, or D), normally established by the age of 7–9 months.

**Behavioural psychopathology:** Externalising mental health problems and symptoms or disorders of attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), or oppositional defiant disorder (ODD).

**Child maltreatment, abuse, and neglect:** Child abuse refers to any caregiver acts of commission that cause harm, threat of harm, or potential for harm, whereas child neglect refers to caregiver omissions that fail to cover a child’s basic needs. Child maltreatment includes any abuse or neglect by a caregiver.

**Child Protection Service (CPS):** The public agency responsible for ensuring that all children and adolescents grow up in a secure caregiving environment. The work of the CPS therefore includes investigations of and interventions in caregiving environments, and if needed, decision and provision of placement in alternative care.

**Disinhibited social engagement disorder (DSED):** A diagnostic construct defined by the DSM-5 and characterised by indiscriminate and disinhibited social behaviour following severely inadequate care in early childhood. Corresponds to the disinhibited subtype of the DSM-IV RAD diagnosis, and to the ICD-10 indiscriminate attachment disorder.

**Disorganised attachment:** A pattern of attachment behaviour characterised by no clear strategy for handling distress, and categorised as insecure attachment, style D. For example, the child may in situations of distress appear unable to choose between approach and avoidance of the caregiver, and may exhibit frozen, misdirected, interrupted, or dissociative behaviour. Disorganised attachment is *not* necessarily indicative of psychopathology or a history of maltreatment, however, is considered a *risk factor* for psychopathology.



**Emotional psychopathology:** Internalising mental health problems and symptoms or disorders of anxiety or depression.

**Psychopathology:** Mental health problems, symptoms, or disorders.

**Psychosocial problems:** Difficulties in various psychological and social functioning areas may be related to mental health across diagnostic categories. In this thesis, psychosocial problems include suicidal ideation and behaviour, non-suicidal self-harm, exposure to bullying, contact with the police, sexual behaviour for economic gains, alcohol and illegal substance use, and substance use for mood improvement.

**Reactive attachment disorder (RAD):** A diagnostic construct defined by the DSM-5 and characterised by socioemotional withdrawal and aberrant attachment behaviour following severely inadequate care in early childhood. It corresponds to the inhibited subtype of the DSM-IV RAD diagnosis and to the ICD-10 reactive attachment disorder.

**Residential youth care:** Publicly or privately owned alternative care units resembling family homes and typically housing three to five residents, where the caregivers are employed and work shift hours, although stability and continuity are strived for.

**Self-esteem:** Self-evaluation of one's own worthiness and abilities in multiple domains.



# 1 Introduction

## Topic of the thesis

This thesis investigated (1) whether reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) are valid diagnostic constructs in adolescence, (2) the degree to which they co-occur with other types of psychopathology and psychosocial problems in adolescence, and (3) the degree to which they are associated with low global and domain-specific self-esteem in adolescence.

### 1.1 Rationale of the thesis

RAD and DSED are severe psychiatric disorders that arise in early childhood and are presumably caused by extremely insufficient care, such as persistent social neglect (American Psychiatric Association, 2013). Longitudinal studies of early institutionalised and severely deprived children have indicated that symptoms of RAD and DSED may persist into adolescence and early adulthood (Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018; Humphreys, Nelson, et al., 2017; Sonuga-Barke et al., 2017; Tizard & Rees, 1975), but controversy has remained as to whether such symptoms in adolescence are better described by more common disorders (e.g. depression, anxiety, posttraumatic stress disorder [PTSD], and attention-deficit/hyperactivity disorder [ADHD]), or still represent RAD and DSED. Existing knowledge about RAD and DSED is largely based on a highly selected group, exposed to severe social, psychological, nutritional, emotional, and physical deprivation in early institutional care (Guyon-Harris et al., 2021; Zeanah & Gleason, 2015), in regimes neglectful of fundamental childhood needs and human rights. The results from such children cannot necessarily be transcribed to children more typically seen by clinicians in the Western world, who may be subject to abuse and neglect by their caregivers, but not necessarily be nutritionally deprived or lack physical and cognitive stimulation. Although RAD and DSED have also been demonstrated in children exposed to in-family maltreatment, research on RAD and DSED has mostly included preschool and school-age children; few studies have explored RAD and DSED in adolescence (Zeanah & Gleason, 2015).

RAD and DSED tend to be misdiagnosed, either by overidentification (Allen & Schuengel, 2020; John et al., 2019; Woolgar & Baldock, 2015; Woolgar & Scott, 2014), underidentification (Scheper et al., 2018; Zimmermann & Soares, 2019), or correct identification but with missed diagnostics of comorbid disorders, warranting knowledge about the RAD and DSED prevalence in high-risk groups frequently encountered by clinicians and social workers, and the rates of co-

occurring psychopathology and psychosocial problems. In addition to being a potential cause of RAD and DSED, childhood maltreatment is a major risk factor for other psychopathology and poor self-esteem (Harter, 2012; Hughes et al., 2017; Lang et al., 2020; Norman et al., 2012; Sonuga-Barke et al., 2017). Poor self-esteem may mediate the association between childhood maltreatment and later psychopathology (Flynn et al., 2014; Ju & Lee, 2018; Turner et al., 2015) and is associated with a low quality of life in high-risk adolescents (Jozefiak et al., 2017). Therefore, self-esteem interventions may, if effective, reduce the risk of additional psychopathology and enhance the quality of life in high-risk adolescents, including those with RAD and DSED. However, knowledge is scarce about self-esteem in individuals with RAD and DSED, particularly in adolescence. Self-esteem interventions targeting specific self-esteem domains have evidenced more effective than general interventions (O'Mara et al., 2006). Therefore, clinicians need more knowledge about RAD and DSED in adolescence, including their construct validity, prevalence, comorbidity, and associations with global and domain-specific self-esteem.

Because RAD and DSED are rare disorders in the general population, they are more easily studied in high-risk samples, such as in individuals under the care of child protection services (CPS). One such very high-risk group, which may be frequently encountered by clinicians and child welfare workers in the Western world, is adolescents living in residential youth care (RYC)—with high exposure rates to child maltreatment and poly-victimisation prior to placement (Greger et al., 2015), multiple placement disruptions, and high levels of psychiatric morbidity (Jozefiak et al., 2016). Therefore, access to data from a national study of adolescents living in Norwegian RYCs with both questionnaires and in-depth psychiatric interviews of the adolescents and their primary contacts in RYC, provided an important opportunity to investigate RAD and DSED in adolescence. Furthermore, data from a national study of adolescents in the general population in Norway allowed comparing the global and domain-specific self-esteem between adolescents with RAD or DSED and adolescents in the general population.

## 1.2 Theoretical framework

*“From every perspective, psychological, cognitive, physiological, and evolutionary, theories underscore relationality as the principal organizer of human experience” (Atkinson, 2019).*

The framework of developmental psychopathology presents a biopsychosocial and transactional understanding of how direct and indirect casual processes may lead to psychopathology, combined with consideration of developmental factors, such as age-dependent periods with increased vulnerability, and cascade effects of the nature—nurture interplay over time, all intertwining to determine the onset and course of psychopathology (Cicchetti & Rogosch, 2002; Rutter & Sroufe, 2000; Sroufe, 2013). The biopsychosocial model proposes that an individual’s mental health is a product of interactions between biological (e.g. genetic composition), psychological (e.g. temperament), and social (e.g. caregiving environment) factors (Engel, 1977; George & Engel, 1980). The attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1969) maps onto the biopsychosocial model and elaborates on how caregiving environments may influence a child’s socioemotional development, including the formation of relational behavioural patterns (secure, insecure, or disorganised attachment styles) (Ainsworth et al., [1978] 2015). These, in turn, may contribute to positive or negative developmental cascades (Masten & Cicchetti, 2010), with importance for brain development (Schoore & Schoore, 2008), emotional regulation capacity (Desatnik et al., 2021; Mukerji et al., 2021; Schoore & Schoore, 2008), and social functioning (Groh et al., 2014), and act as resilience or risk factors for subsequent psychopathology (Fearon et al., 2010; Groh et al., 2012; Schoore & Schoore, 2008; Sroufe et al., 1999; van Ijzendoorn & Bakermans-Kranenburg, 2003). Notably, attachment formation must be understood in light of the transactional model (Humphreys & Zeanah, 2015; Sameroff, 2009; Sroufe et al., 1999) where both the caregiver and the child contribute to the interaction in a bidirectional process that actively forms the quality of the relationship and influences both the caregiver’s parenting practice and the child’s development (Sameroff, 2009). Biological and psychological predispositions of both the child and caregiver affect the child’s developmental trajectory (Schoore & Schoore, 2008). Caregivers tend to transmit their attachment representations to their children, partially mediated by caregiver sensitivity (Verhage et al., 2016). Moreover, the child–caregiver dyadic process is reciprocally influenced by external environmental factors, both in proximal (family, kindergarten, school, and neighbourhood) and more distal sociocultural contexts in which they live (Bronfenbrenner, 1979). Attachment studies in various cultures around the world have confirmed the universality of children’s attachment behaviour in moments of distress; normativity of differentiating between attachment figures and strangers; formation of different attachment styles depending on caregiving qualities;

and association between sensitive caregiving, secure attachment, and child competencies, indicating cross-cultural validity of the attachment theory (Mesman et al., 2016).

Incorporating all of the above, the framework of developmental psychopathology considers continuities and discontinuities in the understanding of mental health, both with regard to conceptualisation—as psychopathology may be understood on a continuum from normal to abnormal (continuity), or as something qualitatively different from normative mental health (discontinuity)—and with regard to measurement, where psychopathology may be measured as dimensional (e.g. symptom scales) or categorical (e.g. diagnoses) constructs (Cicchetti & Rogosch, 2002; Rutter & Sroufe, 2000). The perspectives of developmental psychopathology build on research on risk and protective mechanisms, factors of resilience, importance of cognitive and emotional attribution or processing of experiences, role of attachment relationships, and interplays between nature and nurture, individuals and their environment, and various developmental domains (Rutter & Sroufe, 2000). Therefore, the framework of developmental psychopathology may be useful to understand the developmental needs and complex clinical pictures often presented in children and adolescents with a history of maltreatment, including those with RAD or DSED.

RAD and DSED are severe psychiatric disorders that arise in early childhood and are presumably caused by persistent social neglect or other extremely insufficient care impairing stable attachment formation (American Psychiatric Association, 2013). Social neglect is as damaging as physical or sexual abuse (Gilbert et al., 2009) and frequently (80%) co-occurs with other maltreatment types, particularly physical and emotional abuse (Negri et al., 2019). Therefore, although physical or sexual child abuse has not, in the absence of social neglect, been found to induce RAD or DSED (American Psychiatric Association, 2013; Humphreys & Zeanah, 2015), individuals with RAD or DSED after parental social neglect are likely to have additional exposures to child abuse, potentially further impairing health and development. Hence, to understand the background, context, and risks of adolescents with (and without) RAD and DSED living in RYC, knowledge about social neglect, co-occurring forms of child maltreatment, social setting, and CPS may be valuable. The following section provides information about child maltreatment, followed by a section about the social setting and CPS in Norway, before proceeding to elaborate on RAD, DSED, and related topics relevant to this thesis.

## **1.3 Child maltreatment**

### **1.3.1 Definitions and prevalence**

Child maltreatment may be defined as “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (Barnett et al., 1991; Leeb et al., 2008). Induced harm may appear with or without time delay, need not be intended, and includes physical, psychological, or sexual abuse in childhood, with or without exposure to neglect (Gilbert et al., 2009; Lang et al., 2020; Leeb et al., 2008). Child neglect may be defined as “failure by a caregiver to meet a child’s basic physical, emotional, medical/dental, or educational needs” (Barnett et al., 1991; Leeb et al., 2008) that within the existing sociocultural setting are regarded as caregiver responsibilities (Baer & Martinez, 2006). Thus, child neglect includes emotional unresponsiveness or denial of a child, and failure to ensure a child’s safety (Barnett et al., 1991; Gilbert et al., 2009; Leeb et al., 2008).

Although consensus definitions of child maltreatment include the abuse or neglect by any caregiver (including teachers), parents or guardians are responsible for more than 80% of child maltreatment (except sexual abuse, which is more often committed by other relatives or acquaintances) and more than 87% of neglect (Gilbert et al., 2009). Parental factors that are strongly associated with an increased risk of child maltreatment include low education, substance use including alcohol (estimated as a factor in 80% of US child maltreatment (Reading et al., 2009)), mental health problems, own exposure to childhood maltreatment, and living in poverty (Gilbert et al., 2009; Negriff et al., 2019). Norwegian estimates indicate that 23% of children younger than 18 years have at least one parent with a psychiatric disorder of sufficient severity to likely affect parental daily functioning (Torvik & Rognmo, 2011). In high-income countries, girls are more at risk of sexual abuse than boys, whereas the risk of other maltreatment types is comparable between sexes (Gilbert et al., 2009). Child maltreatment is more prevalent in young children (Lewis et al., 2019; Zeanah & Humphreys, 2018), and the onset is most often prior to age 5 years (Zeanah & Humphreys, 2018). Young children are at particular risk of maladaptive outcomes following child maltreatment, due to higher stress vulnerability and higher impact on developmental trajectories than in older ages (Cowell et al., 2015; Humphreys & Zeanah, 2015; Zeanah & Humphreys, 2018). Many children have experienced multiple types of maltreatment (Gilbert et al., 2009; Kessler et al., 2010; Negriff et al., 2019), which is associated with increased risk of repeated victimisation throughout childhood, increased maltreatment severity, and more serious mental health burdens (Cecil et al., 2016; Cuevas et al., 2009; Ford & Delker, 2018; Gilbert et al., 2009; Turner et al., 2015).

Child maltreatment represents a violation of fundamental human rights (UN Convention on the Rights of the Child, UNCRC) (UN General Assembly, 1989). It is a major public health problem worldwide and is the cause of substantial individual and socioeconomic burden in high-income countries as well as globally (Gilbert et al., 2009; Reading et al., 2009). Global estimates indicate a 36% prevalence of emotional child abuse (Stoltenborgh et al., 2012) and a 54% annual worldwide prevalence of any violence against children aged 2–17 years (Hillis et al., 2016). However, prevalence rates vary greatly between regions, with estimates for Europe (12%) being considerably lower than for Africa (50%), Asia (64%) and the Americas (34–56%) (Hillis et al., 2016). In high-income countries, 4–16% of children are exposed to physical abuse every year, and approximately 10% are exposed to emotional abuse or neglect; cumulative childhood prevalence rates are higher (Gilbert et al., 2009). In a study of 2,062 adolescents in the general Norwegian population, 9.6% reported any parental physical abuse, 1.8% reported serious parental physical abuse, 6.6% reported parental emotional abuse, and 8.5% reported exposure to neglect (Myhre et al., 2015). In the cases of exposure to neglect, RAD and DSED are potential outcomes, although other maladaptive outcomes may be more common.

### **1.3.2 Maladaptive outcomes of child maltreatment**

During the past two to three decades an array of high-quality studies worldwide, including meta-analyses, systematic reviews, longitudinal studies using prospective and retrospective measures, and natural randomised controlled trials, have convincingly documented the associations between childhood adversities and poor social, physical and psychological outcomes (Edwards et al., 2003; Felitti et al., 1998; Gilbert et al., 2009; Hughes et al., 2017; Kessler et al., 2010; Lang et al., 2020; Negriff et al., 2019; Reuben et al., 2016; Zeanah & Sonuga-Barke, 2016). Although genetic and environmental factors may have confounding effects (Dinkler et al., 2017), childhood maltreatment is a recognised causal factor of poor health, including a range of psychopathology and psychosocial problems throughout childhood, adolescence, and adult life (Gilbert et al., 2009; Hughes et al., 2017; Lang et al., 2020; Negriff et al., 2019; Norman et al., 2012; Reuben et al., 2016; Zeanah & Sonuga-Barke, 2016). In accordance with the biopsychosocial perspectives of developmental psychopathology, child maltreatment increases the risk of not only trauma- and stress-related disorders (such as PTSD, RAD, and DSED) but also concurrent and subsequent neurodevelopmental, emotional, behavioural, and substance use disorders (Lansford et al., 2002; Zeanah & Humphreys, 2018), and there is evidence for a dose–response relationship (Edwards et al., 2003; Lauterbach & Armour, 2016; Petruccioli et al., 2019; Woolgar & Simmonds, 2019;



Young-Southward et al., 2020; Zeanah & Sonuga-Barke, 2016). Furthermore, child maltreatment may have marked effects on a child's psychobiological development and increase the risk of dysregulated hormonal (stress and pubertal) systems, which are essential for adolescent development (Negriff et al., 2019; Trickett et al., 2011). Child maltreatment affects underlying transdiagnostic processes that, combined with large interindividual variances in timing, types, length, and severity of exposures, and diverse biopsychosocial conditions, generate substantial differences in types and levels of mental health outcomes between individuals (Humphreys, Fox, et al., 2017; Sroufe, 2013; Woolgar & Simmonds, 2019). A single maltreatment type may lead to various mental health outcomes (multifinality), and a range of maltreatment types may lead to a single mental health outcome (equifinality) (Cicchetti & Rogosch, 1996).

Efforts to differentiate outcomes of various types of adversity indicate that traumatic events (e.g. abuse) may predict disruptions in the limbic system, including increased sensitivity and reactivity to threats (overactive amygdala), decreased learning and memory function (poor hippocampal function) (McLaughlin et al., 2014; McLaughlin et al., 2019; Sheridan & McLaughlin, 2014), and decreased emotional regulation capability (reduced regulation of the amygdala by the medial prefrontal cortex) (McLaughlin & Lambert, 2017). The consequent impairments in social information processing and discriminative abilities between threats and safety may, mediated by emotion regulation difficulties, increase the risk of emotional and behavioural problems, in addition to PTSD (McLaughlin & Lambert, 2017). Early inadequate care by deprivation (e.g. neglect), on the other hand, may to a larger degree impact neuronal proliferation and pruning, and predict reduced social cognition, language, learning, and executive functioning (by reduced cortical thickness in related areas, e.g. prefrontal cortex (PFC), and reduced myelination in the corpus callosum and PFC) (McLaughlin et al., 2014; McLaughlin et al., 2017; McLaughlin et al., 2019; Sheridan & McLaughlin, 2014). In accordance, RAD and DSED—being outcomes of serious social neglect and deprivation—have been associated with language delays (Sadiq et al., 2012; Smyke et al., 2002) and, although the findings are equivocal, reduced cognitive functioning (Pritchett, Pritchett, et al., 2013; Rutter et al., 2007). Furthermore, DSED symptoms have been proposed to reflect impaired inhibitory control due to developmental deviations in the PFC (Pears et al., 2010). However, although social neglect may primarily impair child development by *deprivation* effects through inadequate social, emotional, and cognitive stimulation (Guyon-Harris et al., 2021; McLaughlin et al., 2014; Sheridan & McLaughlin, 2014), neglectful caregiving environments and the absence of a responsive caregiver may, in young children, also induce stress responses (McLaughlin et al., 2017; Mesman et al., 2009; Tronick et al., 1978) and be perceived as a

significant *threat* to survival (Bowlby, 1969; McLaughlin et al., 2014). Hence, even in the potential absence of additional abuse, neurodevelopmental outcomes of severe social neglect may involve the effects of persistent threat and activated stress responses, including emotion regulation problems, decreased ability to discriminate threats from safety, and increased sensitivity and reactivity to threats (McLaughlin et al., 2014; McLaughlin et al., 2017; Sheridan & McLaughlin, 2014). Possibly reflective of such dual threat and deprivation effects, the diagnostic criteria of RAD include both minimal emotional responsiveness and heightened irritability and fearfulness (American Psychiatric Association, 2013). However, unclarities remain regarding specific pathways from early maltreatment to child outcomes, with regard to both RAD/DSED (Lehmann et al., 2020) and psychopathology in general (Guyon-Harris et al., 2021), although abuse and neglect both increase the risk of a range of psychopathology and psychosocial factors.

At the population level, child maltreatment may be the largest single environmental predictor of psychopathology (Zeanah & Humphreys, 2018), and may account for approximately 30% of childhood- or adolescent-onset psychiatric disorders across countries (Green et al., 2010; Kessler et al., 2010; McLaughlin et al., 2012). The rates of emotional, behavioural, and substance use disorders are two to three times higher in maltreated compared with non-maltreated children and adolescents (Briggs-Gowan et al., 2000; Lewis et al., 2019; Negriff et al., 2019; Zeanah & Humphreys, 2018). Psychosocial problems and risk behaviours such as suicidality, self-harm, risky sexual behaviour, alcohol and illicit drug use, substance use for mood improvement, and delinquency, have also consistently been found to be associated with child maltreatment (Gilbert et al., 2009; Leeb et al., 2008; Lewis et al., 2019; Negriff et al., 2019; Norman et al., 2012; Petruccioli et al., 2019; Trickett et al., 2011). Notably, for behavioural problems, the association with child maltreatment may be bidirectional, and children with neurodevelopmental disorders or disabilities have a higher risk of being maltreated (Danese et al., 2017; Dinkler et al., 2017; Humphreys & Zeanah, 2015; Lacey & Minnis, 2020; Lang et al., 2020; Maclean et al., 2017; Stern et al., 2018).

Of relevance to direct and indirect pathways to psychopathology, children with inadequate caregiving experiences are more likely to engage in insecure or disorganised attachment behaviour (Cicchetti et al., 2006; Cyr et al., 2010; Van Ijzendoorn et al., 1999), display a less coherent sense of self and reduced perception of self-worth (Harter, 2012), to a lesser degree master self-regulation of emotional activation, and be less capable of forming healthy social relations (Schore & Schore, 2008). However, adverse effects of child maltreatment need not be permanent, and developmental trajectories may be adjusted by subsequent experiences (Cicchetti & Rogosch, 2002; Sonuga-Barke et al., 2017). Because of high neuroplasticity in young individuals (Weyandt et al., 2020), combined

with the broad and cumulative effects of developmental cascades across domains (Masten & Cicchetti, 2010; Negri et al., 2019; Rutter & Sroufe, 2000), interventions in childhood and adolescence may be largely beneficial, with higher developmental and socioeconomic return on investment in earlier ages (Fox et al., 2017; Fox et al., 2011; Heckman, 2006, 2007; Humphreys et al., 2020; Nelson et al., 2007; Sonuga-Barke et al., 2017; Sroufe, 2013), underlining the importance of appropriate and timely CPS interventions. To better guide CPS decisions and interventions, knowledge is needed about the mental health and self-esteem of adolescents living in RYC, which is largely lacking for RAD and DSED.

## **1.4 Child protection in Norway**

### **1.4.1 Socioeconomic setting**

Norway is a country with 5.4 million inhabitants (Statistisk sentralbyrå, 2021), where 22% are younger than 18 years, of whom 15% are immigrants or children of immigrants (Skogen et al., 2018). There has been peace in Norway since the termination of the second world war in 1945, and the country has undergone enormous economic growth during the past 50–60 years, following the discovery of oil and gas in Norwegian territories (United Nations Association of Norway, 2021). The living standard in Norway is among the highest in the world (United Nations Association of Norway, 2021), and Norway is at the top of the Human Developmental Index—based on life expectancy at birth, expected years of schooling, and gross national income per capita (United Nations Development Programme, 2020a)—and ranks high on the Inequality-adjusted Human Development Index (United Nations Development Programme, 2020b). Norway has an extensive social welfare system, with high-quality public health services and education at the government's expense. In a European context, Norway has a low poverty level, and along with other Scandinavian countries and the Netherlands, the multidimensional poverty level is lower than expected based on average income levels (Whelan et al., 2014). Nonetheless, more than 10% of children in Norwegian households live in persistent poverty, defined as a 3-year period with a household income lower than 60% of the country's median income level (Bufdir.no, 2021a). These children, an increasing group in Norway and amounting to 115,000 in 2019 (Bufdir.no, 2021a), are at higher risk of a range of negative outcomes, including child maltreatment and poor mental health.

Although children and adolescents in the general Norwegian population are relatively healthy, the socioeconomic discrepancy seems to be increasing even in Norway (Mackenbach et al., 1997; Skogen et al., 2018). As elsewhere, lower socioeconomic status in Norway is associated with

a markedly higher risk of psychopathology (Wichstrøm et al., 2012). Furthermore, socioeconomic differences in psychopathology are increasing (Elgar et al., 2015; Skogen et al., 2018), and the associations between parental socioeconomic status and children’s mental health and well-being are evident from childhood until adulthood (Skogen et al., 2018). Receipt of services from the Norwegian CPS is associated with lower family socioeconomic status, non-Norwegian ethnicity, and poor mental health (Backe-Hansen et al., 2014; Bufdir.no, 2020; Christiansen et al., 2019; Heradstveit et al., 2020; Iversen et al., 2007; Nilsen et al., 2021; Staer, 2016). Moreover, children receiving CPS services in Nordic countries, including Norway, have an increased risk of disadvantageous outcomes later in life, including poor health, family disruptions or other problems in family relations, teenage pregnancy, risk of suicide or violent death, lower education and academic performance, higher unemployment, substance-related problems, and higher dependency on governmental benefits (Backe-Hansen et al., 2014; Heradstveit et al., 2020; Lehmann, 2015; Lehmann & Kayed, 2018; Pösö et al., 2014). Notably, a study of the Norwegian CPS found that the most vulnerable families are marginalised within the CPS system and receive the least family intervention and support from the CPS (Clifford et al., 2015).

#### **1.4.2 CPS values, legislation, and practice**

Children’s universal rights are elaborated in the UNCRC (UN General Assembly, 1989) and incorporated into Norwegian law (Lovdata.no, 2014). The child’s best interest is an overriding principle and a defined primary consideration in all actions by the CPS and other administrative authorities (Lovdata.no, 2014, 2020). Furthermore, in compliance with the UNCRC—where the family is considered to be the fundamental growth environment for children—and with the principle of ‘the least intrusive form of intervention’, the Norwegian CPS has a family-preserving focus where the primary aim is to help children and families within their homes (Bufdir.no, 2021c; Lehmann & Kayed, 2018; Pösö et al., 2014). Accordingly, approximately 66% of children and adolescents who receive services from the CPS remain placed within their biological family during the CPS intervention (Bufdir.no, 2020). Meanwhile, when for various reasons it is judged not in a child’s best interest to remain in the family environment, the UNCRC proclaims the state’s responsibility to provide the child with special protection and assistance by placement in alternative care (Lovdata.no, 2014). Accordingly, Norwegian legislation proclaims that the State may assume the care of a child if the current caregiving environment is seriously deprived (for example, due to child maltreatment) and the child’s development or health will likely continue to suffer significantly in that environment (Lovdata.no, 2020). Nonetheless, as opposed to many other Western countries

in which the CPS may emphasise child protection more strongly than family perseverance (Christiansen & Anderssen, 2010; Heradstveit et al., 2020), the Norwegian CPS will even in quite adverse caregiving environments first and foremost prioritise in-home services (Pösö et al., 2014). Only in cases when a child's basic needs cannot be met within the family setting despite the provision of CPS in-home services, will placement in alternative care become relevant (Bufdir.no, 2020; Pösö et al., 2014). Then, the question of placement is usually treated juridically by court proceedings, requiring a court decision that out-of-home placement is in the child's best interest (Pösö et al., 2014). On average, when children are placed in alternative care, the family will have received support from the CPS for 3 years (Christiansen & Anderssen, 2010).

Reflective of the CPS family persevering focus, most RYC participants in this study were relatively old and had attained school age at their first placement in alternative care (Table 1, page 52), implying a potential risk of more longstanding maltreatment and complex and enduring mental health problems (Jones et al., 2011; Tarren-Sweeney, 2018). Foster care is the preferred placement type by the CPS, and RYC is a last resort (Backe-Hansen et al., 2011), typically considered in cases with repeated placement breakdowns, substantial behavioural or substance use problems, or in other cases where foster care is regarded as futile (Backe-Hansen et al., 2014; Bufdir.no, 2021b). Hence, in line with international findings (Ford et al., 2007; Tarren-Sweeney, 2018), and as reflected by findings that RYC residents (Jozefiak et al., 2016) in Norway have higher rates of psychiatric disorders, placement disruptions, and higher age at first placement compared with foster children (Lehmann et al., 2013), adolescents living in Norwegian RYCs may represent the group at highest risk of negative outcomes among young people in Norwegian alternative care (Backe-Hansen et al., 2014).

#### **1.4.3 Risk exposure of children and adolescents in alternative care**

From an international perspective, only a minority of cases of physical abuse in young children are investigated by the CPS (Gilbert et al., 2009), and Norwegian CPS annually investigates the care conditions for approximately 3% to 4% of young people aged 0–22 years living in Norway (Bufdir.no, 2020). Considering available prevalence estimates of child maltreatment in the general Norwegian population (as indicated in Chapter 1.3.1), it seems evident that, also in Norway, many children subject to child maltreatment go undetected by the CPS.

Although the CPS has major responsibilities for children and adolescents with delinquency or substance abuse problems (Lovdata.no, 2020; Pösö et al., 2014) inadequate caregiving conditions

are in Norway the main reasons for contact with the CPS (Kojan & Lonne, 2012; Valset, 2014), and emotional neglect is the main reason for placements in alternative care (Myrvold et al., 2020). Furthermore, although in some cases decisions to place an adolescent in RYC may be primarily due to behavioural problems or substance use, the initial contact with the CPS might have included factors in the home environment such as maltreatment, neglect, parental drug use or parental mental illness (Greger, 2017). Indeed, a study of school-age children in Norwegian foster care revealed that before placement, 86% had been exposed to serious neglect, 36% had been subject to emotional or physical abuse, 55% had reported parental alcohol or substance abuse, and 53% had reported parental mental disorders (Lehmann et al., 2013). In a study of the adolescent RYC population investigated in this thesis, 78% of the girls and 60% of the boys reported memories of child maltreatment, and social neglect was considered part of the pre-placement history for practically all participants (Greger et al., 2015). Overall, recalling the CPS placement criteria (Lovdata.no, 2020) and that most cases of child maltreatment commence in preschool years, the adolescents living in RYC and participating in this study were considered likely to have histories of severely insufficient care in early childhood, thereby fulfilling the DSM-5 exposure criteria of RAD and DSED.

## **1.5 Reactive attachment disorder and disinhibited social engagement disorder**

### **1.5.1 History and diagnostic classification**

The first descriptions of behaviours characteristic of RAD and DSED in children exposed to early severe deprivation were published in the mid-1940s (Goldfarb, 1945; Levy, 1947; Zeanah & Gleason, 2015). However, it was not until 1980—with the introduction of the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 1980)—that attachment disorders were defined and introduced as part of the diagnostic nosology. Research on attachment disorders was extremely scarce for nearly two decades, and not until 1998 did a study address the validity of their diagnostic criteria (Boris et al., 1998; Zeanah & Gleason, 2015). Although RAD and DSED remain among the least studied disorders in the DSM (Kay et al., 2016), major contributions during the past two decades allows the revised DSM-5 to be substantially more research-informed than the previous DSM editions (Zeanah & Gleason, 2015).

An important change with the introduction of the DSM-5 is the definition of RAD and DSED as two distinct disorders, contrasted to the DSM-IV, where their corresponding diagnostic constructs were defined as two subtypes—inhibited and disinhibited type, respectively—of one disorder. The original unification as one disorder consisting of two subtypes was based on observations that the same neglectful rearing environments with limited opportunities to form selective attachments to caregivers, could lead some children to develop behaviour characterised by emotional withdrawal and inhibition, displaying little or no attachment behaviour to anyone, whereas other children developed disinhibited social behaviour, failing to discriminate between familiar and unfamiliar adults, interpreted as a lack of selective attachment behaviour (Zeanah et al., 2016). However, research during the past two decades has indicated that although the two phenotypes may share a common aetiology, they not only differ substantially in their phenomenology, but also differ in their course, treatment response, correlates, and vulnerability factors (Rutter et al., 2009; Zeanah et al., 2016; Zeanah & Gleason, 2010; Zeanah & Gleason, 2015). Furthermore, whereas aberrant attachment behaviour is considered core to RAD (or the corresponding inhibited subtype of RAD in DSM-IV), persisting disinhibited and indiscriminate behaviour has since the introduction of DSM-IV been demonstrated in children regardless of attachment status (Zeanah et al., 2016). Therefore, in the revision to the DSM-5, the two DSM-IV subtypes of RAD were considered more adequately defined as two distinct disorders and DSED is no longer necessarily considered an attachment disorder (Zeanah et al., 2016), reflected by excluding the term ‘attachment’ from the DSED nomenclature. Although one study of foster placed adolescents supports that the distinction between RAD and DSED also applies in adolescence

(Lehmann et al., 2018), the DSM-5 division into two distinct disorders is primarily based on research of pre-school (Rutter et al., 2009; Zeanah & Gleason, 2010; Zeanah & Gleason, 2015) and school-age (Lehmann et al., 2016; Vervoort et al., 2013) children. There is a need to extend the knowledge base for RAD and DSED in adolescence.

The DSM is the most frequently applied nosology in research and the nosology of choice in this thesis. However, clinicians in Europe and many other parts of the world apply the International Classification of Diseases (ICD), a nosology published by the World Health Organization (WHO) (World Health Organization, 1992). The eleventh edition of the ICD was published in English in 2018 and formally approved by the WHO in 2019, but has not yet been implemented in Norway, where the ICD-10 is currently used by clinicians. Both the ICD-11 and ICD-10 classify the two phenotypes of RAD and DSED as two distinct disorders (World Health Organization, 1992, 2018). The ICD-11 applies the same nomenclature as the DSM-5, whereas the corresponding constructs in the ICD-10 are named reactive attachment disorder (corresponds to RAD in DSM-5), and disinhibited attachment disorder (corresponds to DSED in DSM-5). The ICD-10 diagnostic criteria for attachment disorders have been found to converge with the two RAD subtypes of DSM-IV (Zeanah & Gleason, 2015). Thus, the results in this thesis may be relevant for clinicians and researchers applying either the ICD or the DSM nosology.

### **1.5.2 Definitions and DSM-5 criteria**

The diagnostic criteria for both RAD and DSED require exposure to extremely insufficient care such as persistent social neglect, or other conditions impairing the child's chances of forming selective and stable attachments to caregivers, e.g. repeated changes in caregivers due to frequent placement disruptions in foster care or institutional care with high child to caregiver ratios (American Psychiatric Association, 2013). Insufficient care must precede RAD or DSED symptoms and be the presumed developmental cause of the behaviour characteristic of RAD and DSED (American Psychiatric Association, 2013). Both RAD and DSED require a developmental age of at least 9 months (American Psychiatric Association, 2013) to ensure that children have the developmental capacity to form attachment relationships with their caregivers and discriminate between familiar and unfamiliar adults (Scott et al., 2018).

The RAD phenotype is characterised by emotionally withdrawn and inhibited behaviour, and absent attachment behaviour towards caregivers is pathognomonic (American Psychiatric Association, 2013; Zeanah & Gleason, 2015). Accordingly, the RAD A criterion of the DSM-5



requires that the individual both fails to seek (RAD A1) and respond (RAD A2) to comfort from their caregiver when distressed (American Psychiatric Association, 2013). Additionally, the RAD B criterion require the presence of at least two of the following behavioural abnormalities: minimal social or emotional responsiveness; limited signs of positive affect; and expression of unprovoked sadness, irritability or fearfulness when interacting with the primary caregiver in non-threatening situations (American Psychiatric Association, 2013). Furthermore, the disturbance must debut prior to the age of 5 years. To minimise the risk of misdiagnosing autism spectrum disorder (ASD) as RAD, and because RAD and ASD share some features and may be difficult to differentiate (Scott et al., 2018), ASD is an exclusion criterion for RAD (American Psychiatric Association, 2013).

The DSED phenotype, on the other hand, is characterised by disinhibited and overly familiar behaviour which is regarded as socially and developmentally inappropriate within the cultural context (American Psychiatric Association, 2013). The diagnostic threshold is defined as two or more of the following: reduced reticence with unfamiliar adults; overly familiar behaviour (physical or verbal); minimal checking with caregivers in unfamiliar settings; willingness to leave and a lack of expected hesitance with unfamiliar adults (American Psychiatric Association, 2013). The disinhibited behaviour of DSED is not limited to the impulsivity that may be seen in ADHD and specifically involves social disinhibition (American Psychiatric Association, 2013). In adolescence, social disinhibition and overfamiliarity may be evident in relation to both adults and peers (Scott et al., 2018).

### **1.5.3 Relationship between attachment styles and RAD and DSED**

Most children reared in settings with child maltreatment, either in an institutional or family context, develop insecure or disorganised attachment to caregivers, however only a minority develop RAD or DSED (American Psychiatric Association, 2013; Zeanah & Gleason, 2015). Whereas attachment styles are relationship-specific, RAD and DSED are evident in most contexts and imply profound disturbances in social functioning not only with caregivers, but also in other familiar or unfamiliar relations (American Psychiatric Association, 2013; Zeanah & Gleason, 2015). Moreover, whereas RAD and DSED require qualification of diagnostic criteria and thereby imply functional impairment, insecure or disorganised attachment styles are considered risk factors for psychopathology and social dysfunction, but do not necessarily imply any of these (Bosmans et al., 2020; Forslund et al., 2021; Scott et al., 2018; Zeanah & Gleason, 2015). Furthermore, although inadequate care, such as child abuse and neglect, markedly increases the risk of insecure or

disorganised attachment to caregivers (Cicchetti et al., 2006; Cyr et al., 2010; Forslund et al., 2021; van Ijzendoorn & Bakermans-Kranenburg, 2003; Van Ijzendoorn et al., 1999), even non-maltreated children may portray disorganised attachment behaviours (Baer & Martinez, 2006; Cyr et al., 2010; Forslund et al., 2021; Lyons-Ruth & Jacobvitz, 1999; Madigan et al., 2006), whereas severely inadequate care is a definite criterion for RAD and DSED (American Psychiatric Association, 2013). The association between insecure or disorganised attachment and the development of RAD or DSED has been controversial (Bosmans et al., 2020), with some studies reporting no associations and others indicating some associations (Schroder et al., 2019).

In line with the DSM-5, absent or minimal attachment behaviour (seeking and responding to comfort) is a diagnostic criterion for RAD, although it is not sufficient for the RAD diagnosis (American Psychiatric Association, 2013). Furthermore, it has been suggested that RAD may not necessarily correspond to insecure or disorganised attachment, as even disorganised attachment signifies some type of underlying attachment relationship (Atkinson, 2019), and that RAD may instead correspond to an unclassifiable attachment pattern characterised by the child showing minimal attachment behaviour of any type (Atkinson, 2019; Guyon-Harris, Humphreys, Degnan, et al., 2019; Zeanah et al., 2005). Children with DSED, on the other hand, may display insecure, disorganised, unclassifiable, or even secure attachment (American Psychiatric Association, 2013; Rutter et al., 2009; Zeanah & Gleason, 2015). Nonetheless, DSED is more prevalent in children with aberrant attachment behaviour (Zeanah & Gleason, 2015), and disorganised attachment has been found to be an important predictor of DSED in home-reared infants (Lyons-Ruth & Jacobvitz, 2016) and early institutionalised children regardless of subsequent care quality (Gleason et al., 2014). However, disorganised attachment has been found to shift to organised (even secure) attachment following removal from early institutional deprivation to foster care, whereas DSED has proved more persistent despite the establishment of adequate care (Lyons-Ruth & Jacobvitz, 2016). A recent meta-analysis found small-to-moderate associations between DSED behaviour and attachment insecurity or disorganisation (Zephyr et al., 2021), illustrating that although insecure and disorganised attachment are distinct from DSED, they are also partially related (Zephyr et al., 2021). Clearly, however, findings from research on attachment styles do not necessarily apply to individuals with RAD or DSED (Atkinson, 2019; Minnis et al., 2009; Pritchett, Pritchett, et al., 2013; Schroder et al., 2019; Zeanah et al., 2016), hence research needs to specifically investigate individuals with RAD or DSED.

#### **1.5.4 Risk factors for RAD and DSED**

Early institutional care with high children-to-caregiver ratios (American Psychiatric Association, 2013), or institutional staff instructions discouraging emotional closeness and attachment to the residents (Tizard & Rees, 1975) are established risk factors for RAD and DSED, and most knowledge about RAD and DSED derives from studies of early institutionalised children. However, RAD and DSED have also been demonstrated in home-reared children in impoverished groups (Bosmans et al., 2019; Minnis et al., 2013; Zeanah & Gleason, 2015) and children exposed to parental social neglect with subsequent placement in alternative care (Boris et al., 2004; Bruce et al., 2019; Jonkman et al., 2014; Kay & Green, 2013; Kay et al., 2016; Kocovska et al., 2012; Lehmann et al., 2020; Lehmann et al., 2013; Lehmann et al., 2018; Mayes, Calhoun, Waschbusch, Breaux, et al., 2017; Millward et al., 2006; Minnis et al., 2009; Monette et al., 2020; Nelson et al., 2020; Oosterman & Schuengel, 2008; Pears et al., 2010; Zeanah et al., 2004; Zimmermann & Iwanski, 2019). In family-reared children, factors that may impoverish care and facilitate RAD and DSED, include the following: loss of caregivers by abandonment, imprisonment, or death; parental mental or physical health concerns; parental insecure attachment styles; parental substance abuse; domestic violence; separation or divorce; and childhood maltreatment (Hornor, 2019).

In line with the frequent co-occurrence of inadequate and harmful components of child maltreatment (Gilbert et al., 2009; Humphreys & Zeanah, 2015; Negriff et al., 2019), a recent study in foster youth found that in addition to being associated with social neglect and the absence of feeling loved by family members, a latent factor representing the RAD B criterion (socioemotional unresponsiveness and emotional dysregulation) was associated with a range of other potentially traumatic events, including physical abuse by family and non-family members, emotional abuse by family members, and victimisation to bullying (Lehmann et al., 2020), indicating that the RAD-component comprising symptoms of socioemotional unresponsiveness and dysregulation (DSM-5 RAD B criterion) may be related to harmful (abuse) as well as inadequate (neglect) input (Lehmann et al., 2020). Questions about the potential additional role of harmful input have also been raised for DSED, where preliminary findings indicate that various disruptions in emotional interactions with the caregiver, including intrusive emotional or physical caregiver behaviours, mediated the association between inadequate caregiving and signs of DSED (Humphreys & Zeanah, 2015; Lyons-Ruth et al., 2009). Furthermore, maltreated children have increased risks of additional negative environmental exposures, such as living in poverty (Gilbert et al., 2009) and prenatal exposure to teratogens (Humphreys & Zeanah, 2015), thereby adding to the risk of impeded development and disadvantageous outcomes.

Although severely impaired caregiving is an obligate aetiological factor of both RAD and DSED (American Psychiatric Association, 2013), and the risk of RAD or DSED increases with decline of the caregiving environment (Scott et al., 2018; Smyke et al., 2002) and longer duration of deprivation (O'Connor et al., 2000), most children exposed to insufficient care do not develop either disorder (Guyon-Harris et al., 2021; O'Connor et al., 2000; Zeanah & Gleason, 2015). Intraindividual vulnerability and protective factors are largely unexplored, and little is known about why some individuals develop RAD or DSED in settings where others do not (Guyon-Harris et al., 2021; Zeanah et al., 2016). However, genetics may contribute to the aetiology of both RAD and DSED, and hereditary neurodevelopmental disorders or vulnerability factors may predispose to RAD or DSED in response to early inadequate care (Bosmans et al., 2020; Lehmann et al., 2020; Minnis et al., 2007; Nelson et al., 2020; Rutter et al., 2004).

### **1.5.5 Epidemiology of RAD and DSED**

There is a general scarcity of epidemiological data on RAD and DSED, and prevalence rates clearly depend on the risk exposure of the studied samples (Zeanah et al., 2016). In the general population, RAD and DSED are believed to be rare and the prevalence of ICD-10 defined RAD has been reported as 0.9% in Danish toddlers (Skovgaard et al., 2007). In a sample of Romanian preschool children recruited from paediatric clinics, none were identified as having RAD and 2% were identified with DSED (Gleason, Zamfirescu, et al., 2011). For school-age children in a deprived Scottish neighbourhood, the prevalence of a combined RAD and DSED (as defined by DSM-IV) was found to be 1.4% (Minnis et al., 2013). By contrast, in an urban South-African township, 12.5% of a school-aged subsample qualified for DSED (Pritchett, Rochat, et al., 2013).

In high-risk populations, such as children with a history of early severe institutionalised deprivation, the rates of RAD and DSED are higher, estimated to be less than 10% RAD and approximately 20% DSED (American Psychiatric Association, 2013). More specifically, in toddlers living in Romanian institutions, a symptom cluster corresponding to RAD was found in 7–13%, a cluster corresponding to DSED was found in 10–19%, and a cluster corresponding to having both RAD and DSED was found in 7–24% (Smyke et al., 2002). In Romanian preschool children with current or previous institutional deprivation, 4% had RAD, and 18% had DSED (Gleason, Fox, et al., 2011). The prevalence of DSED has in the longitudinal English and Romanian Adoptee Study (ERAS) been found to depend on the age of removal from institutional deprivation: In pre-schoolers, the rates of DSED were approximately 30% for those adopted between ages 24–42

months, 20% for those adopted between ages 6–24 months, and 5% for those adopted at ages younger than 6 months (O'Connor et al., 2000). Furthermore, the quality of the caregiving environment has been found to be associated with the prevalence of DSED, and in pre-schoolers living in Romanian institutions, *symptoms* of DSED were evident in 69% of those living in standard institutions with multiple caregivers working rotating shifts, contra 34% of those living in institutions that provided more consistent caregiving environments (Zeanah et al., 2002). In toddlers living in Portuguese institutional care where the general, nutritional, and medical care conditions were adequate, *symptoms* of DSED were observed in 51% and were predicted by prenatal risk factors such as maternal disease or substance use, as well as risk factors for emotional neglect (Oliveira et al., 2012).

Rates of RAD and DSED have also been found to be high in maltreated family-reared children with subsequent placement in foster care, as exemplified in the following: A combined RAD–DSED (DSM-IV) was evident in 38% of toddlers assessed 3 months after foster placement in the USA (Zeanah et al., 2004), 18% of preschool foster children in the Netherlands (Oosterman & Schuengel, 2008), and 19.4% of school-age foster children living in Norway (Lehmann et al., 2013). Regarding RAD, 35% of US toddlers qualified for the ICD-10 RAD 3 months after foster placement (Zeanah et al., 2004), whereas 5% of Scottish preschool children qualified for RAD at the time of foster placement, with a reduction to 2.6% after 1 year in foster care (Bruce et al., 2019). Regarding DSED, the corresponding ICD-10 disinhibited attachment disorder was evident in 22% of toddlers 3 months after foster placement in the USA (Zeanah et al., 2004) and in 49% of school-age children adopted from out-of-home care in the UK (Kay et al., 2016). Furthermore, moderate to high levels of DSED *symptoms* were reported in 46% of maltreated foster-placed preschool children in the USA (Pears et al., 2010) and 58% of adolescents in English foster or residential care (Kay & Green, 2013). However, there is a lack of knowledge about the prevalence rates of RAD and DSED symptoms and diagnoses in high-risk adolescents exposed to in-family maltreatment with subsequent placement in alternative care, ultimately in RYC.

### **1.5.6 The course of RAD and DSED**

Symptoms of RAD and DSED have been demonstrated to be stable and persistent in children who continue to live in insufficient caregiving environments over time (Scott et al., 2018). Nonetheless, longitudinal studies of children with a history of early severe institutional deprivation have demonstrated that symptoms of RAD and DSED may recover in response to enhanced caregiving environments (Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018; Humphreys, Nelson, et al., 2017; Smyke et al., 2012); however some individuals show persisting signs of RAD or DSED throughout childhood and adolescence despite removal to adequate care (Fox et al., 2017; Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018; Nelson et al., 2020; Rutter et al., 2007; Smyke et al., 2012; Sonuga-Barke et al., 2017). Of note, RAD is more responsive to improved caregiving than DSED (Fox et al., 2017; Gleason, Fox, et al., 2011; Rutter et al., 2009; Scott et al., 2018; Smyke et al., 2010; Smyke et al., 2012). Furthermore, following placement in adequate care, DSED may persist despite the development of secure attachment to new caregivers (American Psychiatric Association, 2013; Scott et al., 2018). By use of variable- and person-centred approaches, the longitudinal Bucharest Early Intervention Project (BEIP) found that although RAD and DSED symptoms often decreased markedly following foster placement (Smyke et al., 2012), a persistence of RAD and DSED symptoms was associated with older age at the time of foster placement, more time in institutional care (Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018), and for DSED, numerous placement disruptions (Guyon-Harris et al., 2018). In agreement with the BEIP, findings from the ERAS indicate that persistence of DSED symptoms throughout childhood and adolescence is predicted by extended stay (> age 6 months) in severely deprived early institutional care (Rutter et al., 2007; Sonuga-Barke et al., 2017).

In early adolescence, persisting signs of RAD and DSED following early institutional deprivation have been found to predict lower social functioning beyond the core features of RAD and DSED, and above and beyond time spent in institutions (Guyon-Harris, Humphreys, Fox, et al., 2019). Furthermore, qualification for a DSED diagnosis in early childhood has been found to predict reduced social and scholastic competence and increased risk-taking behaviour in early adolescence, despite a reduction in DSED symptoms after placement in adequate care (Guyon-Harris, Humphreys, Miron, et al., 2019). RAD and DSED represent disorders with lasting encumbrance throughout childhood, however, much remains to be learned about their presence in adolescence.

### **1.5.7 Controversies related to measurement, background, and age**

In addition to controversies regarding the relationship with attachment styles, existing controversies for RAD and DSED include issues of measurement, differences in background, and the question of validity in older children and adolescents (Zeanah et al., 2016). Most studies of RAD and DSED have included only young children, leading to questions of applicability beyond early childhood (Zeanah et al., 2016). However, longitudinal studies of children exposed to early institutionalisation in very deprived settings have illustrated that symptoms of RAD and DSED may persist from early childhood to adolescence and early adulthood (Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018; Humphreys, Nelson, et al., 2017; Sonuga-Barke et al., 2017). Even so, there have been questions as to whether symptoms of RAD and DSED in older children and adolescents may be better explained by other common psychiatric disorders (Zeanah et al., 2016), issues which in adolescence remain unaddressed. Misdiagnosis of RAD and DSED is common (Allen & Schuengel, 2020; Chaffin et al., 2006; John et al., 2019; Woolgar & Baldock, 2015), with large potential consequences due to missed treatment. Clarification of uncertainties concerning RAD and DSED in adolescence is a proclaimed priority (Zeanah & Gleason, 2015).

Although several studies have illustrated the presence of RAD and DSED in children without histories of early institutionalisation, questions have been raised—due to differences in methodology and background (such as more extensive deprivation in early institutionalised children, including physical, mental, emotional, social, and nutritional neglect and under-stimulation)—as to whether these really are comparable to the RAD and DSED described in early institutionalised children (Zeanah et al., 2016; Zeanah & Gleason, 2015). Early and severe deprivation in institutional care is no longer a common practice in the Western world, whereas in-family child maltreatment remains a major public health problem worldwide (Gilbert et al., 2009). Because the generalisability of results from studies of individuals exposed to early extensive deprivation in institutions has been questioned (Giltaj et al., 2015; Guyon-Harris, Humphreys, Degnan, et al., 2019), clinicians and social workers in the Western world need knowledge about RAD and DSED in populations that they are more likely to encounter, for example adolescents exposed to in-family maltreatment and neglect with subsequent placement in RYC.

Hence, by studying adolescents living in Norwegian RYCs, this thesis aims to help clarify current controversies of RAD and DSED and promote adequate assessment, diagnostics, and interventions to high-risk adolescents frequently encountered by health care and social welfare services in the Western world. To do so, this thesis investigates RAD and DSED in adolescence with respect to construct validity, comorbid psychopathology and psychosocial problems, and

global and domain specific self-esteem. The following sections present relevant background information for each of these themes, starting with methodological considerations regarding psychometry and validity.

## **1.6 Methodological considerations**

### **1.6.1 Psychometry and construct validity**

To overcome the challenge that psychiatric disorders and other psychological constructs rarely can be measured directly—as is the case for theoretical constructs in general—psychometrics often take an indirect approach by measuring multiple observable characteristics considered to be indicators of the underlying latent construct (e.g. disorder) of interest (Byrne, 2012; de Vet et al., 2011). Therefore, and because many psychiatric disorders both have overlapping symptoms and may co-occur, questions of diagnostic validity arise both with respect to the existence of the underlying psychiatric constructs, and of their measurement. Clearly, any investigation of the validity of a psychiatric construct relies on the degree to which the applied measurement instrument adequately measures the construct of interest within the studied context and population, and whether the results agree with the underlying theoretical model of the construct (de Vet et al., 2011). Several facets of validity need consideration, and validation is considered a continuous process (de Vet et al., 2011). Whereas content validity refers to the degree to which items of a measurement instrument are adequately relevant and comprehensive for the construct to be measured, criterion validity reflects the rate of agreement between a measurement instrument and a defined gold standard (de Vet et al., 2011). However, in the case of no available gold standard, construct validation may replace criterion validation, resting on the assumption that the instrument of choice validly measures the construct of interest (de Vet et al., 2011). Furthermore, construct validity refers to the ‘degree to which the scores of a measurement instrument are consistent with hypotheses’ of the underlying construct, including whether the instrument adequately reflects ‘the dimensionality of the construct to be measured’ (i.e. structural validity), and whether it adequately differentiates between the construct of interest and other relevant constructs (discriminant validity), for example differential diagnoses (de Vet et al., 2011). Given the lack of gold standards for the measurement of RAD and DSED in adolescence, and the aim to investigate whether RAD and DSED in adolescence are consistent with their construct definitions in DSM-5, by being distinct from each other and from symptom clusters of other psychiatric disorders, this thesis focuses on construct validation of RAD and DSED.



## **1.6.2 Dimensional and categorical measures of psychopathology**

As considered within the framework of developmental psychopathology (Rutter & Sroufe, 2000), both in research and clinical practice the presence of psychopathology may be conceptualised and measured categorically or dimensionally, each having advantages and disadvantages (Stafford et al., 2003). Dimensional measures encompass various gradients of psychopathological constructs that are conceptualised as continuous, carry higher statistical power and allow the inclusion of individuals who may have high degrees of impairment and disease burden despite the unfulfillment of certain diagnostic criteria (Dejong, 2010). On the other hand, categorical measures, such as diagnoses, provide valuable tools to summarise a range of clinical factors (for example, degree of impairment and distress, symptom onset and duration, the presence of obligate symptoms, and absence of exclusion criteria), aiding assessment and treatment decisions, as well as easing communication between clinicians (Dejong, 2010; Stafford et al., 2003). Furthermore, the categorical classification of psychiatric disorders has facilitated research on mental health by providing appropriate definitions and a more reliable operationalisation of psychopathology (Stafford et al., 2003).

Whether a continuous or discontinuous conceptualisation of psychopathology provides the best-fitting map to the terrain of mental health problems remains debatable (Conway et al., 2021; Dejong, 2010; Haslam et al., 2012; Markon et al., 2011). In particular, for individuals with a history of severely inadequate care, the current psychiatric nosologies of DSM and ICD may not adequately encompass the complexity and severity of the presented symptoms, cautioning the insufficiency in such high-risk populations of merely measuring dichotomous psychiatric disorders and their comorbidities (Dejong, 2010; Tarren-Sweeney, 2013, 2018). Moreover, dimensional measures of psychopathology may provide more reliable and valid information than categorical measures, even when the underlying latent constructs are conceptualised as discrete (Markon et al., 2011), but they do not consider obligate diagnostic criteria (for example, for RAD, the core element of aberrant attachment behaviour). Therefore, a combined dimensional and categorical methodological approach to psychopathology may provide more nuanced and adequate information than either approach alone. Research on RAD and DSED in adolescence is still in its infancy, advocating the need for a broad approach to maximise the return of research and enhance our understanding beyond early and middle childhood. Therefore, to incorporate the advantages of both dimensional and categorical measures and to better capture the potential complex symptomatology of high-risk adolescents living in RYCs, the studies of this thesis apply both dimensional and categorical measures of RAD, DSED, and other psychopathology.

## **1.7 Psychopathology and psychosocial problems in childhood and adolescence**

### **1.7.1 Epidemiology of psychiatric disorders and psychosocial factors in young people**

Psychopathology represents a major contributor to the global and European burden of disease (Kieling et al., 2011; Wykes et al.), and 75% of mental health problems begin before age 18 years (Wykes et al.). On an average, 10–20% of children and adolescents worldwide have mental health problems (Charach et al., 2020; Costello et al., 2005; Kieling et al., 2011; Vasileva et al., 2021); however, prevalence rates vary greatly (1.8–39.4%) between countries (Achenbach et al., 2012; Gilbert et al., 2012), much due to differences in methodologies, culture, and rates of risk and protective factors (Gilbert et al., 2012). Lifelong risk factors for psychopathology include genetic predispositions, physical health problems, an inadequate psychosocial or educational environment, exposure to adverse toxins or substances, exposure to violence, abuse, or neglect, and mental health problems within the family context (Arango et al., 2018; Kieling et al., 2011). Similar to other Scandinavian countries, the rates of psychopathologies in the general Norwegian population are relatively low (Reneflot et al., 2018; Rescorla et al., 2012). Two studies have documented the prevalence of psychiatric disorders using clinical interviews of children in the general Norwegian population, revealing that 7% of pre-school children (Wichstrøm et al., 2012) and 7% of school-age children (Heiervang et al., 2007) qualified for any DSM-IV psychiatric disorder. For individuals aged 3–18 years in Norway, the prevalence of any psychiatric disorder is estimated to be 8% (Mykletun et al., 2009); however, population studies of adolescents using clinical interviews are lacking. Adolescence represents a developmental period with increasing rates of psychopathology, including emotional, behavioural and substance use disorders (Costello et al., 2003), and prevalence rates in preschool and school-age children do not necessarily apply to adolescence. Because the prevalence rates in adolescence may vary with age and between the sexes (Costello et al., 2003), age and sex are treated as potential confounders in this study and are adjusted for in regression models.

The British Child and Adolescent Mental Health Study (BCAMHS) found comparable prevalence rates (7.8%) (Ford et al., 2003) to Norwegian findings in school-age children (Heiervang et al., 2007; Reneflot et al., 2018), and reported the following point prevalence rates in 13–15-year-olds: 12.2% qualified for any psychiatric disorder, 2.5% had depression, 5.0% had anxiety or adjustment disorder, 2.1% had ADHD, 1.4% had ODD, and 3.3% had CD (Ford et al., 2003). Norwegian register data of clinically diagnosed psychiatric disorders in adolescence are consonant with and no higher than the findings in BCAMHS, except for a possibly higher rate of ADHD, estimated to be prevalent in 3.4% of pre-adolescents in Norway (Reneflot et al., 2018).

Psychosocial problems and risk behaviours assessed in this thesis (Paper II) include suicidal ideation and behaviour, self-harm without suicidal intent, illicit substance use or daily alcohol consumption, delinquent or criminal behaviour, victimisation from bullying, and sexual behaviour for economic gains, for which the following prevalence rates in the Norwegian general adolescent population have been estimated: 17% lifetime prevalence of suicidal thoughts in 17–19 year olds (Strandheim et al., 2014), 10% lifetime prevalence of deliberate self-harm, including suicidal attempts, in 12–18-year olds (Gillies et al., 2018). Furthermore, weekly alcohol intake has been reported in 5% of 13–19-year-olds (Bakken, 2020) and 19% of 17–19-year-olds (Strandheim et al., 2011); however, given the cultural norm of heavy episodic drinking in adolescence (Strandheim et al., 2009), daily alcohol consumption is likely to be rare. Ever having tried cannabis or other illicit drugs was reported among 3.8% of 13–19-year olds (Mangerud et al., 2014) and 14% of 17–19-year olds (Strandheim et al., 2011). During a 1-year period, approximately 1% of adolescents in junior and senior high schools self-reported acts of serious delinquency (such as burglary, robbery with threats, and fighting with weapons), and approximately 15% reported any type of delinquency (including vandalism, stealing from shops, tagging on walls or buildings) (Bakken, 2015). Regarding bullying, 4–7% self-reported frequent exposure to bullying (at least every two weeks) (Bakken, 2015). Furthermore, regarding risky sexual behaviour, 1.4% (2.1% boys and 0.6% girls) of 14–17-year-olds living in Oslo reported having exchanged sexual services for economic gains (Pedersen & Hegna, 2000).

Across continents of the Western world, research demonstrates that compared with peers in the general population, children and adolescents in alternative care have substantially higher levels and rates of mental health problems (Ford et al., 2007; Goemans et al., 2016; Tarren-Sweeney, 2018), with 35–50% of children in alternative care having mental health problems in a clinical range and an additional 15–25% having problems in the subclinical range (Tarren-Sweeney, 2018). In Norway, 51% of school-age foster children (Lehmann et al., 2013) and 76% of adolescents living in RYC (Jozefiak et al., 2016) have been found to qualify for one or more psychiatric disorders, as defined by the DSM-IV. Overall, children and adolescents in alternative care, and particularly those living in RYC, represent *the* population of children and adolescents in Western societies with the greatest need for mental health services (Tarren-Sweeney, 2018). Thorough knowledge about the health of children and adolescents in alternative care is warranted to adequately meet their needs and rights. This thesis contributes by studying the mental health of adolescents with RAD or DSED living in RYC.

### 1.7.2 Association between RAD/DSED and psychopathology or psychosocial problems

Although associations between child maltreatment and various forms of psychopathology are well-established, less is known about the associations between RAD or DSED and other forms of psychopathology or psychosocial problems, especially in adolescence. The persistence of RAD or DSED has major negative consequences for all involved parties and predicts relational difficulties, functional impairment, and higher special education needs (Nelson et al., 2020; Zeanah & Gleason, 2015). Because child maltreatment often leads to complex clinical problems (Lehmann et al., 2020; Tarren-Sweeney, 2018), differential diagnosis may be particularly challenging, and the misdiagnosis of RAD and DSED is not uncommon (Chaffin et al., 2006; John et al., 2019). To avoid overidentification of attachment problems and underidentification of neurodevelopmental problems or common psychopathology (Allen & Schuengel, 2020; John et al., 2019; Woolgar & Baldock, 2015; Woolgar & Scott, 2014) or *vice versa* (Scheper et al., 2018; Zimmermann & Soares, 2019), either of which may lead to missed treatment, prolonged suffering, and high socioeconomic costs, knowledge is needed about diagnostic construct validity, prevalence rates, and degrees of co-occurrence. However, available research on the rates of co-occurrence between RAD or DSED and other mental health and psychosocial problems is mainly limited to preschool and school-age children, and not necessarily transferable to adolescence (de Girolamo et al., 2012; Sonuga-Barke et al., 2017).

Of the available research, studies of the combined DSM-IV RAD (inhibited and disinhibited type, corresponding to DSM-5 RAD and DSED, respectively) have reported high rates of co-occurrence with both emotional and behavioural symptoms and disorders (Jonkman et al., 2014; Kocovska et al., 2012; Lehmann et al., 2013; Mayes, Calhoun, Waschbusch, Breaux, et al., 2017; Millward et al., 2006; Minnis et al., 2009; Minnis et al., 2013; Moran et al., 2017; Oosterman & Schuengel, 2008; Pritchett, Pritchett, et al., 2013; Schroder et al., 2019). Indeed, the complexity of mental health problems and impairments of social, cognitive, and behavioural functions in children with DSM-IV RAD may fit within the concept of early symptomatic syndromes eliciting neurodevelopmental clinical examinations (ESSENCE) (Gillberg, 2010; Minnis, 2013; Pritchett, Pritchett, et al., 2013). However, with the DSM-5 distinguishing between RAD and DSED, the scientific expectation has been that RAD is associated with emotional problems and DSED with behavioural problems (Zeanah & Gleason, 2015). Existing results are inconsistent, regarding both RAD and DSED.

For RAD, some studies have confirmed the above expectation in preschool and school-age children (Atkinson, 2019; Gleason, Zamfirescu, et al., 2011; McGoron et al., 2012), whereas others

have reported ambiguous sample-dependent findings (Spangler et al., 2019), no association between RAD and any psychopathology in pre-schoolers (Jonkman et al., 2014), or, in contrast, associations with *both* emotional and behaviour problems in school-age children and early adolescents (Giltaij et al., 2016; Guyon-Harris, Humphreys, Degnan, et al., 2019; Vervoort et al., 2013; Zimmermann & Iwanski, 2019). The degree of co-occurrence for RAD remains unstudied beyond the age of 12 years.

For DSED, the expected association with behavioural problems has been confirmed in preschool and school-age children by some (Gleason, Fox, et al., 2011; Kay et al., 2016; Rutter et al., 2007; Scheper et al., 2018; Vervoort et al., 2013), whereas others have found DSED in preschool and school-age children to co-occur with (Giltaij et al., 2016; Gleason, Zamfirescu, et al., 2011; Mayes, Calhoun, Waschbusch, Breaux, et al., 2017) and be positively associated with (Jonkman et al., 2014; Kay & Green, 2013; McGoron et al., 2012) *both* behavioural and emotional disorders or problems. In adolescence, associations between symptoms of DSED and both emotional and behavioural problems have been demonstrated in never-institutionalised adolescents with a history of childhood maltreatment (Kay & Green, 2013), whereas in young adults with a history of early institutional deprivation, persistent DSED has been found to be associated only with symptoms of ADHD and callous-unemotional traits (Kennedy et al., 2017). Furthermore, prevalence rates of co-occurring psychiatric disorders in adolescents with DSED disorder are unknown, and knowledge about the degree of co-occurrence between RAD or DSED and psychosocial problems (including suicidality, self-harm without suicidal intention, substance use, bullying experiences, and risky sexual behaviour) is lacking in all age groups.

Therefore, to enhance diagnostic precision and provide high-risk adolescents with adequate assessment and treatment plans, investigations are required to establish the degree of co-occurrence between RAD or DSED in adolescence and other psychopathology and psychosocial problems.

## **1.8 Self-esteem**

### **1.8.1 Global and domain-specific self-esteem**

Self-esteem may be defined as the evaluation of one's own worth and ability, and develops throughout life resulting from an interplay between a person's developmental history, cognitive abilities, and experience (Harter, 2012), with attachment relationships and subsequent internal working models (IWMs) as critical contributors to self-esteem development (Harter, 2012). Rather than being a unitary construct, self-esteem is commonly conceptualised as a multidimensional construct, consisting of both global self-esteem as an overall evaluation of one's self-worth, and self-esteem in more specific areas, such as scholastic, social, and physical domains (Harter, 2012). A person's self-esteem may be high in one specific domain and low in another. For example, one may have a high scholastic competence self-esteem and a low social acceptance self-esteem, or vice versa. Furthermore, to which degree a specific domain influences an individual's global self-esteem may depend both on the individual's opinion of that domain's importance (the intrapersonal perspective), and how influential the individual considers the domain to be for social status (the interpersonal perspective) (von Soest et al., 2016). Therefore, to adequately understand a person's self-esteem, both global and domain-specific components must be considered (Harter, 2012; Marsh et al., 2004; Rosenberg et al., 1995; von Soest et al., 2016).

### **1.8.2 Development of self-esteem through childhood and adolescence**

The rudiments of self-evaluation in early childhood are relational experiences with caregivers, where caregiver sensitivity, responsiveness, emotional availability, encouragement, and support promote a perception of the self as lovable and competent, fostering healthy and high self-esteem (Harter, 2012). In early childhood, parental sensitivity and support are vital for self-esteem, whereas in older children, competence and mastery increasingly contribute to self-esteem (Harter, 2012). Therefore, children with supportive and sensitive caregivers may enter reinforcing beneficial cycles where a high self-esteem and a secure attachment pattern build confidence to engage in exploratory behaviour with skill-enhancing activities, further enhancing mastery and boosting self-esteem in various domains (Harter, 2012). By contrast, children with caregivers who are emotionally unavailable, unsupportive, or convey rejection, punishment, and spite are not only at risk of negative expectations in relation to others, but also at risk of a self-perception as incompetent, unworthy and unlovable, portrayed as low global self-esteem (Harter, 2012), and may be less likely to engage in exploratory activities and behaviours that could have increased mastery, competencies, and subsequent self-esteem. Nonetheless, both self-esteem (Haney & Durlak, 1998;

O'Mara et al., 2006) and the underlying self-concepts feeding self-esteem (Dweck, 2017) are malleable beyond early childhood and may be altered throughout life in response to biological (e.g. physical and cognitive maturity) and environmental changes (e.g. new relational experiences) (Harter, 2012). According to sociometer theory, self-esteem may act as a gauge to measure the quality of interpersonal relationships and feelings of social disapproval or approval and belongingness (Leary et al., 1995; Magro et al., 2019), underlining the unceasing importance of relational experiences and social support. Although the influence of caregivers continues to be important throughout childhood and adolescence, as children grow older, their social milieu expands, and their self-esteem increasingly depends on evaluations and relational experiences with non-caregivers such as peers, teachers, and other significant adults (Harter, 2012; Rubin et al., 2007). Indeed, in adolescence, peer acceptance has been found to protect global self-esteem from the negative effects of low closeness to parents (Birkeland et al., 2014).

While acknowledging that measurement and construct validity issues may confound observed age differences—on a population level—global and domain-specific self-esteem decrease from childhood to adolescence (Robins et al., 2002), and increase throughout adolescence and into adulthood (Robins et al., 2002; von Soest et al., 2016). In adolescence, females tend to have lower self-esteem than males (von Soest et al., 2016).

### **1.8.3 Self-esteem qualities**

Self-esteem may have different functional qualities regardless of level, and high self-esteem does not necessarily imply healthy self-esteem. Optimally, self-esteem reflects a deep and stable sense of self-worthiness, enclosing awareness of personal assets and limitations, and remains a balanced self-evaluation throughout both failure and success (Harter, 2012). By contrast, contingent self-esteem is more fragile and unstable, constantly dependent on external validation (Bleiberg, 1984; Harter, 2012), and may develop as a result of parental praise and support predominantly being contingent on particular achievements or outcomes, often portraying unrealistic expectations (Blatt & Zuroff, 1992; Harter, 2012). To protect fragile self-esteem, individuals with contingent self-esteem are more prone to develop false self-behaviour, whereas optimal self-esteem is characterised by authenticity and greater personal integrity (Harter, 2012). Exposure to childhood abuse and neglect increases the risk of false self-behaviour (Fonagy, 2002; Harter, 2012). For one thing, abusive and neglecting caregivers are less likely to provide the child with the needed emotional regulation, scaffolding, and interpretations of the social setting, which would help them develop and integrate realistic evaluations of their own abilities and worth (Harter, 2012). Second,

false self-behaviour may be self-protective acts to decrease the chance of further abuse and neglect, e.g. by not communicating one's true needs for comfort and nurture or by attempting to engage a depressed or for other reasons unresponsive caregiver. Third, false self-behaviour may serve the purpose of protecting the self from further destruction, e.g. by self-aggrandisement or in the form of dissociation, by the exclusion of episodic maltreatment memories from the awareness (Harter, 2012). Childhood abuse and neglect may, therefore, lead to a less coherent structure of the self (Harter, 2012).

#### **1.8.4 Predictors and outcomes of self-esteem**

High self-esteem predicts advantageous outcomes in various domains, including employment, health, and social relations (Orth & Robins, 2014). Reversed, adolescent low self-esteem predicts disadvantageous outcomes in adulthood, including more economic hardship, poor physical and mental health, and psychosocial problems such as criminal behaviour, substance use, further victimisation, and risky sexual behaviour (Stein et al., 2002; Trzesniewski et al., 2006). Furthermore, low self-esteem is associated with a low quality of life in adolescents living in RYC, independent of psychopathology (Jozefiak et al., 2017).

Although self-esteem and emotional and behavioural problems are associated constructs, it is unclear whether low self-esteem is primarily a cause or a consequence of such psychopathology (Orth et al., 2012; Reed-Fitzke, 2020; Zeigler-Hill, 2011). Possibly, self-esteem mediates the relationship between negative stress and psychopathology (Pearlin, 1989; Reed-Fitzke, 2020; Soler et al., 2013), including the relationship between childhood maltreatment and psychopathology in adolescents living in RYC (Greger et al., 2017). Therefore, in accordance with the framework of developmental psychopathology and potential positive or negative cascading effects across developmental domains (Cicchetti & Rogosch, 2002; Masten & Cicchetti, 2010), and because self-esteem interventions in adolescence have proven beneficial in high-risk groups (Haney & Durlak, 1998), targeting self-esteem may be critical to promote mental health and other important life outcomes in these high-risk adolescents. Because targeting specific self-esteem domains are more effective than more general interventions (O'Mara et al., 2006), specified knowledge is needed about global and domain-specific self-esteem in the population at hand.



### **1.8.5 Relationship between RAD or DSED and self-esteem**

Research of self-esteem in individuals with RAD or DSED is very limited, and the findings are somewhat ambiguous. In a study of institutionalised children, a higher score on a combined symptom measure for both RAD and DSED was associated with lower global and scholastic competence self-esteem, and no associations were found with self-esteem for social acceptance or athletic competence (Vacaru et al., 2018). For school-age children with RAD, one study found that global self-esteem did not differ between children with and without a RAD diagnosis within a high-risk sample (Bosmans et al., 2019). However using a dimensional approach to RAD, another study found that RAD symptom load was associated with lower scores on a combined measure of self-esteem for scholastic competence, social acceptance and behavioural conduct (Zimmermann & Iwanski, 2019). By contrast, children with DSED symptoms in special education schools had higher global self-esteem than their peers (Vervoort et al., 2014). Self-esteem has not been investigated for individuals with RAD older than 12 years, or for individuals with DSED beyond middle childhood. Because of possible developmental changes from childhood through adolescence for RAD, DSED (Zeanah et al., 2016) and global and domain-specific self-esteem (Robins et al., 2002; von Soest et al., 2016), findings for any of these concepts in school-age children may not apply in adolescence. Therefore, there is a need for investigations of self-esteem in adolescents with RAD or DSED.



## 2 Aims of the thesis

This thesis aimed to expand knowledge about RAD and DSED in adolescence by investigating their construct validity, prevalence, comorbidity, and association with global and domain-specific self-esteem in high-risk adolescents living in RYCs. More specifically, the following research questions were addressed:

### **Paper I: Are RAD and DSED valid diagnostic constructs in adolescence, and how frequent are they in adolescents living in RYC?**

- 1) May RAD and DSED symptoms as measured using an instrument developed and validated for young children be identified in adolescence?
- 2) What is the frequency of RAD and DSED symptoms and the point prevalence of RAD and DSED diagnoses in adolescents living in RYC?
- 3) Do RAD and DSED symptoms in adolescence represent two distinct disorders, as defined by the DSM-5, or are they better understood as one unified disorder, as defined by the DSM-IV?
- 4) Do symptoms of RAD and DSED represent distinct diagnostic constructs in adolescence, or are they better explained by other psychiatric disorders?

### **Paper II: What are the rates of co-occurrence and strengths of associations between RAD or DSED in adolescence and other psychopathology and psychosocial problems?**

- 1) How prevalent are emotional and behavioural disorders and psychosocial problems measured categorically in adolescents with RAD or DSED diagnoses, and what are the levels of dimensionally measured emotional and behavioural problems in adolescents with RAD or DSED diagnoses?
- 2) Does the presence of RAD or DSED *diagnoses* in adolescents living in RYC affect the risks of having emotional or behavioural psychopathology or psychosocial problems?
- 3) Does the number of RAD or DSED *symptoms* in adolescents living in RYC affect the risks of having emotional or behavioural psychopathology or psychosocial problems?

**Paper III: What characterises global and domain-specific self-esteem in adolescents with RAD or DSED?**

- 1) Do adolescents with RAD or DSED diagnoses have lower mean global or domain-specific self-esteem compared with adolescents in the general population and adolescents living in RYC without RAD or DSED diagnoses?
- 2) Are levels of global and domain-specific self-esteem in adolescents living in RYC associated with RAD or DSED symptom loads?

## 3 Methods

### 3.1 Participants

This thesis is based on data from two national research projects in Norway, where one is a study of high-risk adolescents living in RYC and the other is a study of adolescents in the general population. All three papers include data from the high-risk population, whereas data from the general population are included only in Paper III.

#### 3.1.1 Adolescents in residential youth care (RYC)

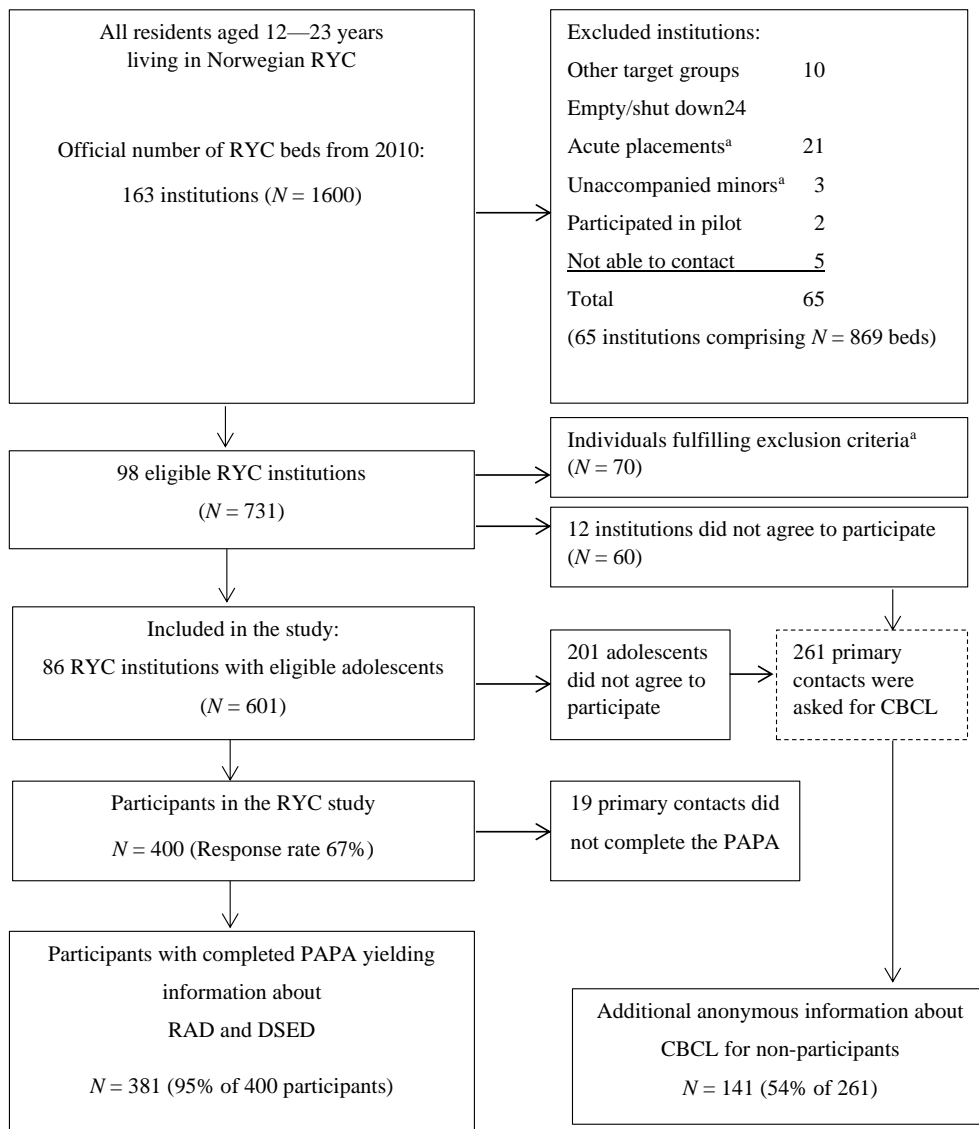
The high-risk population consisted of participants from the research project *Mental Health in Adolescents Living in Residential Youth Care* (referred to in this thesis as ‘the RYC study’) (Jozefiak et al., 2016; Kayed et al., 2015), a cross-sectional study inviting all residents between 12 and 23 years living in Norwegian RYC in 2011–2014 to participate. Exclusion criteria included insufficient Norwegian language proficiency for the completion of interviews and questionnaires, and for ethical reasons, adolescents in acute crisis placements and unaccompanied minors without asylum in Norway. A flowchart of the recruitment process depicted in Jozefiak et al. (2016) has been modified and reproduced in Figure 1. In total, 98 RYC institutions were invited, of which 86 agreed to participate, hosting 601 eligible adolescents. Of them, 400 adolescents consented to participate (response rate 67%). Information about RAD and DSED was available for 381 (95% of 400) participants, of whom 322 had completed a psychiatric interview yielding information about additional psychiatric disorders, and 306 had completed a self-esteem questionnaire. A flowchart illustrating which participants from the RYC study are included in Papers I–III is depicted in Figure 2. The 381 participants with available information about RAD or DSED were between 12.2 and 20.2 years old, and additional characteristics are presented in Table 1.

Table 1. Participant Characteristics

Characteristics	RYC study (N=381)					YiN study (N=10,480)			
	<i>n</i>	%	<i>M</i>	<i>SD</i>	Median	<i>n</i>	%	<i>M</i>	<i>SD</i>
Female	220	57.7				5,295	50.5		
Age (years)			16.7	1.4				15.8	1.9
Age at first placement			12.5	3.9	14.0				
0–1 year	9	2.3							
2–3 years	14	3.7							
4–5 years	10	2.6							
6–11 years	62	16.3							
12–17 years	281	73.8							
Missing	5	1.3							
Number of placements			3.3	2.4					
Ethnic Norwegian		78							

Note. *RYC* residential youth care; *YiN* Young in Norway (general population). *M* mean value; *SD* standard deviation.

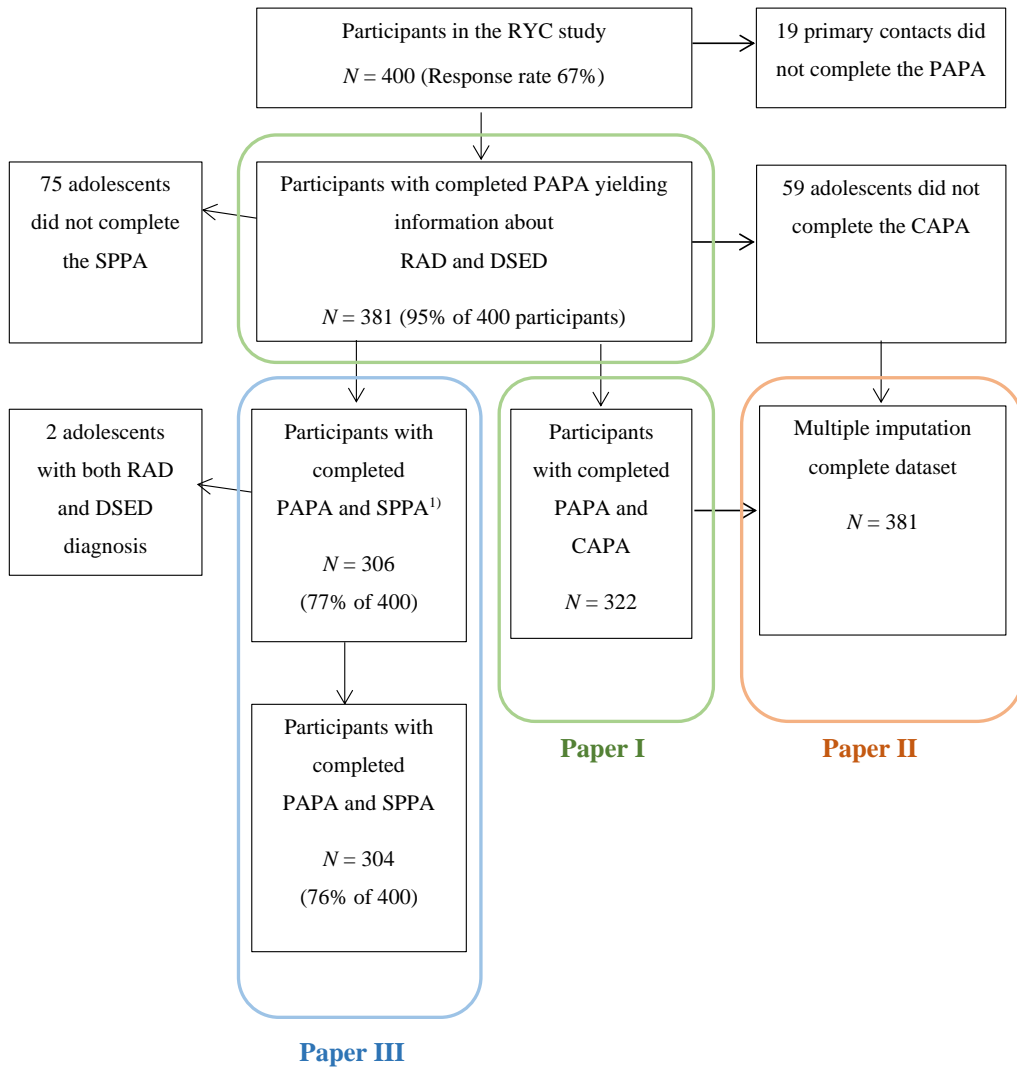
Figure 1. Flowchart of the recruitment process for the RYC study



Note. *CBCL* Child Behavior Check List; *DSED* disinhibited social engagement disorder; *PAPA* preschool age psychiatric assessment; *RAD* reactive attachment disorder; *RYC* residential youth care.

<sup>a</sup> Exclusion criteria: Adolescents with insufficient Norwegian language qualifications to be interviewed were excluded from the study. Further, unaccompanied minors without asylum in Norway and adolescents in acute placements were considered to be in too high states of crisis to ethically defend data collection and were therefore excluded. However, for unaccompanied minors who had received a residence permit from Norwegian authorities, were sufficiently fluent in the Norwegian language, and lived in regular RYCs, requesting permission to participate in the study was considered ethically acceptable.

Figure 2. RYC participant flowchart for Papers I–III



Note. *CAPA* child and adolescent psychiatric assessment; *DSED* disinhibited social engagement disorder; *PAPA* preschool age psychiatric assessment; *RAD* reactive attachment disorder; *SPPA* Self-Perception Profile for Adolescents.



### **3.1.2 Adolescents in the general population**

In Paper III, adolescents living in RYC were compared to those in the general population by accessing data from the *Young in Norway Study* (YiN) (Wichstrøm, 1999), which included a total of 12,287 participants (response rate 97%) from 67 schools, stratified according to geographic region and school size from a national register of all junior and senior high schools in Norway. A total of 11,605 students completed the self-esteem questionnaire, of which 10,480 revealed information about age and sex (allowing age- and sex-adjusted analyses) and participated in the study of self-esteem in Paper III. Figure 1 in Paper III depicts a participant flowchart for adolescents in the general population, as well as those in RYC, with available information about RAD, DSED and self-esteem. The YiN participants were between 12 and 20 years old, and additional characteristics are presented in Table 1.

## **3.2 Setting**

### **3.2.1 Residential youth care in Norway**

In contrast to many parts of the world, where child welfare institutions may be large and have high child-to-caregiver ratios, Norwegian RYC institutions are small units (often housing three to five residents) that aim to resemble family homes and provide the residents with all basic needs. Further, Norwegian RYCs are subject to strict legislation with requirements for quality, content, and internal control (Lovdata.no, 2008). These include requirements for the professional competency of staff and leaders, demanding professional guidance and training for all personnel. Staff working hours are arranged to ensure adequate levels of stability and continuity for the residents. Every resident has a designated primary contact who takes on the responsibility of effectuating the roles of a primary caregiver and establishing a close relationship with that resident. Normally, a resident maintains the same primary contact during the entire stay in RYC, and the setting generally permits each resident and primary contact get to know each other well. A previous report of the RYC population in this thesis revealed that 90% of the participants had been living in RYC for at least 3 months (Kayed et al., 2015). Because the early childhood primary caregivers (biological parents) of the participants were unavailable for the RYC study and because the primary contacts in RYC were considered to have sufficiently knowledge of their designated RYC resident, the primary contacts were trusted as reliable caregiver informants in the RYC study.

### **3.3 Procedure**

#### **3.3.1 RYC institutions**

Data were collected from June 2011 to July 2014 by four research assistants with relevant professional backgrounds, extensive prior work experience with families and children, and completion of a training programme for the administration and scoring of the semi-structured psychiatric interviews. The research assistants visited the RYCs around the country, collected questionnaires and completed semi-structured psychiatric interviews with the adolescents and their primary contacts in the institutions.

The collection process took on average 2.5 hours (maximum 4 hours) per adolescent. To reduce the burden of participation, the adolescents were given hourly breaks and the possibility of spreading the process over 2 days. A team of child and adolescent psychiatrists and psychologists were available during the entire data collection period, in case of emergencies.

#### **3.3.2 General population**

Data from the general population was collected in 1992, by student completion of questionnaires during school hours. To avoid response bias due to inter-participant influences, all participants in each school completed the survey at the same time point. Students who had given participation consent but were not present at the time of the collective survey completion, were contacted for later completion of the survey. The schools never had access to the students' replies, and the participants were non-identifiable for the researchers.

### 3.4 Measures

Table 2 provides an overview of the measures applied in this thesis.

Table 2. Measures used in Papers I–III

Measure	Topic	Form	Paper		
Adolescent as informant			I	II	III
CAPA	Psychiatric symptoms and disorders	Interview	♦	♦	
	Psychosocial problems				
SPPA	Global and domain-specific self-esteem	Questionnaire			♦
Additional interview	Background information	Interview	♦	♦	♦
Primary contact as informant					
ASDI	ASD	Interview	♦	♦	♦
CAPA	ADHD	Interview	♦	♦	
CBCL	Emotional and behavioural problems	Questionnaire		♦	
PAPA	RAD and DSED	Interview	♦	♦	♦

Note. *ASD* autism spectrum disorder; *ASDI* Asperger Syndrome Diagnostic Interview; *CAPA* Child and Adolescent Psychiatric Assessment; *CBCL* Child Behaviour Checklist; *DSED* disinhibited social engagement disorder; *PAPA* Preschool Age Psychiatric Assessment; *RAD* reactive attachment disorder; *SPPA* Self-Perception Profile for Adolescents

#### 3.4.1 RAD and DSED

At the time of data collection, no validated assessment tools were available for assessing RAD and DSED in adolescence or assessing RAD and DSED according to the DSM-5 criteria (Lehmann et al., 2018). Furthermore, there were no available measures for structured observation of RAD or DSED behaviour in adolescence and no tools for self-assessment of RAD or DSED symptoms (Lehmann et al., 2018). One of the objectives of this thesis was to investigate whether adolescents may present RAD and DSED symptoms that are detectable using DSM-based measures developed and validated for younger children. In sum, therefore, RAD and DSED were assessed using the Preschool Age Psychiatric Assessment (PAPA) (Egger et al., 2006), a caregiver-informed semi-structured psychiatric interview with a module developed and validated for the assessment of the DSM-IV inhibited and disinhibited subtypes of RAD, corresponding to the DSM-5 RAD and DSED, respectively. The 15 available items were categorised according to the DSM-5 criteria, with 11 items measuring RAD symptoms and 4 items measuring DSED symptoms (Table 1, Paper I). To reduce the risk of overdiagnosis, symptoms were only considered representative of RAD or DSED

if predefined severity levels were met, requiring high levels of functional impairment and symptom burden (e.g. symptoms being present regularly, in most activities, and to a problematic degree).

To be considered as having a RAD diagnosis, the participants were required to fulfil the RAD A1 criterion (minimal comfort seeking) as well as one or more items for two or more RAD B criteria (minimal social or emotional responsiveness; limited signs of positive affect; expression of unprovoked sadness, irritability or fearfulness in non-threatening interactions). Because there was no item to measure adolescents' responsiveness to comfort, the RAD A2 criterion (minimal response to comfort) could not be included in the diagnostics of RAD. Adolescents who qualified for autism spectrum disorder (ASD) and the above RAD criteria ( $n = 5$ ) were in accordance with the DSM-5 considered not to have RAD diagnosis. Participants who fulfilled two or more of the items measuring DSED were considered to qualify for the DSED diagnosis.

A previous study of the same population investigated the interrater reliability for DSM-IV diagnoses based on blinded re-coding of a randomly drawn sample ( $n = 42$ ; 10.5%) of interview audio recordings and estimated the interrater reliability for the DSM-IV RAD inhibited and disinhibited type by Gwet's  $AC_1$  to be 0.82, and the absolute agreement rate to be 88% (Jozefiak et al., 2016).

### **3.4.2 Other psychopathology and psychosocial problems**

*Interview with the adolescents.* The Child and Adolescent Psychiatric Assessment (CAPA) (Angold & Costello, 2000) is a semi-structured psychiatric interview developed for the assessment of psychiatric disorders in children and adolescents according to DSM-IV criteria (Angold & Costello, 2000). Information about the degree of impairment and symptom intensity, frequency, onset, and duration are obtained. The interview contains both mandatory and optional follow-up questions. The interviewers ensure that the questions are understood by the interviewees and probe until having clarified whether symptom criteria are met. The CAPA is coded electronically with subsequent diagnostic evaluation by a computer-based algorithm according to DSM-IV criteria. Symptoms of the following psychiatric disorders were obtained from the CAPA: major depressive disorder (MDD), dysthymia, generalised anxiety disorder (GAD), panic attacks, other anxiety disorders, conduct disorder (CD), oppositional defiant disorder (ODD), and PTSD. Additionally, categorical measures of any depression, anxiety, or CD/ODD diagnoses were obtained from the CAPA, as well as information about suicidality, self-harm, bullying experience, contact with the police, profit-motivated sexual activity, and substance use. In a previous study of the same RYC

population, available information about the Child Behaviour Checklist (CBCL) scores of both participants ( $N = 400$ ) and 141 anonymous non-participants allowed the estimation of DSM-IV psychiatric disorders for 541 adolescents living in RYC by use of Bayesian multiple imputation estimation (Jozefiak et al., 2016). The results revealed that the estimated prevalence rates were comparable to the observed prevalence rates derived from the completed CAPA interviews, thus confirming participant representativeness (Jozefiak et al., 2016). Interrater reliability estimates for CAPA-based DSM-IV diagnoses by Gwet's  $AC_1$  were as follows (absolute agreement rate in parentheses): MDD 0.89 (93%), dysthymia 0.92 (95%), GAD = 0.93 (95%), agoraphobia without panic = 1.0 (100%), specific phobia = 0.86 (88%), social phobia 0.87 (91%), CD = 0.78 (86%), ODD = 0.97 (98%), and substance abuse = 0.69 (76%) (Jozefiak et al., 2016). The CAPA also yielded information about ethnic origin. However, information about age at first placement and the total number of placements in alternative care was retrieved from an additional adolescent interview constructed by the research group to yield background information regarded as particularly relevant for adolescents in alternative care, not covered by the CAPA.

*Interview with the adolescents' primary contacts.* Because symptoms of ADHD and ASD are more reliably reported by adults with close knowledge of an adolescent than by self-reporting (Mazefsky et al., 2011; Owens et al., 2007; Swanson et al., 2012), ADHD and ASD were assessed using interviews with the adolescents' primary contacts. For the assessment of ADHD, the caregiver version of CAPA was applied for which the interrater reliability by using Gwet's  $AC_1$  was 0.74, with an absolute agreement rate of 83% (Jozefiak et al., 2016). Furthermore, to include participants who received ADHD medication and therefore may report subthreshold symptom levels at the time of data collection, participants previously diagnosed with ADHD were included in the categorical ADHD diagnosis. Because the CAPA does not include measures of ASD, the Asperger Syndrome Diagnostic Interview (ASDI) (Gillberg et al., 2001) was used to assess ASD. A previous study of the RYC participants found interrater reliability estimates for ASD by Gwet's  $AC_1$  to be 0.83, with an absolute agreement rate of 88% (Jozefiak et al., 2016).

*Child Behaviour Checklist (CBCL) with the adolescents' primary contacts.* The CBCL for ages 6–18 (Achenbach & Rescorla, 2001) is a caregiver questionnaire with 118 items for the assessment of emotional and behavioural problems in children and adolescents, with satisfactory reliability and validity in Norwegian populations (Jozefiak et al., 2012; Nøvik, 1999), including the current population of adolescents living in RYC (Jozefiak et al., 2016). In addition to CBCL items classified as 'other problems', the following syndrome scales of the 2001 CBCL version (Achenbach & Rescorla, 2001) were applied in this thesis: anxiety/depressed, withdrawn/depressed,

somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviour and aggressive behaviour.

### 3.4.3 Self-esteem

Participants in both RYC and the general population completed the revised version (Wichstrøm, 1995) of the Self-Perception Profile for Adolescents (SPPA), a measure of global and domain-specific self-esteem with nine subscales. However, two of the subscales were omitted: The 'job competence' subscale was omitted because having a part-time job was considered to be rare for the studied age group in the general population (von Soest et al., 2016) and was confirmed as rare (11%) in the RYC population (Jozefiak et al., 2016). Furthermore, the behavioural conduct subscale was omitted due to low reliability in previous studies (Trent et al., 1994; von Soest et al., 2016). The remaining seven subscales used in this thesis (Paper III) include assessment of global self-esteem by the self-worth subscale and assessment of domain-specific self-esteem by the following subscales: scholastic competence, social acceptance, athletic competence, physical appearance, romantic appeal, and close friendships. The revised SPPA provides a less complicated response format and has shown equally good or better psychometric properties as the original SPPA version (Wichstrøm, 1995). Furthermore, internal consistency was acceptable for all subscales in a previous study of the general population investigated in this thesis (von Soest et al., 2016). Each subscale in the revised SPPA consists of five items, rated on a Likert scale ranging from 1 (*describes me poorly*) to 4 (*describes me very well*). Approximately half of the statements for each subscale are negatively worded, and the remaining statements are positively worded. Therefore, the scores of items with negative wording were reversed; high scores signify high levels of self-esteem for all items.

### 3.5 Ethics

The studies in this thesis (Papers I—III) complied with current ethical standards and were approved by the Norwegian Regional Committee for Medical and Health Research Ethics (reference number: 2015/1474/REC Central), as was the research project *Mental Health in Adolescents living in Residential Youth Care* (REF Jozefiak 2015). All participants in the RYC study provided written informed consent. Additionally, in accordance with Norwegian legislation, written informed consent was collected from the legal guardians of participants younger than 16 years. To avoid a feeling of social pressure to participate, leaders of the RYCs received information about the project, whereafter the invitation to participate was conveyed to the adolescents through the RYC staff by standardised information stressing that participation was fully voluntary, that all questions need not be completed, and that retraction of the consent to participate could be made at any time. This information was repeated orally to the adolescents by the research assistants prior to data collection at the RYC institutions. All participants in the RYC study received economic compensation (approximately 50 Euro) for participation, and one of every hundred participants was randomly selected to receive an iPhone as a participation reward.

The *Young in Norway Study* of the general population was approved by the Norwegian Data Protection Authority (DPA). In the YiN study, all participants, and the legal caregivers of those under the age of 15 years, provided written informed consent. Teachers were compensated for the required time and effort of the data collection, and one randomly selected participant received a family travel cheque as a participation reward.

### 3.6 Missing data

Because information about RAD and DSED was based on primary caregiver interviews (PCI) and not self-report, we expected the missingness of RAD and DSED to be independent of observed and unobserved data concerning the adolescents, hence missing completely at random (MCAR) (Bjørnstad & Lydersen, 2012). Therefore, complete case analysis was considered likely to give unbiased results (Bjørnstad & Lydersen, 2012). Moreover, the proportion of adolescents with missing PCI (19 of 400) was well below 10%, further indicating the appropriateness of a complete case analysis (Bjørnstad & Lydersen, 2012). Therefore, adolescents without PCI were omitted, reducing the total number of participants from 400 to 381 (Figure 1). Among the 381 participants with available PCI, the rates of missing RAD and DSED items ranged from 0.0% ( $n = 0$ ) to 5.2% ( $n = 20$ ), as detailed in Appendix B (Table B1). In the diagnostics of RAD and DSED, symptoms were considered absent where the corresponding RAD and DSED items were missing.

As illustrated in Figure 2, adolescent diagnostic interviews (CAPA) providing information about other psychiatric symptoms and disorders were missing for 59 of the 381 participants with PCI-informed RAD and DSED. Because non-response may be associated with increased mental health problems (Knudsen et al., 2010), we expected missing CAPA not to be MCAR, and that complete case analysis could potentially (but not necessarily) introduce bias (Bjørnstad & Lydersen, 2012). In Paper I, multiple imputation by use of an auxiliary mental health variable was discussed as an option to reduce potential bias, but the large total number (>130) of symptom variables for the latent factors (differential disorders) under investigation precluded the feasibility of multiple imputation. To evaluate the representativeness of the data for the remaining 322 participants with completed CAPA and PCI, the mean scores of the CBCL syndrome subscales were compared with the 59 participants with missing CAPA. Because CBCL subscale scores did not differ between participants with and without completed CAPA, the 322 participants with both CAPA and PCI were, for investigating RAD and DSED discriminant validity, considered to be representative of the whole sample and were included in the factor analyses in Paper I. Furthermore, the analyses in Mplus were handled according to a full information maximum likelihood procedure, and hence all available information for the participants with both CAPA and PCI was used.

Paper II had fewer than 50 variables, and for the 59 participants with incomplete CAPA interviews, available CBCL scores were considered satisfactory as auxiliary mental health variables, permitting multiple imputation of missing CAPA-informed psychopathology and psychosocial factors. Appendix C provides the results of both complete case and imputed data analyses, including the prevalence rates and odds ratios of co-occurring psychiatric disorders (Table C1) and psychosocial problems (Table C2) among adolescents with RAD and DSED. Although most differences are modest, for some factors, the strength of association is slightly stronger or weaker by complete case analysis than by analyses based on multiple imputation, which indicates that data were not MCAR and that complete case analysis may give biased results. In total, given the availability of auxiliary complete mental health variables, multiple imputation was considered preferable. Hence, in Paper II and this thesis, results from the imputed data analyses of comorbid psychopathology and psychosocial factors are presented and discussed. In Paper III, however, we had no available auxiliary self-esteem variables. In the absence of a relevant auxiliary variable with few or no missing values, imputation of the outcome is not considered beneficial (van Buuren, 2018), hence complete case analyses were applied in Paper III.



### 3.7 Statistical analysis

Statistical analyses performed in Mplus version 8 (Muthén & Muthén, 1998-2017) included confirmatory factor analysis and latent factor analysis (Paper I). All other analyses were performed in the Statistical Package for the Social Sciences (SPSS), versions 25 and 26. Two-sided *p*-values <.05 were considered to signify statistical significance; however, *p*-values between .01 and .05 should be cautiously interpreted due to multiple hypotheses. Where relevant, 95% confidence intervals (CI) are reported.

In Paper I, the evaluation of whether the PAPA measure delineates and differentiates RAD and DSED in adolescence was performed using two complimentary approaches. First, RAD and DSED were conceptualised as dimensional latent factors, and confirmatory factor analysis (CFA) was conducted to compare one- and two-factor solutions. Model fit was evaluated using commonly used indices, and the models were compared by chi-square difference testing. Second, RAD and DSED were conceptualised as categorical constructs and latent profile analyses (LPA) were conducted to compare 1–4 classes with respect to their prevalence, entropy, and the Vuong–Lo–Mendell–Rubin (VLMR) likelihood ratio test of *k* versus *k* – 1 classes (Asparouhov & Muthén, 2012). Furthermore, to investigate the discriminant validity of RAD and DSED, each disorder (RAD, DSED, MDD, dysthymia, GAD, panic attacks, other anxiety disorders, ADHD inattentive type, ADHD hyperactive/impulsive type, CD, ODD, PTSD, and ASD) was conceptualised as a latent dimensional factor. Subsequently, CFA with one-factor solutions, combining symptoms of RAD or DSED (in separate models) and each of the other mentioned disorders (in separate models), were compared with two-factor solution CFAs, where symptoms loaded separately on RAD or DSED and the differential disorder under investigation. Model fit was evaluated and compared as described above.

In Paper II, the Student's *t*-test was used to analyse the differences in means. Both categorical and dimensional measures of RAD, DSED and other psychopathology were employed. Co-occurring psychopathology or psychosocial problems were categorised as the dependent variable (in separate models), and associations with RAD and DSED were investigated using logistic and linear regression analyses with adjustment for age and sex.

In Paper III, the means for each of the seven SPPA subscales were calculated, and a grouping variable consisting of the following four groups was created: adolescents in the general population (YiN); adolescents living in RYC with neither RAD nor DSED diagnosis (RYC); adolescents living in RYC with a RAD diagnosis (RAD); and adolescents living in RYC with a DSED diagnosis (DSED). The mean global and domain-specific self-esteem of the four groups

were compared using a general linear model (analysis of covariance, [ANCOVA]), with the mean SPPA values for each subscale as the dependent variable (in separate models). To accommodate large differences in the group sizes and slight discrepancies in standard deviations between the groups, bootstrapping was performed using the bias-corrected and accelerated (BC<sub>a</sub>) method and B = 1000 bootstrap samples. Furthermore, within the RYC population, linear regression analyses were used to investigate associations between global and domain-specific self-esteem and the dimensionally measured RAD and DSED symptom loads, with the SPPA subscale mean as the dependent variable (separate models for each of the seven SPPA subscales). Adjustment for age and sex was made in all analyses.

## 4 Results

An overview of the psychopathologies, psychosocial problems, and self-esteem domains associated with RAD or DSED symptoms or diagnoses is presented in Table 3.

### Paper I

#### *Validity of reactive attachment disorder and disinhibited social engagement disorder in adolescence*

All measured symptoms of RAD and DSED were evident in adolescents, with frequencies ranging from 2.4% to 34.6% for RAD symptoms and from 3.5% to 11.1% for DSED symptoms. The prevalence rates of RAD and DSED diagnoses were as follows: 8.7% had RAD (95% CI 6.0%–11.0%;  $n = 33$ ), 8.1% had DSED (95% CI 5.4%–10.9%;  $n = 31$ ) and 0.5% ( $n = 2$ ) had both disorders, leading to a total prevalence of 16.3% (95% CI 12.6%–20.0%;  $n = 62$ ) RAD or DSED. The majority of participants with a DSED diagnosis were female, whereas the other characteristics (age, age at first placement, number of out-of-home placements and ethnicity) were comparable between the groups.

The latent constructs of RAD and DSED correlated modestly (Est. = .23, SE = .09,  $p = .010$ ). In the LPA, a three-class solution represented by symptoms of RAD, DSED, or neither RAD nor DSED evidenced the best model fit. The LPA revealed that the available RAD A item (lack of comfort seeking) was prevalent in the latent class for RAD and not in the latent class for DSED (Paper I, Table 3). However, several of the RAD B items, including the most frequently occurring RAD symptom (highly ambivalent and contradictory responses (Paper I, Table 1), were present in both the RAD and DSED LPA classes (Paper I, Table 3). Nevertheless, the two-factor CFA solution where RAD and DSED were categorised as two separate latent variables, evidenced better model fit than the one-factor solution, where RAD and DSED symptoms were combined in a single latent variable.

Because the above findings support the categorisation of RAD and DSED as two separate diagnostic constructs, subsequent investigation of discriminant validity was conducted separately for RAD and DSED. For all investigated disorders, the two-factor CFA solutions where RAD or DSED were categorised as latent variables separate from each of the differential psychiatric disorders evidenced better fit than one-factor solutions, where symptoms of RAD or DSED were combined with symptoms of the other psychiatric disorder (one at a time) to form a single latent

variable. The latent constructs of RAD and ASD correlated highly, whereas the correlations between RAD and the remaining disorders were modest. The latent construct of DSED evidenced moderate correlations with dysthymia and ADHD, and modest correlations with the remaining disorders.

## **Paper II**

### ***Reactive attachment disorder and disinhibited social engagement disorder in adolescence: co-occurring psychopathology and psychosocial problems***

All investigated psychiatric disorders (depression, anxiety, ADHD, and CD/ODD) and all investigated psychosocial problems (suicidal thoughts, suicidal plan, suicidal attempt, suicidal behaviour without suicidal intent, self-harm, exposure to bullying, contact with police, sex for gain, substance use, and substance use for mood improvement) were prevalent among adolescents with a RAD diagnosis and among those with a DSED diagnosis (Paper II, Table 1 and Figure 1).

Compared with other high-risk adolescents living in RYC, adolescents with a RAD diagnosis had increased odds of having suicidal thoughts and scored higher on the withdrawn/depressed CBCL syndrome scale. The odds of depression, anxiety and self-harm increased with an increasing number of RAD symptoms. Except for the CBCL syndrome scale for rule-breaking behaviour, RAD symptom load was associated with all CBCL subscales (anxiety/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, aggressive behaviour and ‘other problems’).

Compared with adolescents living in RYC without a DSED diagnosis, those with a DSED diagnosis had higher odds of having ADHD, any comorbid disorder, and suicidal thoughts, and the odds of all these factors increased with an increase in the number of DSED symptoms. Furthermore, except for the CBCL subscales ‘withdrawn/depressed’ and ‘somatic complaints’, the mean scores of all the CBCL subscales (anxiety/depressed, social problems, thought problems, attention problems, rule-breaking behaviour, aggressive behaviour and ‘other problems’) were higher in adolescents with a DSED diagnosis, and were associated with higher DSED symptom counts.

### **Paper III**

#### ***Self-esteem in adolescents with reactive attachment disorder or disinhibited social engagement disorder***

Compared with adolescents in the general population, those with a RAD diagnosis had lower self-esteem for scholastic competence and higher self-esteem for close friendship (Paper III, Table 1). However, no differences in global or domain-specific self-esteem were noted between adolescents with a RAD diagnosis and those living in RYC who neither qualified for a RAD nor a DSED diagnosis.

Adolescents with a DSED diagnosis, on the other hand, had lower self-esteem for several domains compared with several of the groups (Paper III, Table 1). Compared with adolescents in the general population, those with a DSED diagnosis had lower self-esteem for scholastic competence, social acceptance, athletic competence, physical appearance, and self-worth. Compared with adolescents living in RYC who qualified for neither RAD nor DSED diagnoses, those with a DSED diagnosis had lower self-esteem for social acceptance and self-worth. Compared with adolescents with a RAD diagnosis, those with a DSED diagnosis had lower self-esteem for social acceptance and physical appearance.

The results from linear regression analyses, within the RYC sample, of the associations between the dimensional scales of RAD and DSED symptoms and the levels of global and domain-specific self-esteem are portrayed in Table 2, Paper III. Increasing the RAD symptom load was associated with lower self-esteem for social acceptance, athletic competence, romantic appeal, and close friendship. Increasing the DSED symptom load was associated with lower self-esteem for scholastic competence.

Table 3. Factors which by logistic and linear regression analyses in Papers II and III evidenced increased odds or positive associations with RAD or DSED diagnoses or symptoms

	RAD		DSED	
	Diagnosis	Symptoms	Diagnosis	Symptoms
<b>Psychiatric disorders<sup>1</sup></b>				
Depression		◆		
Anxiety		◆		
ADHD			◆	◆
Any disorder			◆	◆
<b>Psychosocial problems<sup>1</sup></b>				
Suicidal thoughts	◆		◆	◆
Self-harm		◆		
Substance for mood			◆	
<b>CBCL scale<sup>1</sup></b>				
Anxiety/depressed		◆	◆	◆
Withdrawn/depressed	◆	◆		
Somatic complaints		◆		
Social problems		◆	◆	◆
Thought problems		◆	◆	◆
Attention problems		◆	◆	◆
Rule-breaking behaviour			◆	◆
Aggressive behaviour		◆	◆	◆
Other problems		◆	◆	◆
<b>Self-esteem domains<sup>2</sup></b>				
Scholastic competence	◆		◆	◆
Social acceptance		◆	◆	
Athletic competence		◆	◆	
Physical appearance			◆	
Romantic appeal		◆		
Close friends		◆		
Self-worth			◆	

<sup>1</sup> Comparisons made within the RYC population.

<sup>2</sup> Self-esteem by RAD and DSED diagnoses: general population as the comparison group. Associations with RAD and DSED symptoms: comparison made within the RYC population.

## 5 Discussion

### 5.1 Summary of findings

This thesis evaluated adolescents living in Norwegian RYC, and examined to what degree RAD and DSED symptoms and disorders are present in such high-risk adolescents, whether RAD and DSED in adolescence may be considered valid diagnostic constructs distinct from each other and from other common psychiatric disorders, to what degree RAD and DSED in adolescence co-occur with other psychopathology and psychosocial factors, and what characterises global and domain-specific self-esteem in adolescents with, compared with without, RAD or DSED.

To summarize, RAD and DSED symptoms and diagnoses in adolescents living in RYC were relatively prevalent and were found to represent two distinct latent constructs, each of which was distinguishable from the latent constructs of other common psychiatric disorders. Furthermore, most adolescents with RAD or DSED diagnoses had additional psychiatric disorders and psychosocial problems, and all the investigated disorders and psychosocial problems—both of emotional and behavioural types—evidenced high prevalence rates both in adolescents with RAD and in those with DSED. Within the high-risk sample of adolescents living in RYC, categorical measures of psychopathology and psychosocial problems failed to reveal increased risks of other psychiatric disorders or psychosocial problems in adolescents with RAD or DSED, whereas dimensional measures revealed that having a DSED diagnosis and having higher RAD or DSED symptom counts were associated with more emotional and behavioural problems. Regarding self-esteem, adolescents living in RYC had lower scholastic competence self-esteem, whether or not they qualified for a RAD or DSED diagnosis. Furthermore, compared with both general and high-risk populations, adolescents with a DSED diagnosis had lower self-esteem for several domains. When RAD and DSED were measured dimensionally, having more RAD symptoms was associated with lower self-esteem for several domains, and having more DSED symptoms was associated with lower self-esteem for scholastic competence.

Overall, the results support the construct validity and high degree of psychiatric morbidity of RAD and DSED in adolescence. Furthermore, the results indicate relatively high prevalence rates of RAD and DSED in adolescents living in RYC and, by exploring global and domain-specific self-esteem in adolescents with RAD or DSED, indicate possible directions for self-esteem interventions in this very high-risk group.

## 5.2 General discussion

### 5.2.1 Prevalence and construct validity of RAD and DSED

All the available RAD and DSED items of the PAPA were present in adolescents living in RYC, demonstrating that a measure developed and validated for the assessment of RAD and DSED in young children may also identify RAD and DSED symptoms in adolescents. The combined prevalence rates of RAD and DSED diagnoses were in line with findings in school-aged foster children in Norway (Lehmann et al., 2013), a group considered to be less at risk than adolescents in RYC, and overdiagnosis of RAD and DSED in this study is therefore unlikely. Although epidemiological data of RAD and DSED in the general population are scarce, the prevalence rates of RAD and DSED diagnoses in RYC were approximately 10 times higher than estimates in the general population (Minnis et al., 2013; Skovgaard et al., 2007), illustrating the high-risk nature of the adolescents living in RYC.

The range of symptom frequencies was larger for RAD items than for the DSED items, and the most frequent RAD symptoms were three times as prevalent as the RAD diagnosis. The frequencies of DSED symptoms, on the other hand, were more in accordance with the prevalence of the DSED diagnosis. One reason for this may be that the PAPA includes more items for RAD than DSED, thereby increasing the likelihood that some of the RAD items were frequent. Another explanation may lie in the more complex diagnostic structure of RAD, requiring the presence of both RAD A (minimal comfort seeking and response) and RAD B criteria (low social–emotional responsiveness and emotional dysregulation), and the possibility that some of the RAD symptoms may be less specific to the RAD diagnosis. The LPA indicated high specificity for the available item measuring the RAD A criterion, whereas some of the symptoms of the RAD B criterion were also present in the LPA latent class for DSED and were thus less specific to RAD. These findings agree with the current understanding that aberrant attachment behaviour (defined by the RAD A criterion) is core to RAD and not a characteristic of DSED and with findings of high correlations between symptoms of RAD B and DSED in foster-placed adolescents (Lehmann et al., 2018), as well as indications that RAD B symptoms may be more trauma-related rather than attachment-related (Lehmann et al., 2020). Nonetheless, studies of foster-placed adolescents support the construct validity of RAD (Lehmann et al., 2020; Lehmann et al., 2018) and the distinction between RAD and DSED in adolescence (Lehmann et al., 2018). Also consistent with the DSM-5, the current factor analyses of RAD symptoms in adolescents living in RYC (Paper I) indicate that the RAD items were specific for RAD and that the latent construct of RAD (consisting of both RAD A and RAD B symptoms) was distinct from the latent construct of DSED.



In agreement with the DSM-5 and knowledge about RAD and DSED in preschool and school age children (Davidson et al., 2015; Follan et al., 2011; Gleason, Fox, et al., 2011; Lehmann et al., 2016; Minnis et al., 2007), the symptoms of RAD and DSED were distinct from those of other common psychiatric disorders in adolescence. The high correlation between symptoms of RAD and ASD reflects that these two disorders share some clinical features and underlines the importance of not misdiagnosing ASD as RAD, supporting the rationale that ASD is an exclusion criterion for RAD in the DSM-5. Despite the high correlation, the model differential test (Paper I, Table 2) indicated a distinction between RAD and ASD. Notably, both theory and research suggest that individuals with ASD may have comorbid RAD (Scott et al., 2018), and that RAD and ASD are differentiable disorders (Davidson et al., 2015; Mayes, Calhoun, Waschbusch, & Baweja, 2017). To summarize, the current study supports the construct validity of RAD and DSED in adolescence in accordance with the DSM-5 and the understanding of RAD and DSED in younger children.

### **5.2.2 Co-occurring psychopathology and psychosocial problems**

Consistent with knowledge about long-term negative consequences of child maltreatment (Hughes et al., 2017; Lang et al., 2020; Negri et al., 2019; Zeanah et al., 2016) and high psychiatric morbidity and complexity among adolescents in RYC (Tarren-Sweeney, 2018), the rates of both emotional and behavioural psychopathology and psychosocial problems in adolescents with RAD or DSED were considerably higher than population estimates (Bakken, 2015; Costello et al., 2003; Nøvik, 1999; Polanczyk et al., 2015; Reneflot et al., 2018; Rescorla et al., 2012), as high or higher than findings in adolescents with PTSD from a UK population-representative sample (Lewis et al., 2019), and comparable to findings in early adolescents with a history of institutional deprivation and ‘care as usual’ in the BEIP study (Humphreys et al., 2015; Zeanah et al., 2009). For RAD, the high co-occurrence of behavioural and emotional disorders in adolescents with a RAD diagnosis, and the significant associations between RAD symptom load and both behavioural and emotional problems, contrast with findings in preschool age where RAD seems to be associated with emotional problems only (Corval et al., 2019; McGoron et al., 2012; Spangler et al., 2019), yet agree with findings in school-age children and early adolescents (Giltaij et al., 2016; Guyon-Harris, Humphreys, Degnan, et al., 2019; Vervoort et al., 2013; Zimmermann & Iwanski, 2019), pointing to a possible developmental change in the comorbidity profile for individuals with RAD.

For DSED, the high rates of co-occurring emotional and behavioural psychiatric disorders and psychosocial problems, and the positive associations between DSED (measured both

categorically and dimensionally) and emotional and behavioural problem scales, are consonant with research in preschool and school-age children which demonstrates that DSED may co-occur (Giltaij et al., 2016; Gleason, Zamfirescu, et al., 2011; Mayes, Calhoun, Waschbusch, Breaux, et al., 2017) or be associated (Jonkman et al., 2014; Kay & Green, 2013; McGoron et al., 2012) with not only behavioural, but also emotional psychopathology. Because of the cross-sectional nature of the study, knowledge cannot be deduced about the developmental trajectories or pathways to the various types of co-occurring psychopathologies and problems for participants with RAD or DSED. However, studies have suggested that poor self-esteem may act as a mediator in the development of psychopathology following child maltreatment (Greger et al., 2017; Soler et al., 2013).

### **5.2.3 Self-esteem in adolescents with RAD or DSED**

Finding lower scholastic competence self-esteem in adolescents with RAD or DSED compared with adolescents in the general population agrees with findings in institutionalised school-aged children with RAD or DSED symptoms (Vacaru et al., 2018). However, scholastic competence self-esteem was low in all groups of adolescents living in RYC, whether or not they qualified for RAD or DSED diagnoses; hence, the low values may be mostly related to factors common for all adolescents in RYC. However, because scholastic competence self-esteem within the RYC population decreased with an increasing number of DSED symptoms, there may be additional DSED-specific factors acting to further reduce scholastic competence self-esteem in adolescents with DSED, although not reaching statistical significance in the categorical between-RYC-groups comparisons, probably due to reduced statistical power in the categorical approach.

The finding that global self-esteem was similar in adolescents with RAD and other high-risk adolescents living in RYC mimics the lack of difference in global self-esteem between high-risk school-age children with and without RAD (Bosmans et al., 2019). Contrary to our expectations, global self-esteem and most other self-esteem domains in adolescents with a RAD diagnosis (and adolescents in RYC with neither RAD nor DSED) were comparable to self-esteem among adolescents in the general population. Possible explanations for this lack of expected discrepancy include a normalisation of self-esteem following removal from an adverse home environment, consonant with findings in adolescents experiencing a decrease in poly-victimisation (Turner et al., 2015). Additionally, for adolescents in RYC, it may be that not only a halt in adversity but also new and salutary emotional experiences with sensitive and supportive alternative caregivers (including teachers, former foster parents, and current caregivers in the RYCs) have had reparative effects,

modifying internal working models of the self and others sufficiently to level with the general population means of self-esteem. In line with the sociometer theory (Leary et al., 1995; Magro et al., 2019) and self-esteem in adolescence depending increasingly on social acceptance by peers and non-family members (Harter, 2012; Rubin et al., 2007), peer acceptance and social support by significant others may have enhanced self-esteem despite an absence of parental support (Birkeland et al., 2014). Indeed, in a previous study of the RYC sample in this thesis, adolescents living in RYC (89.8%) self-reported social support from friends as frequently as adolescents in the general population (88.2%,  $p = .404$ ) (Singstad et al., 2020). Furthermore, RYCs may represent a new and beneficial frame of reference for high-risk adolescents, providing a self-esteem comparison context consisting of peers with similar backgrounds and challenges, rather than the often more fortunate peers in the general population, ultimately contributing to positive adjustments of self-esteem following placement in RYC.

However, the cross-sectional nature of the data prevented conclusions about the trajectory of self-esteem following placement in RYC. Hence, the unexpectedly high self-esteem values—including the higher close friendship self-esteem in adolescents with RAD than in the general population—may have preceded placement in RYC or even the first placement in alternative care. The unexpectedly high values may represent *falsely* high self-esteem, for which victims of child maltreatment are more at risk (Harter, 2012). However, the finding that adolescents with DSED evidenced lower self-esteem for several domains compared with adolescents in the general population, indicates there is no general trend of falsely high self-esteem in the adolescents living in RYC. Furthermore, the findings that self-esteem for several domains decreased with an increasing number of RAD symptoms, indicates there is no general tendency toward falsely high self-esteem in adolescents with RAD, in total supporting the authenticity of the reported self-esteem values by adolescents with RAD or DSED.

The association between RAD symptom load and poor self-esteem for several domains was *not* echoed by lower self-esteem in adolescents with a RAD diagnosis, which is seemingly *not* simply explained by increased statistical power in the dimensional compared with the categorical approach to RAD. Instead, this apparent internal discrepancy in the results between the dimensional and categorical measures of RAD may reflect that the RAD diagnosis requires the presence and absence of certain criteria, as opposed to the dimensional measure of RAD, which simply reflects the number of RAD symptoms. For example, considering that recollections of poly-victimisation are associated with lower self-esteem (Soler et al., 2012), and that recollections of potentially traumatic events in foster youth are associated with symptoms of the RAD B criteria, but not the

RAD A criteria (suggesting that the latter may be more affected by severely inadequate care in pre-memory or preverbal ages, and less affected by traumatic events in older ages) (Lehmann et al., 2020), it may be that self-esteem is more strongly associated with the RAD B than with the RAD A criterion. If so, this may have contributed to the differing results between the dimensional and categorical approaches to RAD, given that we had numerous items reflecting the RAD B criterion, only one item representing the RAD A criterion, and that the presence of the latter was obligated to the RAD diagnosis. Although the modest to high correlations between symptoms of RAD and other psychiatric disorders (Paper I) associated with low self-esteem could suggest that the differences in self-esteem associations between a dimensional and a categorical approach to RAD may be partly explained by the contribution of other disorders, the overall findings that RAD symptom clusters were nonetheless distinct from symptom clusters of other disorders (Paper I) and that the RAD diagnosis was distinct from co-occurring diagnoses (Paper II), argues for the validity of the self-esteem results (Paper III).

Regarding DSED, the findings that compared with adolescents in the general population, those with DSED had lower self-esteem for social acceptance, athletic competence, physical appearance, and global self-worth agree with reports of maltreated and non-maltreated children (Brayden et al., 1995; Cederbaum et al., 2020; Grilo & Masheb, 2001; Mennen et al., 2010; Vacaru et al., 2018). Although countering previous findings in special education school-age children with signs of DSED (Vervoort et al., 2014), the lower global self-esteem in adolescents with DSED agrees with findings in institutionalised school-age children with either RAD or DSED symptoms (Vacaru et al., 2018). For several self-esteem domains, adolescents with DSED evidenced lower values than other high-risk adolescents in RYC, including those with RAD. Possibly, the disinhibited behaviour intrinsic to DSED may increase the risk of adverse experiences, even after placement in alternative care, limiting improvement in self-esteem despite removal from an adverse home environment. Moreover, in Norwegian culture, social withdrawal may be preferred over disinhibited and socially invading behaviour, possibly resulting in more experiences of dislike and rejection for individuals with DSED compared with those with RAD, with implications for self-esteem throughout childhood and adolescence, before and after placement. Nonetheless, having more RAD symptoms was associated with lower self-esteem in several domains. Thus, in total, the assessment of global and domain-specific self-esteem may be clinically valuable in adolescents with RAD or DSED symptoms or diagnoses.

### 5.3 Strengths and limitations

The major strengths of this study include the national, comparatively large, representative samples of adolescents living in RYC and in the general population, with high response rates. Additional strengths include the use of in-depth semi-structured psychiatric interviews to assess a range of psychosocial problems and psychiatric disorders, including RAD and DSED, and the assessment of multiple self-esteem domains. For RAD and DSED, the use of a diagnostic DSM-IV caregiver interview (PAPA) developed and validated for young children with a history of early institutional deprivation may carry both strengths and limitations. Although possible developmental changes to RAD and DSED throughout childhood could undermine the PAPA's content validity for adolescence, as one might expect symptoms and behavioural patterns of RAD and DSED to have changed somewhat from early childhood to adolescence, an overall aim of this study was to investigate whether RAD and DSED may be considered valid constructs in adolescence. Therefore, given that the current knowledge about RAD and DSED is predominantly based on studies of early institutionalised and severely deprived children, the demonstration that adolescents with a history of early in-family maltreatment and subsequent placement in RYCs may exhibit behaviour that is indeed detectable by a diagnostic instrument developed to assess RAD and DSED in young children with a history of early institutional deprivation may be viewed as a strength and support to the construct validity of RAD and DSED in adolescence. What is more, a newly developed diagnostic interview to assess DSM-5-defined RAD and DSED in adolescence—the reactive attachment disorder and disinhibited social engagement disorder assessment (RADA) (Lehmann et al., 2018)—shows substantial overlap with the RAD and DSED measure of PAPA, supporting the age relevance and content validity of items used to assess RAD and DSED in this thesis.

That said, the cross-sectional study design prevented causal inference and deductions about the developmental trajectory of RAD and DSED and their relationship to co-occurring psychopathology, psychosocial problems, and self-esteem throughout adolescence, both prior to and after placement in RYC. Nonetheless, by providing a snapshot of high-risk adolescents living in RYC, the cross-sectional data may add valuable knowledge about RAD and DSED in line with the research aims of this thesis, given adequate internal and external validity, which is further discussed in the following sections.

### 5.3.1 Internal validity

#### *Selection bias*

Because non-participation in epidemiological studies may be associated with poorer mental health (Knudsen et al., 2010; Wolke et al., 2009), attrition may have selectively biased results to underestimate the levels and rates of mental health problems and related outcomes. However, given the national scope of the RYC study, the relatively high participation rate, and the demonstration of representativeness by diagnostic estimations of psychiatric disorders for non-participants, it is considered unlikely that selection bias significantly influenced the results of the RYC study. Furthermore, regarding the YiN study, which was conducted at schools in the general population, we cannot rule out that adolescents who have dropped out of school may have lower than average self-esteem, and that their non-participation may have produced slightly overestimated self-esteem levels. If so, the self-esteem differences we observed between adolescents with RAD or DSED and the general population (Paper III), may be slightly exaggerated. Nonetheless, considering the very high school participation rate for adolescents living in Norway (98.5% in public junior high schools, of which 97% continue to senior high schools (von Soest et al., 2016)), the careful measures taken in the selection procedure to ensure national representativeness of the YiN participants, and the very high response rate, selection bias in the YiN study is expected to be negligible.

Even so, a possible source of selection bias with regard to the comparison of self-esteem between adolescents living in RYC and those in the general population, lies in potential sociocultural time trends of self-esteem during the 20 years between the data collection of the two studies (RYC in 2011–2014; YiN in 1992). Although knowledge about time trends in Norwegian adolescents is lacking for most of the self-esteem domains, a previous study reported that physical appearance self-esteem increased slightly from 1992 to 2010 (von Soest et al., 2014). If the same is true for other self-esteem domains—which is conceivable, as physical appearance self-esteem is highly correlated with global self-esteem (von Soest et al., 2016; Wichstrøm & Von Soest, 2016)—the differences between self-esteem in adolescents living in RYC (with or without RAD or DSED) and that of the general population, portrayed in Paper III, may be underestimated.

#### *Information bias*

Several possible sources of differential misclassification may have biased the results of this thesis. For one, there may be rater bias due to some primary contacts potentially being more prone

than others to identify and report RAD and DSED symptoms, for example, due to possible differences between collegial milieus and competencies in the RYCs. However, because the participants with RAD or DSED were widespread (the 33 participants with a RAD diagnosis were dispersed in 28 RYC institutions, and the 31 participants with a DSED diagnosis were dispersed in 28 different institutions, except for two institutions each hosting one of the two participants who qualified for both RAD and DSED), there is little reason to suspect that reports of RAD and DSED are largely exaggerated by inter-collegial differences between primary contacts working in certain RYCs, or systematic between-RYC differences in staff liabilities or recognition competencies. On the other hand, although not suspected, we cannot exclude that institutional factors in the RYCs having no participants qualifying for RAD or DSED may contribute to the underdiagnosis of RAD and DSED.

For DSED, differential misclassification by rater bias may have contributed to the preponderance of females with a DSED diagnosis, for example, by a cultural liability to classify disinhibited behaviour as more problematic in females than in males. Furthermore, although common in research (Humphreys, Nelson, et al., 2017; Lehmann et al., 2018; Sonuga-Barke et al., 2017), the sole use of caregiver information in diagnosing RAD and DSED may have biased the results by both over- (Giltaij et al., 2017) and underidentification (Bruce et al., 2019). In line with clinical recommendations (Zeanah et al., 2016), a multi-method assessment including observational measures could have strengthened the diagnostics of RAD and DSED in this study. However, caregiver-informed and observational measures have been found to converge in the assessment of RAD and DSED (Atkinson, 2019; Gleason, Fox, et al., 2011; Zeanah & Gleason, 2015; Zimmermann & Iwanski, 2019), supporting the validity of the results.

A possible source of non-differential misclassification of RAD (but not DSED) lies in the uncertainty of whether the aberrant adolescent attachment behaviour reported by primary contacts in the RYC corresponds with the participants' attachment behaviours towards previous primary caregivers. If lack of comfort-seeking, rather than being a symptom of RAD, represents expected adolescent behaviour in an RYC setting, it could cause overdiagnosis of RAD in the studies of this thesis, possibly biasing all results related to RAD. As an attempt to avoid such overdiagnosis, pre-defined requirements regarding scope and level were set for diagnostic contribution of minimal comfort seeking, demanding presence regularly, and in most activities. Moreover, the finding that minimal comfort seeking was reported in no more than 16% (Paper I, Table 1) opposes the notion that minimal comfort seeking might represent expected adolescent behaviour in an RYC setting. Furthermore, previous demonstrations of the trans-relational nature of RAD (Zimmermann &

Iwanski, 2019) supports that RAD symptoms reported by primary contacts in RYC may indeed be representative of adolescent behaviour towards previous caregivers, supporting the viability of our approach to RAD diagnostics.

Nonetheless, the lack of available items measuring response to comfort may have introduced non-differential misclassification bias by inflating the number of participants classified with a RAD diagnosis and deflating the number of RAD items in the dimensional measure of RAD. Moreover, our inability to certify histories of early inadequate care (although substantiated by knowledge of the CPS legislation and practice) and, for RAD, assure the debut of symptoms prior to age 5 years, may have introduced non-differential misclassification resulting in overdiagnosis of RAD and DSED. Although unable to exclude these sources of information bias, with possible over- or underestimation of RAD and DSED, the comparability of observed prevalence rates in adolescents living in RYC with those seen in children living in Norwegian foster care (Lehmann et al., 2013), suggests that potential misclassification has not markedly inflated the total prevalence rates of RAD and DSED.

Given that adolescents were adequately classified with RAD or DSED, another possible source of differential information bias lies in the possibility that adolescents with RAD or DSED may differ from those without, in their liability to self-report various outcome variables. For example, considering the social inhibition inherent in RAD, it may be that adolescents with RAD are less apt to self-disclose vulnerable information, resulting in possible underestimation of true associations between RAD and co-occurring psychopathology, psychosocial problems, and self-esteem. However, rates of co-occurring psychiatric disorders and psychosocial problems based on self-report were very high for both RAD and DSED. Thus, the scant and weak associations may rather be due to comparison with other very high-risk adolescents living in RYC. Such a contextual comparison factor could, however, not explain lack of the expected discrepancy between self-esteem in adolescents with RAD (and those in RYC with neither RAD nor DSED) and peers in the general population. Although these unexpected findings may result from differential misclassification, for example, by increased susceptibility for self-aggrandisement among victims of child maltreatment (Harter, 2012), there are—as considered in the above general discussion of self-esteem findings—several contextual factors that may promote the self-esteem of adolescents living in RYC where developmental support is provided, supporting the authenticity of the results. Nonetheless, future research of self-esteem in high-risk groups may better clarify the question of falsely high self-esteem by including measures of self-awareness about one's own shortcomings (Salmivalli, 2001).



## ***Confounding***

Age and sex are considered common confounders in medical research, and both self-esteem and most types of psychopathology in adolescence depend on age and sex. Therefore, age and sex were included as covariates in all the regression models of this study. However, there may be other confounding factors that have not been adjusted for, thereby biasing results. For example, length and intensity of maltreatment exposure, age at first placement, number of placements, quality of care in previous or current placements, length of stay in the current RYC institution, and genetic or neurobiological factors may all possibly affect the presence of RAD, DSED, other psychopathology, psychosocial factors, and the level of self-esteem, thereby representing possible confounders in this study. We had no available measures for most of these factors and therefore no way to investigate the potential degree of introduced bias. We did have information about age at first placement and number of placements, but neither was associated with a RAD or DSED diagnosis (Paper I), and post hoc analyses performed during the review process of Paper II revealed no associations with RAD or DSED symptom loads (Appendix A, Table A2). Although this may seem to counter some previous findings that higher age at first placement and multiple placement disruptions are strong predictors of persistent RAD and DSED (Guyon-Harris, Humphreys, Degnan, et al., 2019; Guyon-Harris et al., 2018; O'Connor et al., 2000) and more complex mental health problems (Tarren-Sweeney, 2018), the lack of such associations in the RYC sample is likely explained by the low diversity of these factors in the sample, given that the vast majority of participants had relatively high age at first placement (Table 1; Appendix A, Table A1) and multiple placements disruptions (Table 1; 81.8% had two or more placements). Therefore, for the RYC participants, age at first placement and number of placements were not considered confounding factors, and their exclusion from regression analyses is not expected to have biased the results. Comorbid psychopathology, psychosocial factors, and self-esteem were considered to represent mediating factors or colliders more likely than confounders; hence, adjustment could have introduced rather than corrected bias, and these factors were not included as covariates.

In the comparison of self-esteem (Paper III), we lacked information among the adolescents in the general population about RAD, DSED, or RYC placement, and our resulting inability to adjust for the possible presence of these factors may have biased results by underestimating real self-esteem differences between the RYC and general population groups. However, given the rarity of RAD, DSED, and RYC placements in the general population, such potential bias is likely to be negligible.

### **5.3.2 External validity**

Because rates of psychopathology and psychosocial factors and levels of self-esteem are age dependent, the generalisability of the results may be limited to adolescent populations. Furthermore, the rates of RAD, DSED, other psychopathology, and psychosocial problems, and levels of self-esteem may all depend on both past and present caregiving conditions. Thus, results of RAD and DSED prevalence rates, co-occurrence rates, and associations with psychopathology and self-esteem domains are not necessarily transferrable to adolescents with very dissimilar exposure histories or caregiving backgrounds, adolescents with current maltreatment exposure, adolescents living in RYC institutions offering poorer conditions for developmental support (e.g. RYCs with larger sizes, higher caregiver-child ratios, or less staff continuity), or adolescents living in non-RYC settings (e.g. family care, foster homes, or homeless). Inter-cultural differences in mental health (Kieling et al., 2011) and self-esteem (Harter, 2012) may also limit the applicability of results in non-Western cultures. Nonetheless, given previous international findings in younger children with other backgrounds and caregiving contexts, the results supporting the construct validity of RAD and DSED in adolescence, including discriminant validity, may apply to adolescents with a range of backgrounds and caregiving conditions.

### **5.4 Ethical considerations**

Data collection was already completed at the initiation of this PhD project and the data collection processes were considered to be ethically acceptable. Regarding the conduct and publication of this thesis, ethical considerations included awareness that documenting relatively high rates of RAD and DSED in adolescents living in RYC and high rates of co-occurring psychiatric disorders and psychosocial problems, as well as poor self-esteem in certain domains, may be perceived as further stigmatisation of an already vulnerable group and may unintentionally add to the burden and worry of those living in RYC. Overall, however, there was unanimous agreement in the research group that, given the scarcity of knowledge about RAD and DSED in adolescence and considerations that the research might provide vital knowledge to promote adequate assessment and beneficial treatment of adolescents with RAD or DSED, it would be more ethically problematic to refrain from carrying out the research than to complete the research and report results. Moreover, demonstrating the validity of RAD and DSED in adolescence may contribute to enhanced self-understanding for adolescents with RAD and DSED symptoms, and, especially for those with multiple additional problems, there may be some comfort and relief in the

documentation that they are not alone, possibly contributing to more openness, transparency, and reduced feelings of stigma following early inadequate care.

## **5.5 Clinical implications**

### **5.5.1 Assessment**

In adherence with clinical guidelines for all children and adolescents exposed to childhood maltreatment or neglect (Zeanah et al., 2016), and supported by the findings of this thesis, which demonstrate high psychiatric morbidity in adolescents living in RYC with and without RAD or DSED, a recent update of CPS guidelines in Norway now targets the importance of implementing comprehensive psychiatric assessment for high-risk children and adolescents and describes a standard procedure for assessing mental health and substance use in all children who receive support from the CPS (Helsedirektoratet, 2020). Furthermore, new Norwegian legislation is being drafted with the aim of providing interdisciplinary health assessment to all children and adolescents at the time of placement in alternative care (BFD, 2020). However, there is no guarantee that adolescents, despite referral by the CPS to local or specialised health care services, are offered an assessment of RAD or DSED. In clinical practice, presumably due to the rarity of RAD and DSED in the general population, even the most extensive psychiatric assessment tools commonly applied in childhood and adolescence (for example, the Kiddie-SADS (Ambrosini, 2000; Kaufman et al., 1997)) do not assess RAD and DSED. Furthermore, minimal comfort seeking and withdrawn behaviour intrinsic to RAD tends to go unnoticed in early childhood until comorbid behavioural problems emerge (Nelson et al., 2020).

Therefore, the findings of this thesis may carry high clinical value, as they indicate the importance that comprehensive assessment of high-risk children and adolescents includes an assessment of RAD and DSED. The presence of RAD or DSED may warrant specialised interventions to enhance caregiving qualities and commitment (Zeanah et al., 2016), promote healthy child development, and prevent placement disruptions (Konijn et al., 2019; Oosterman et al., 2007). Because such interventions are not necessarily delivered by health care services or the CPS in the mere presence of common emotional or behavioural disorders, overlooking RAD or DSED may deprive the child of interventions that could have enhanced the caregiver's sensitivity, availability, emotional co-regulation, and dedication, to provide the basis for an advantageous development.

In addition to a comprehensive assessment, the subsequent clinical interpretation of the assessment results is crucial. Besides substantiating that RAD and DSED in adolescence are rightfully recognised, our findings illustrate the importance of rightfully acknowledging co-occurring disorders and problems, rather than interpreting them as subordinate to RAD and DSED (although child maltreatment may have been a common causal factor). If comorbidity is not recognised, the mental health trajectory of children and adolescents with RAD or DSED may suffer from the missed treatment of other treatable disorders (Woolgar & Scott, 2014). However, simply acknowledging all co-occurring psychiatric disorders and mental health problems and viewing each as discrete clinical phenomena may, although aligned with current nosologies, represent an oversimplified clinical understanding of the symptoms, problems, and developmental challenges faced by individuals with a history of severely inadequate care (Tarren-Sweeney, 2018). For these individuals, a comprehensive clinical understanding may require a broader consideration of previous and present social contexts and subsequent implications for the individual's mental health and further developmental requirements (Dejong, 2010; Tarren-Sweeney, 2018), viewed through the lens of developmental psychopathology. Although clinicians must adhere to existing diagnostic nosologies, the construction of graphically illustrated symptom profiles (Tarren-Sweeney, 2013, 2018) or thorough case formulations may help further the understanding of the complex clinical pictures that are often present in individuals with RAD or DSED (and in other children and adolescents in alternative care).

Of further relevance to achieving a comprehensive understanding of the adolescent's function, daily challenges, and need for interventions or support, the results of this thesis indicate the importance of assessing related psychosocial problems, such as suicidality, bullying experiences, delinquent behaviour, risky sexual behaviour, and substance use. Because spontaneous disclosure of such experiences or behaviours may be limited by potential feelings of shame, guilt, or other discomfort, adequate assessment may require specific inquiry of such psychosocial problems. In sum, faced with adolescents who fulfil the diagnostic criteria of RAD or DSED, clinicians should expect to reveal other mental health and psychosocial problems of both emotional and behavioural types and be prepared to address these in a comprehensive treatment plan and required developmental support.

Not all adolescents with RAD or DSED had co-occurring psychopathology or psychosocial factors, illustrating the diversity in outcomes following inadequate care circumstances and the importance of keeping an open mind in the assessment process, as well as providing individualised treatment plans for young people in alternative care (Woolgar & Simmonds, 2019). The diversity in

outcomes illustrates the importance of cautiously translating population risk to individual levels, and the importance of rightfully accentuating factors of resilience (Lacey & Minnis, 2020). Because adequate self-esteem may promote resilience in maltreated children and adolescents and mediate the association between childhood adversity and later psychopathology, and because self-esteem may be enhanced by interventions targeting specific domains, the findings of this thesis emphasise the relevance of assessing global and domain specific self-esteem in high-risk adolescents, including those with RAD or DSED, and adjusting treatment and support plans accordingly.

Assessment tools commonly used by clinicians to reveal potentially traumatising events, such as the Child and Adolescent Trauma Screen (CATS) (Sachser et al., 2016), typically lack items for the assessment of emotional abuse or social neglect, considered critical causal factors of RAD and DSED. Clinicians who dutifully apply standard assessments of traumatic events may therefore be poorly positioned to properly consider the potential presence of RAD or DSED. Instead, the assessment of high-risk individuals, including children and adolescents in alternative care, should contain more comprehensive measures of past adversities, including exposure to neglect and emotional abuse. A novel example for self-report is the Maltreatment and Abuse Chronology of Exposure (MACE), which exists in Norwegian, has proven reliable and valid in a Norwegian context, and is freely available for clinical use; it also notes the ages at times of exposure, thereby providing critical information concerning developmentally sensitive periods (Fosse et al., 2020). However, the early inadequate care resulting in RAD or DSED may well have occurred in the earliest years of the child's development, impeding own recollection and verbalisation of the experienced neglect, which underlines the importance of not concluding in the assessment of previous childhood maltreatment or neglect without having consulted independent sources with close knowledge of the individual's childhood (such as family members, teachers, the CPS, or others) (Lehmann et al., 2020). To avoid underidentification of RAD and DSED in adolescence, as substantiated by finding relatively high rates of RAD and DSED symptoms and diagnoses in adolescents living in RYC, assessment of background histories in high-risk adolescents should include multiple informants and specify exposures to early social neglect, emotional abuse, and other caregiving conditions which may have hindered the child in forming selective and stable attachment relationships.

To prevent the appropriateness of assessment depending on the awareness of individual clinicians, child and adolescent mental health services should develop customised assessment plans for high-risk groups, including all children and adolescents with suspected or known early maltreatment or repeated caregiver shifts. For school-age children, the recently developed and

validated Early TRAuma-Related Disorders Questionnaire (ETRADQ) may provide an appropriate primary screening of RAD and DSED in accordance with the DSM-5, requiring less time and effort than a more thorough diagnostic assessment (Monette et al., 2020). However, in adolescence, validated screening instruments for RAD and DSED are lacking. The current clinical practice parameter for assessment and treatment of RAD and DSED proposes that, to determine the need for more thorough assessment and given the lack of validated screening instruments, clinicians should routinely ask caregivers a few central questions targeting the main features of RAD and DSED (Zeanah et al., 2016). The finding of this thesis that, despite relatively high prevalence rates, most high-risk adolescents in RYC do not have RAD or DSED diagnoses, could support the sufficiency of such primary screening questions for RAD and DSED behaviour, with the application of more in-depth assessment only in cases of positive screens. On the other hand, although a primary screening by one or two central questions (for example inquiries of the obligate RAD A criterion of minimal comfort seeking and response) may effectively exclude individuals who disqualify for the RAD diagnosis, the results of this thesis illustrate the risk of simultaneously excluding individuals who, despite diagnostic disqualification for RAD, are exceedingly impaired by a high RAD symptom load, for example having numerous symptoms reflecting the RAD B criteria. Given the relatively high-frequency rates of RAD and DSED symptoms in adolescents living in RYC (Paper I) and foster care (Lehmann et al., 2018), and the findings that for adolescents living in RYC, having more RAD or DSED symptoms is associated with more emotional and behavioural problems and to some degree poorer self-esteem, it may be worthwhile to provide all adolescents living in RYC—and possibly other high-risk adolescents such as those in foster care—with a thorough and formal assessment of RAD and DSED.

For children, numerous in-depth diagnostic tools of RAD and DSED are available (Lehmann et al., 2018); however, until recently, there were no such validated assessment tools for adolescents. A few years ago, a multi-national research group developed a diagnostic tool for RAD and DSED—the RADA—which is applicable in childhood and adolescence, is customised to the DSM-5, and is available in English, French and Norwegian (Lehmann et al., 2018). A recent research project in Norway has included the RADA in the tool-kit for multidisciplinary one-day routine assessment of children and adolescents at the time of placement in alternative care, the ‘CARE model’, covering primary assessment of developmental, physical, mental, and dental health and care needs, and resulting in a report describing the child’s needs and further recommendations of interventions and appropriate referrals (Myrvold et al., 2020). In a recent evaluation, all involved parties described high satisfaction and usability of the CARE model (Myrvold et al., 2020). Provided that certain

organisational considerations described by the researchers are addressed, national implementation of the CARE model (or similar models) may be suitable for providing high-risk children and adolescents with adequate primary assessment. Additionally, and substantiated by previous findings of late-onset emotional problems in adolescents with a history of early institutional deprivation and subsequent adoption to well-functioning families (Sonuga-Barke et al., 2017), mental health assessment of children and adolescents in care should account for heterotypic continuity and various mental health trajectories regardless of caregiving qualities, and include routine *monitoring* as well as primary assessment of mental health problems (Tarren-Sweeney, 2018). Although the cross-sectional design of the current study prevents any inference of mental health trajectories for individuals with RAD or DSED, the results demonstrating high rates of co-occurring emotional and behavioural problems in adolescents with RAD or DSED support the suitability of routine monitoring. Furthermore, the high degree of clinical complexity that the results of this thesis uncovers, supports the suggestion that children and adolescents entering residential care should bypass primary mental screening by the CPS and instead be automatically referred to comprehensive mental health and psychosocial-developmental assessment by specialist clinical services, as proposed in a protocol for CPS mental health screening and monitoring (Tarren-Sweeney, 2018).

### **5.5.2 Prevention**

Because child maltreatment is a common causal factor of multiple substantial and lasting negative outcomes, including mental health problems, psychosocial problems, poor self-esteem, and in severe cases RAD and DSED, prevention of child maltreatment is warranted, and increased investment in preventive and therapeutic interventions has been called for (Gilbert et al., 2009). The results of this thesis substantiate that RAD and DSED are manifested in adolescence and involve high degrees of psychiatric morbidity, thus demonstrating lasting and burdensome consequences of early inadequate care and emphasising the importance of preventing child maltreatment, and in other ways promoting children's chances of forming lasting, selective attachments to caregivers in early childhood—a developmental period where the individual (Humphreys & Zeanah, 2015; Kieling et al., 2011; Sroufe et al., 1999), societal, and socioeconomic (Arango et al., 2018; Heckman, 2006, 2007; Kieling et al., 2011) potential gains of preventive mental health measures are at their highest. Preventive efforts may be universal (targeting whole populations), selected (targeting groups at risk), or indicated (targeting individuals or families with high risk or manifest problems in an early phase) (American Psychological Association, 2014), and may need to include

both indirect measures targeting psychosocial risk factors (such as poverty, parental substance use, and parental psychopathology) (Arango et al., 2018; Gilbert et al., 2012), and direct measures targeting caregiver abilities (Arango et al., 2018; Skogen et al., 2018). Furthermore, to encompass primary (prior to debut), secondary (in early or subclinical stages) and tertiary (directed towards the manifested unwanted outcome, to reduce or hinder progression and related complications or sequelae) (Gerstman, 2013) prevention of RAD and DSED, there is a need for effective means to uncover maltreatment in early stages and ages, provide suitable and timely interventions for children and families with inadequate caregiving environments, capture the complexity of mental health and psychosocial problems in young people with a history of early maltreatment, and provide suitable and timely treatment to individuals with trauma- and attachment related problems, including RAD and DSED symptoms and diagnoses.

### **5.5.3 Treatment and care**

Ideally, early intervention could entirely prevent child maltreatment and ensure sensitive and supportive caregiving to all children, with resulting primary prevention of RAD, DSED and other psychopathology. However, no public health measures have thus far succeeded, hence the need for additional rehabilitative or curative treatment interventions (Kieling et al., 2011). Although validated treatment programmes for RAD and DSED are lacking, the provision of lasting relationships to sensitive and emotionally available caregivers is considered the most critical treatment intervention for individuals with RAD or DSED (Guyon-Harris et al., 2021; Zeanah et al., 2016). Current clinical recommendations include specialised interventions aiming to enhance attachment security and seek to counteract RAD and DSED by promoting sensitively attuned caregiving (Chaffin et al., 2006; Zeanah et al., 2016). Application of such specialised caregiver interventions may serve both preventive and therapeutic purposes, potentially enhancing the caregiver–child interactions and transactional processes, promoting the child or adolescent’s socioemotional functioning and development, easing the burden of caregiving, increasing the caregiver commitment to the child or adolescent, and stabilising placements, thereby potentially facilitating constructive rather than destructive developmental cascades.

Adequate identification and knowledge of RAD and DSED may also be decisive for how adults beyond the primary caregiving context (e.g. teachers and trainers) understand and react to deviant adolescent social behaviour (Bosmans et al., 2020), thereby affecting how adolescents are met in more extended developmental arenas, with potential implications for further adolescent



social, emotional, behavioural, and scholastic development (Spilt et al., 2016). Because schools represent an essential developmental arena for adolescents, and because teachers may take on a caregiver role for better or worse during school hours (Bosmans et al., 2020; Spilt et al., 2016; Verschueren & Koomen, 2012), teachers and schools need to be adequately involved and may well need specialised interventions and guidance to promote positive and prevent negative attachment cycles and developmental cascades (Bosmans et al., 2020). By demonstrating the validity and high degree of psychiatric morbidity of RAD and DSED in adolescence, this thesis advocates for the importance of providing timely and appropriate interventions to caregivers, including teachers, of children *and* adolescents with RAD or DSED.

Furthermore, the high rates of co-occurrence demonstrated by this thesis suggest that treatment plans for adolescents with RAD or DSED often necessitate additional interventions for other problems or disorders. Currently, evidence-based clinical guidelines primarily provide disorder-specific treatment recommendations which fail to differentiate between the uniform psychopathology typically seen in individuals with a history of adequate care and the complex psychopathology typically seen in those with a history of severely inadequate care and subsequent alternative placements (Tarren-Sweeney, 2018). Although in the latter cases clinicians may lack adequate treatment guidelines, the acknowledgement of co-occurring disorders and problems suggested by the findings of this study may facilitate a better individual fit of treatment plans for adolescents with RAD or DSED. Even so, the complex attachment and trauma-related psychopathology resulting from severely inadequate care, as illustrated here for RAD and DSED, and the unstable caregiving arrangements of many individuals in alternative care, including those living in RYC, may require longer treatment duration and care continuity than provided by standard health care services or time-limited treatment modules, challenging the typical organisation and operation of mental health care services in the Western world (Tarren-Sweeney, 2018).

Moreover, adhering to the framework of developmental psychopathology within a socioecological perspective, a comprehensive prevention and treatment approach may need to consider both proximal and more distal environmental factors that may compromise or promote therapeutic change and the overall mental health trajectory, including not only the provision of direct interventions to caregivers and adolescents, but also, for example, granting consultation to providers of social welfare benefits (potentially enhancing caregiver availability and family living environment) and, not least, placement decision makers (the CPS and courts) (Tarren-Sweeney, 2018). Indeed, because decisions made by child protection workers may be influenced by their understanding of the child's health and psychosocial functioning (Fluke et al., 2020),

comprehensive assessment and correct diagnostics of high-risk children and adolescents may be critical to providing child protection workers with the information required for an adequate decision-making process. Acknowledging RAD and DSED as valid diagnoses in adolescence may therefore have implications for CPS placement decisions and the abilities of child welfare and protection services to provide adequate psychoeducation and specialised caregiver interventions intended to enhance caregiving quality and prevent placement breakdown, which could potentially be crucial to the child or adolescent's further development and mental health trajectory (Tarren-Sweeney, 2018). A recent consensus statement by experts in the field of attachment recommends that CPS and family court practitioners be guided by attachment theory through the principles of “(a) the need for familiar, non-abusive caregivers; (b) the value of continuity of good-enough care; and (c) the benefits of networks of attachment relationships” (Forslund et al., 2021). Adherence to these principles by the CPS and courts would likely benefit all children and adolescents, not least in efforts to prevent and treat RAD and DSED.

Given that self-esteem may mediate the relationship between childhood maltreatment and adolescent psychopathology, assessing and targeting self-esteem in high-risk children and adolescents may potentially prevent or improve co-occurring psychopathology in adolescence. The results of this thesis indicate that interventions targeting scholastic competence self-esteem may be warranted in adolescents living in RYC regardless of whether they qualify for a RAD or DSED diagnosis. The presence of DSED may increase the relevance of targeting self-esteem in the domains of social acceptance, athletic competence, physical appearance, and self-worth. Furthermore, a high RAD symptom load may increase the relevance of targeting the self-esteem domains of social acceptance, athletic competence, romantic appeal, and close friendship. However, because of substantial within-group variances in mean self-esteem values, individual assessment and customised interventions are required. Nonetheless, there may be general implications to consider in the context of RYC institutions.

#### **5.5.4 Interventions in residential youth care**

Although RYCs may, as they typically do in Norway, emphasise the importance of providing continuity and stability for residents and arrange staff working hours thereafter, unavoidable rotations in staff and the temporariness of RYC placements may complicate the establishment of lasting relations to caregivers within the RYC context. Nonetheless, experiences in adolescence that represent discontinuities to earlier experiences may yield critical turning-points

(Rutter & Sroufe, 2000), and relations to RYC staff may represent opportunities for corrective relational experiences with the potential to adjust maladaptive IWMs of the self and others. However, relational difficulties inherent to RAD and DSED, and the high psychiatric morbidity and complexity demonstrated by the results of this thesis, warrant that RYC staff are knowledgeable of various mental health disorders (Lehmann & Kaye, 2018) and possess high emotional and relational competencies (Steinkopf et al., 2021). Therefore, this thesis substantiates the importance that RYC staff are carefully selected and receive appropriate education, training, and specialised guidance to enhance their understanding of aberrant adolescent behaviour and enable them to continuously respond in sensitive manners and provide sorely needed developmental support.

Furthermore, and combined with the overall finding of reduced scholastic competence self-esteem among adolescents in RYC, the results of this thesis argue for the establishment of routine collaborations between child protection workers, health care services, RYCs (or other caregivers), teachers, and special educators in schools, aiming for a joint understanding of the adolescent's behaviour, functioning, and developmental needs for socio-emotional and scholastic support, including interventions to enhance attachment relationships through caregiver and teacher sensitivity (Bosmans et al., 2020; Spilt et al., 2016; Zeanah et al., 2016) and promote scholastic competence self-esteem (O'Mara et al., 2006). Moreover, milieu therapeutic plans of the RYCs should preferably be customised to residents' mental health and self-esteem profiles, for example, taking measures to enhance social acceptance self-esteem by specific social competence skills training and contingent feedback or praise (O'Mara et al., 2006), or targeting self-esteem of physical appearance, athletic competence, and self-worth by stimulating participation and mastery in physical activities (Haugen et al., 2013; Legrand, 2014; Spence et al., 2005). Although a developmental approach to the needs of adolescents in RYC may be pertinent, much remains to be learned about therapeutic and preventive interventions in children and adolescents with trauma- and attachment-related disorders (Tarren-Sweeney, 2018), including RAD and DSED (Zeanah et al., 2016).

### **5.5.5 Future research**

Finding support for the validity of RAD and DSED in adolescence, and the relatively high rates of RAD and DSED symptoms and diagnoses, calls for the development and validation of suitable RAD and DSED questionnaires to perform adequate screening of RAD and DSED in high-risk adolescent populations. Furthermore, although several structural observational measures of

RAD and DSED are available for infants, preschool-, and school-age children (Corval et al., 2019; Lehmann et al., 2018; Zimmermann & Iwanski, 2019), no observational measures have been developed or validated for use in adolescence.

The results of this thesis highlight questions concerning the trajectories throughout placement periods in alternative care, including time spent in RYCs, of RAD and DSED symptoms and disorders, co-occurring psychopathology and psychosocial problems, and global and domain specific self-esteem. More knowledge is needed about the potential moderators and mediators of various outcomes related to health, functioning, self-esteem, and well-being throughout childhood and adolescence in individuals with RAD or DSED. Future intervention studies should investigate the effect on RAD and DSED of specialised caregiver programs in various age groups and caregiving contexts, and possible beneficial side effects on comorbid psychopathology, psychosocial problems, and self-esteem. Studies should also specifically target the complex clinical picture seen in some individuals with RAD or DSED, considering co-occurring psychopathology, psychosocial problems, and self-esteem profiles, and investigate how interventions should be adjusted accordingly. In light of the state's responsibility of young people in alternative care, and as substantiated by the results of this thesis that individuals with trauma- and attachment related disorders, including RAD and DSED, are over-represented in alternative care, governments have a particular responsibility to investigate and provide best therapeutic practice and care for these individuals.

Given children's universal rights, another government responsibility is to secure research on how societies by various approaches may best prevent child maltreatment and promote caregiving quality. Because of a generation effect, where individuals exposed to child maltreatment are more at risk of developing parenting difficulties themselves and become executors of child maltreatment, evaluation of treatment interventions targeting high-risk adolescents, including those with RAD or DSED, may not only enhance their own individual long-term outcomes, but also constitute primary prevention of child maltreatment in future generations (Trickett et al., 2011; Zeanah & Humphreys, 2018). Finally, little is known about homotypic and heterotypic continuities of RAD and DSED into adulthood, and how persisting symptoms of RAD and DSED are then best conceptualised and treated.

## **5.6 Theoretical contribution**

This thesis supports that RAD and DSED, as defined by the DSM-5, are distinct and valid diagnostic constructs in adolescence and not only in childhood. Furthermore, although we were unable to provide causal inference or details about the developmental cascade effects of nature–nurture interplays, the findings that adolescents with RAD or DSED symptoms or diagnoses have high rates of co-occurring emotional and behavioural psychopathology and psychosocial problems, and that they may have low self-esteem in certain domains, all fit within the frameworks of attachment theory and developmental psychopathology. The results that some psychopathology, psychosocial problems, and self-esteem domains may be associated with higher RAD symptom load independently of a RAD diagnosis, may add to the notion that for adolescents with a history of severely inadequate care, a strict diagnostic focus within the current nosologies may insufficiently capture the complexity of mental health problems, leading to ignorance of treatment needs in individuals who have high symptom loads despite not all diagnostic criteria being fulfilled (Dejong, 2010; Tarren-Sweeney, 2013, 2018). Hence, the results support the application of combined dimensional and categorical approaches to RAD, DSED, and related psychopathology in both clinical practice and research.

## 5.7 Conclusions

Among adolescents living in RYC following inadequate in-family care, positive scores were found for all the available items of a caregiver-informed RAD and DSED psychiatric interview developed for young children with a history of early institutional deprivation. Symptom frequencies and diagnostic prevalence rates of RAD and DSED were relatively high in adolescents living in RYC, and RAD and DSED were distinct from one another and from other common psychiatric disorders in adolescence. Hence, RAD and DSED may be considered valid diagnostic constructs in adolescence. Moreover, RAD and DSED in adolescence frequently co-occur with psychopathology and psychosocial problems of both emotional and behavioural types and may be associated with poor global and domain-specific self-esteem.

Therefore, adolescents with a history of early severely inadequate care should be offered easy access to high-quality comprehensive assessment and treatment, including RAD, DSED, other psychopathology and psychosocial problems, and considering global and domain-specific self-esteem. Policy makers and public health planners should emphasise and cultivate primary prevention of childhood maltreatment by all possible means. Intervention studies should investigate best practices for children and adolescents with complex clinical pictures following early inadequate care, including RAD and DSED.

## 6 References

- Achenbach, T. M., & Rescorla, L. (2001). *Manual for the ASEBA school-age forms & profiles: An integrated system of multi-informant assessment*. Burlington, VT.
- Achenbach, T. M. P. D., Rescorla, L. A. P. D., & Ivanova, M. Y. P. D. (2012). International epidemiology of child and adolescent psychopathology I: diagnoses, dimensions, and conceptual issues. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51(12), 1261-1272. <https://doi.org/10.1016/j.jaac.2012.09.010>
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. N. ([1978] 2015). *Patterns of attachment: a psychological study of the strange situation*. Psychology Press.
- Ainsworth, M. D. S., & Bowlby, J. (1991). An ethological approach to personality development. *The American psychologist*, 46(4), 333-341. <https://doi.org/10.1037//0003-066X.46.4.333>
- Allen, B., & Schuengel, C. (2020). Attachment disorders diagnosed by community practitioners: a replication and extension. *Child and Adolescent Mental Health*, 25(1), 4-10. <https://doi.org/http://dx.doi.org/10.1111/camh.12338>
- Ambrosini, P. J. (2000). Historical development and present status of the schedule for affective disorders and schizophrenia for school-age children (K-SADS). *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(1), 49-58. <https://doi.org/10.1097/00004583-200001000-00016>
- American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders III* (3rd ed.).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.).
- American Psychological Association. (2014). Guidelines for prevention in psychology. *The American psychologist*, 69(3), 285-296. <https://doi.org/10.1037/a0034569>
- Angold, A., & Costello, E. J. (2000). The Child and Adolescent Psychiatric Assessment (CAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(1), 39-48. <https://doi.org/10.1097/00004583-200001000-00015>
- Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., McDaid, D., Marín, O., Serrano-Drozdowskyj, E., Freedman, R., & Carpenter, W. (2018). Preventive strategies for mental health. *The Lancet Psychiatry*, 5(7), 591-604. [https://doi.org/10.1016/S2215-0366\(18\)30057-9](https://doi.org/10.1016/S2215-0366(18)30057-9)
- Asparouhov, T., & Muthén, B. O. (2012). *Using Mplus TECH11 and TECH14 to test the number of latent classes*. *Mplus Web Notes: No. 14*.
- Atkinson, L. (2019). Reactive attachment disorder and attachment theory from infancy to adolescence: review, integration, and expansion. *Attachment & Human Development*, 21(2), 205-217. <https://doi.org/10.1080/14616734.2018.1499214>
- Backe-Hansen, E., Bakketeig, E., Gautun, H., & Grønningsæter, A. B. (2011). *Institusjonsplassering - siste utvei. Betydningen av barnevernsreformen fra 2004 for institusjonstilbudet [Placement in institutions - the last opportunity. The importance of the child welfare reform in 2004 for placement policy in institutions]* (NOVA, Issue. v. o. a. NOVA - Norsk institutt for forskning om oppvekst. [http://www.nova.no/asset/5057/1/5057\\_1.pdf](http://www.nova.no/asset/5057/1/5057_1.pdf)
- Backe-Hansen, E., Madsen, C., Kristofersen, L. B., Hvinden, B., Clausen, S.-E., Andersen, P. L., & Valset, K. (2014). *Barnevern i Norge 1990-2010: en longitudinell studie [Child welfare in Norway 1990-2010: A longitudinal study]* (E. Backe-Hansen, C. Madsen, L. B. Kristofersen, & B. Hvinden, Eds. Vol. 9/14). Norsk institutt for forskning om oppvekst, velferd og aldring (NOVA) [Norwegian Social Research]. <https://oda.oslomet.no/oda-xmlui/handle/20.500.12199/5074>
- Baer, J. C., & Martinez, C. D. (2006). Child maltreatment and insecure attachment: A meta-analysis. *Journal of Reproductive and Infant Psychology*, 24(3), 187-197.
- Bakken, A. (2015). *Ungdata. Nasjonale resultater 2014. Nova Rapport 7/15. [Youth Data. National Results 2014]*. [https://khrono.no/files/2017/11/15/nova-rapport\\_7-15\\_ungdata2014.pdf](https://khrono.no/files/2017/11/15/nova-rapport_7-15_ungdata2014.pdf)
- Bakken, A. (2020). *Ungdata 2020. Nasjonale resultater. NOVA Rapport 16/20 [Youth Data. National Results 2020]*.

- Barnett, D., Manly, J. T., & Cicchetti, D. (1991). Continuing toward an operational definition of psychological maltreatment. *Development and Psychopathology*, 3(1), 19-29. <https://doi.org/10.1017/S0954579400005046>
- BFD, & Barne og familiedepartementet [Ministry of Children and Families]. (BFD, 2020). *Høring - tverrfaglig helsekartlegging av barn i barnevernet [Hearing - interdisciplinary health assessment of children in the Child Protection Service]*. The Norwegian Government. <https://www.regjeringen.no/no/dokumenter/horing-tverrfaglig-helsekartlegging-av-barn-i-barnevernet/id2819979/>
- Birkeland, M. S., Breivik, K., & Wold, B. (2014). Peer Acceptance Protects Global Self-esteem from Negative Effects of Low Closeness to Parents During Adolescence and Early Adulthood. *Journal of Youth and Adolescence*, 43(1), 70-80. <https://doi.org/10.1007/s10964-013-9929-1>
- Bjørnstad, J. F., & Lydersen, S. (2012). Missing Data. In M. B. Veierød, S. Lydersen, & P. Laake (Eds.), *Medical statistics in clinical and epidemiological research* (pp. 429-461). Gyldendal akademisk.
- Blatt, S. J., & Zuroff, D. C. (1992). Interpersonal relatedness and self-definition: Two prototypes for depression. *Clinical Psychology Review*, 12(5), 527-562. [https://doi.org/10.1016/0272-7358\(92\)90070-0](https://doi.org/10.1016/0272-7358(92)90070-0)
- Bleiberg, E. (1984). Narcissistic disorders in children. *Bulletin of the Menninger Clinic*, 48(6), 501-517.
- Boris, N., Hinshaw-Fuselier, S. S., Smyke, A., Scheeringa, M. S., Heller, S. S., & Zeanah, C. (2004). Comparing criteria for attachment disorders: Establishing reliability and validity in high-risk samples. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43(5), 568-577. <https://doi.org/http://dx.doi.org/10.1097/00004583-200405000-00010>
- Boris, N. W., Zeanah, C. H., Larrieu, J. A., Scheeringa, M. S., & Heller, S. S. (1998). Attachment disorders in infancy and early childhood: a preliminary investigation of diagnostic criteria. *American Journal of Psychiatry*, 155(2), 295-297.
- Bosmans, G., Spilt, J., Vervoort, E., & Verschuere, K. (2019). Inhibited symptoms of reactive attachment disorder: links with working models of significant others and the self. *Attachment & Human Development*, 21(2), 190-204. <https://doi.org/10.1080/14616734.2018.1499213>
- Bosmans, G., Verschuere, K., Cuyvers, B., & Minnis, H. (2020). Current perspectives on the management of reactive attachment disorder in early education. *Psychology Research and Behavior Management*, 13, 1235. <https://doi.org/10.2147/PRBM.S264148>
- Bowlby, J. (1969). *Attachment and loss : vol. 1 : Attachment* (Vol. no. 79). Hogarth Press.
- Brayden, R. M., Deitrich-MacLean, G., Dietrich, M. S., Sherrod, K. B., & Altemeier, W. A. (1995). Evidence for specific effects of childhood sexual abuse on mental well-being and physical self-esteem. *Child Abuse and Neglect*, 19(10), 1255-1262. [https://doi.org/10.1016/0145-2134\(95\)00078-M](https://doi.org/10.1016/0145-2134(95)00078-M)
- Briggs-Gowan, M. J., Horwitz, S. M., Schwab-Stone, M. E., Leventhal, J. M., & Leaf, P. J. (2000). Mental health in pediatric settings: distribution of disorders and factors related to service use. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(7), 841-849. <https://doi.org/10.1097/00004583-200007000-00012>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard university press.
- Bruce, M., Young, D., Turnbull, S., Rooksby, M., Chadwick, G., Oates, C., Nelson, R., Young-Southward, G., Haig, C., & Minnis, H. (2019). Reactive attachment disorder in maltreated young children in foster care. *Attachment & Human Development*, 21(2), 152-169. <https://doi.org/10.1080/14616734.2018.1499211>
- Bufdir.no. (2020). *Barnevernsstatistikk [Statistics of the Child Protection Service]*. Barne- ungdoms- og familiedirektoratet [The Norwegian Directorate for Children, Youth and Family Affairs]. [https://www.bufdir.no/Statistikk\\_og\\_analyse/Barnevern/](https://www.bufdir.no/Statistikk_og_analyse/Barnevern/)
- Bufdir.no. (2021a). *Barn i lavinntektsfamilier [Children in low income families]*. Barne- ungdoms- og familiedirektoratet [The Norwegian Directorate for Children, Youth and Family Affairs]. [https://bufdir.no/Familie/Fattigdom/Ny\\_Barnefattigdom\\_i\\_Norge/](https://bufdir.no/Familie/Fattigdom/Ny_Barnefattigdom_i_Norge/)



- Bufdir.no. (2021b). *Barneverninstitusjoner [Residential Youth Care]*. Barne- ungdoms- og familiedirektoratet [The Norwegian Directorate for Children, Youth and Family Affairs].  
[https://bufdir.no/Barnevern/Tiltak\\_i\\_barnevernet/Barnevernsinstitusjoner/](https://bufdir.no/Barnevern/Tiltak_i_barnevernet/Barnevernsinstitusjoner/)
- Bufdir.no. (2021c). *Slik jobber barnevernet [The work of the CPS]*. Barne- ungdoms- og familiedirektoratet [The Norwegian Directorate for Children, Youth and Family Affairs].  
[https://bufdir.no/Barnevern/Om\\_barnevernet/Om\\_barnevernet/](https://bufdir.no/Barnevern/Om_barnevernet/Om_barnevernet/)
- Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. Routledge.
- Cecil, C. A. M., Viding, E., Fearon, P., Glaser, D., & McCrory, E. J. (2016). Disentangling the mental health impact of childhood abuse and neglect. *Child Abuse and Neglect, 63*, 106-119.  
<https://doi.org/10.1016/j.chiabu.2016.11.024>
- Cederbaum, J. A., Negri, S., & Palmer Molina, A. (2020). Child maltreatment and romantic relationships in adolescence and young adulthood: The mediating role of self-perception. *Child Abuse and Neglect, 109*, 104718-104718. <https://doi.org/10.1016/j.chiabu.2020.104718>
- Chaffin, M., Saunders, R. H. B. E., Nichols, T., Barnett, D., Zeanah, C., Berliner, L., Egeland, B., Newman, E., Lyon, T., Letourneau, E., & Miller-Perrin, C. (2006). Report of the APSAC task force on attachment therapy, reactive attachment disorder, and attachment problems. *Child Maltreatment, 11*(1), 76-89. <https://doi.org/10.1177/1077559505283699>
- Charach, A., Mohammadzadeh, F., Belanger, S. A., Easson, A., Lipman, E. L., McLennan, J. D., Parkin, P., & Szatmari, P. (2020). Identification of preschool children with mental health problems in primary care: systematic review and meta-analysis. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 29*(2), 76-105.
- Christiansen, Ø., & Anderssen, N. (2010). From concerned to convinced: reaching decisions about out-of-home care in Norwegian Child Welfare Services. *Child & Family Social Work, 15*(1), 31-40.  
<https://doi.org/10.1111/j.1365-2206.2009.00635.x>
- Christiansen, Ø., Havnen, K. J. S., Iversen, A. C., Fylkesnes, M. K., Lauritzen, C., Nygård, R. H., Jarlby, F., & Vis, S. A. (2019). *Når barnevernet undersøker: Barnevernets undersøkelsesarbeid - fra bekymring til beslutning. Delrapport 4 [Investigations by the CPS - from concern to conclusion] (4)*. UiT Norges Arktiske Universitet [UiT The Arctic University of Norway].  
[https://bibliotek.bufdir.no/BUF/101/nar\\_barnevernet\\_undersoker\\_del4\\_red\\_25.11.19.pdf](https://bibliotek.bufdir.no/BUF/101/nar_barnevernet_undersoker_del4_red_25.11.19.pdf)
- Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology, 8*(4), 597-600. <https://doi.org/10.1017/S0954579400007318>
- Cicchetti, D., & Rogosch, F. A. (2002). A Developmental Psychopathology Perspective on Adolescence. *Journal of Consulting and Clinical Psychology, 70*(1), 6-20. <https://doi.org/10.1037/0022-006X.70.1.6>
- Cicchetti, D., Rogosch, F. A., & Toth, S. L. (2006). Fostering secure attachment in infants in maltreating families through preventive interventions. *Development and Psychopathology, 18*(3), 623-649.  
<https://doi.org/10.1017/S0954579406060329>
- Clifford, G., Fauske, H., Lichtwarck, W., & Marthinsen, E. (2015). *Minst hjelp til dem som trenger det mest? Sluttrapport fra forsknings-og utviklingsprosjektet 'Det nye barnevernet' [Least support to those who need it the most? Final report from the research and development project 'The New Child Welfare Service'] (6/2015)*. Nordlandsforskning [Nordland Research Institute].
- Conway, C. C., Krueger, R. F., Cicero, D. C., DeYoung, C. G., Eaton, N. R., Forbes, M. K., Hallquist, M. N., Kotov, R., Latzman, R. D., Ruggero, C. J., Simms, L. J., Waldman, I. D., Waszczuk, M. A., Watson, D., Widiger, T. A., & Wright, A. G. C. (2021). Rethinking the diagnosis of mental disorders: data-driven psychological dimensions, not categories, as a framework for mental-health research, treatment, and training. *Current Directions in Psychological Science, 30*(2), 151-158.  
<https://doi.org/10.1177/0963721421990353>
- Corval, R., Belsky, J., Baptista, J., Mesquita, A., & Soares, I. (2019). Development and validation of an observational measure of symptoms of reactive attachment disorder. *Attachment & Human Development, 21*(2), 111-131. <https://doi.org/10.1080/14616734.2018.1499209>

- Costello, E. J., Egger, H., & Angold, A. (2005). 10-Year research update review: the epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. *Journal of the American Academy of Child and Adolescent Psychiatry*, *44*(10), 972-986. <https://doi.org/10.1097/01.chi.0000172552.41596.6f>
- Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, *60*(8), 837-844. <https://doi.org/10.1001/archpsyc.60.8.837>
- Cowell, R. A., Cicchetti, D., Rogosch, F. A., & Toth, S. L. (2015). Childhood maltreatment and its effect on neurocognitive functioning: Timing and chronicity matter. *Development and Psychopathology*, *27*(2), 521-533. <https://doi.org/10.1017/S0954579415000139>
- Cuevas, C. A., Finkelhor, D., Ormrod, R., & Turner, H. (2009). Psychiatric diagnosis as a risk marker for victimization in a national sample of children. *Journal of Interpersonal Violence*, *24*(4), 636-652. <https://doi.org/10.1177/0886260508317197>
- Cyr, C., Euser, E. M., Bakermans-Kranenburg, M. J., & Van Ijzendoorn, M. H. (2010). Attachment security and disorganization in maltreating and high-risk families: A series of meta-analyses. *Development and Psychopathology*, *22*(1), 87-108. <https://doi.org/10.1017/S0954579409990289>
- Danese, A., Moffitt, T. E., Arseneault, L., Bleiberg, B. A., Dinardo, P. B., Gandelman, S. B., Houts, R., Ambler, A., Fisher, H. L., & Poulton, R. (2017). The origins of cognitive deficits in victimized children: implications for neuroscientists and clinicians. *American Journal of Psychiatry*, *174*(4), 349-361. <https://doi.org/10.1176/appi.ajp.2016.16030333>
- Davidson, C., O'hare, A., Mactaggart, F., Green, J., Young, D., Gillberg, C., & Minnis, H. (2015). Social relationship difficulties in autism and reactive attachment disorder: Improving diagnostic validity through structured assessment. *Research in Developmental Disabilities*, *40*, 63-72. <https://doi.org/10.1016/j.ridd.2015.01.007>
- de Girolamo, G., Dagani, J., Purcell, R., Cocchi, A., & McGorry, P. D. (2012). Age of onset of mental disorders and use of mental health services: needs, opportunities and obstacles. *Epidemiology and psychiatric sciences*, *21*(1), 47-57. <https://doi.org/10.1017/s2045796011000746>
- de Vet, H. C. W., Terwee, C. B., Mokkink, L. B., & Knol, D. L. (2011). *Measurement in Medicine*. Cambridge University Press.
- Dejong, M. (2010). Some reflections on the use of psychiatric diagnosis in the looked after or "in care" child population. *Clinical Child Psychology and Psychiatry*, *15*(4), 589-599. <https://doi.org/10.1177/1359104510377705>
- Desatnik, A., Bel-Bahar, T., Taylor, L., Nolte, T., Crowley, M. J., Fonagy, P., & Fearon, P. (2021). Emotion regulation in adolescents: Influences of internal representations of relationships – An ERP study. *International Journal of Psychophysiology*, *160*, 1-9. <https://doi.org/10.1016/j.ijpsycho.2020.11.010>
- Dinkler, L., Lundström, S., Gajwani, R., Lichtenstein, P., Gillberg, C., & Minnis, H. (2017). Maltreatment-associated neurodevelopmental disorders: a co-twin control analysis. *Journal of Child Psychology and Psychiatry*, *58*(6), 691-701. <https://doi.org/10.1111/jcpp.12682>
- Dweck, C. S. (2017). *Mindset: Changing the way you think to fulfil your potential*. Robinson.
- Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: results from the adverse childhood experiences study. *American Journal of Psychiatry*, *160*(8), 1453-1460. <https://doi.org/https://doi.org/10.1176/appi.ajp.160.8.1453>
- Egger, H. L., Erkanli, A., Keeler, G., Potts, E., Walter, B. K., & Angold, A. (2006). Test-retest reliability of the Preschool Age Psychiatric Assessment (PAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*(5), 538-549. <https://doi.org/10.1097/01.chi.0000205705.71194.b8>
- Elgar, F. J., Pförtner, T.-K., Moor, I., De Clercq, B., Stevens, G. W. J. M., & Currie, C. (2015). Socioeconomic inequalities in adolescent health 2002–2010: a time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *The Lancet*, *385*(9982), 2088-2095. [https://doi.org/10.1016/S0140-6736\(14\)61460-4](https://doi.org/10.1016/S0140-6736(14)61460-4)
- Engel, G. L. (1977). The need for a new medical model: a challenge for biomedicine. *Science*, *196*(4286), 129-136. <https://doi.org/10.1126/science.847460>

- Fearon, R. P., Bakermans-Kranenburg, M. J., van Ijzendoorn, M. H., Lapsley, A. M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: a meta-analytic study. *Child Development, 81*(2), 435-456. <https://doi.org/10.1111/j.1467-8624.2009.01405.x>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*(4), 245-258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Fluke, J. D., López, M. L., Benbenishty, R., Knorth, E. J., & Baumann, D. J. (2020). *Decision-Making and Judgment in Child Welfare and Protection: Theory, Research, and Practice*. Oxford University Press.
- Flynn, M., Cicchetti, D., & Rogosch, F. (2014). The prospective contribution of childhood maltreatment to low self-worth, low relationship quality, and symptomatology across adolescence: a developmental-organizational perspective. *Developmental Psychology, 50*(9), 2165-2175. <https://doi.org/10.1037/a0037162>
- Follan, M., Anderson, S., Huline-Dickens, S., Lidstone, E., Young, D., Brown, G., & Minnis, H. (2011). Discrimination between attention deficit hyperactivity disorder and reactive attachment disorder in school aged children. *Research in Developmental Disabilities: A Multidisciplinary Journal, 32*(2), 520-526. <https://doi.org/10.1016/j.ridd.2010.12.031>
- Fonagy, P. (2002). *Affect regulation, mentalization, and the development of the self*. Other Press.
- Ford, J. D., & Delker, B. C. (2018). Polyvictimization in childhood and its adverse impacts across the lifespan: Introduction to the special issue. *Journal of Trauma and Dissociation, 19*(3), 275-288. <https://doi.org/10.1080/15299732.2018.1440479>
- Ford, T., Goodman, R., & Meltzer, H. (2003). The British Child and Adolescent Mental Health Survey 1999: the prevalence of DSM-IV disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 42*(10), 1203-1211. <https://doi.org/10.1097/00004583-200310000-00011>
- Ford, T., Vostanis, P., Meltzer, H., & Goodman, R. (2007). Psychiatric disorder among British children looked after by local authorities: comparison with children living in private households. *British Journal of Psychiatry, 190*, 319-325. <https://doi.org/10.1192/bjp.bp.106.025023>
- Forslund, T., Granqvist, P., Ijzendoorn, R., Sagi-Schwartz, A., Glaser, D., Steele, M., Hammarlund, M., Schuengel, C., Bakermans-Kranenburg, M., Steele, H., Shaver, P. R., Lux, U., Simmonds, J., Jacobvitz, D., Groh, A. M., Bernard, K., Cyr, C., Hazen, N. L., Foster, S., Psouni, E., Cowan, P. A., Pape Cowan, C., Rifkin-Graboi, A., Wilkins, D., Pierrehumbert, B., Tarabulsky, G. M., Carcamo, R. A., Wang, Z., Liang, X., Kázmierczak, M., Pawlicka, P., Ayiro, L., Chansa, T., Sichimba, F., Mooya, H., McLean, L., Verissimo, M., Gojman-de-Millán, S., Moretti, M. M., Bacro, F., Peltola, M. J., Galbally, M., Kondo-Ikemura, K., Behrens, K. Y., Scott, S., Roiguez, A. F., Spencer, R., Posada, G., Cassibba, R., Barrantes-Vidal, N., Palacios, J., Barone, L., Madigan, S., Mason-Jones, K., Reijman, S., Juffer, F., Pasco Fearon, R., Bernier, A., Cicchetti, D., Roisman, G., Cassidy, J., Kindler, H., Zimmerman, P., Feldman, R., Spangler, G., Zeanah, C. H., Dozier, M., Belsky, J., Lamb, M. E., & Duschinsky, R. (2021). Attachment goes to court: child protection and custody issues. *Attachment and Human Development, 1*-52. <https://doi.org/10.1080/14616734.2020.1840762>
- Fosse, R., Skjelstad, D. V., Schalinski, I., Thekkumthala, D., Elbert, T., Aanonsen, C. M., Greger, H. K., & Jozefiak, T. (2020). Measuring childhood maltreatment: Psychometric properties of the Norwegian version of the Maltreatment and Abuse Chronology of Exposure (MACE) scale. *PLoS One, 15*(2). <https://doi.org/10.1371/journal.pone.0229661>
- Fox, N., Nelson, C., & Zeanah, C. (2017). The Effects of Psychosocial Deprivation on Attachment: Lessons from the Bucharest Early Intervention Project. *Psychodynamic Psychiatry, 45*(4), 441-450. <https://doi.org/10.1521/pdps.2017.45.4.441>
- Fox, N. A., Almas, A. N., Degnan, K. A., Nelson, C. A., & Zeanah, C. H. (2011). The effects of severe psychosocial deprivation and foster care intervention on cognitive development at 8 years of age: Findings from the Bucharest Early Intervention Project. *Journal of Child Psychology and Psychiatry, 52*(9), 919-928. <https://doi.org/10.1111/j.1469-7610.2010.02355.x>

- George, E., & Engel, L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry*, *137*(5), 535-544.
- Gerstman, B. B. (2013). *Epidemiology kept simple: an introduction to traditional and modern epidemiology* (3 ed.). John Wiley & Sons.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, *373*(9657), 68-81. [https://doi.org/10.1016/S0140-6736\(08\)61706-7](https://doi.org/10.1016/S0140-6736(08)61706-7)
- Gilbert, R. P., Fluke, J. P., O'Donnell, M. P., Gonzalez-Izquierdo, A. P., Brownell, M. P., Gulliver, P. P., Janson, S. P., & Sidebotham, P. P. (2012). Child maltreatment: variation in trends and policies in six developed countries. *Lancet*, *379*(9817), 758-772. [https://doi.org/10.1016/S0140-6736\(11\)61087-8](https://doi.org/10.1016/S0140-6736(11)61087-8)
- Gillberg, C. (2010). The ESSENCE in Child Psychiatry: Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examinations. *Research in Developmental Disabilities: A Multidisciplinary Journal*, *31*(6), 1543-1551. <https://doi.org/10.1016/j.ridd.2010.06.002>
- Gillberg, C., Gillberg, C., Råstam, M., Wentz, E., Gillberg, I. C., & Rastam, M. (2001). The Asperger Syndrome (and high-functioning autism) Diagnostic Interview (ASDI): A preliminary study of a new structured clinical interview. *Autism*, *5*(1), 57-66. <https://doi.org/10.1177/1362361301005001006>
- Gillies, D., Christou, M. A., Dixon, A. C., Featherston, O. J., Rapti, I., Garcia-Angueta, A., Villasis-Keever, M., Reebye, P., Christou, E., Al Kabir, N., & Christou, P. A. (2018). Prevalence and characteristics of self-harm in adolescents: Meta-analyses of community-based studies 1990–2015. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*(10), 733-741. <https://doi.org/10.1016/j.jaac.2018.06.018>
- Giltaij, H. P., Sterkenburg, P. S., & Schuengel, C. (2015). Psychiatric diagnostic screening of social maladaptive behaviour in children with mild intellectual disability: Differentiating disordered attachment and pervasive developmental disorder behaviour. *Journal of Intellectual Disability Research*, *59*(2), 138-149. <https://doi.org/10.1111/jir.12079>
- Giltaij, H. P., Sterkenburg, P. S., & Schuengel, C. (2016). Adaptive behaviour, comorbid psychiatric symptoms, and attachment disorders. *Advances in Mental Health and Intellectual Disabilities*, *10*(1), 82-91. <https://doi.org/10.1108/AMHID-07-2015-0035>
- Giltaij, H. P., Sterkenburg, P. S., & Schuengel, C. (2017). Convergence between observations and interviews in clinical diagnosis of reactive attachment disorder and disinhibited social engagement disorder. *Clinical Child Psychology and Psychiatry*, *22*(4), 603-619. <https://doi.org/10.1177/1359104517709049>
- Gleason, M. M., Fox, N. A., Drury, S., Smyke, A., Egger, H. L., Nelson, C. A., Gregas, M. C., & Zeanah, C. H. (2011). Validity of evidence-derived criteria for reactive attachment disorder: indiscriminately social/disinhibited and emotionally withdrawn/inhibited types. *Journal of the American Academy of Child and Adolescent Psychiatry*, *50*(3), 216-231 e213. <https://doi.org/10.1016/j.jaac.2010.12.012>
- Gleason, M. M., Fox, N. A., Drury, S. S., Smyke, A. T., Nelson, C. A., 3rd, & Zeanah, C. H. (2014). Indiscriminate behaviors in previously institutionalized young children. *Pediatrics*, *133*(3), e657-665. <https://doi.org/10.1542/peds.2013-0212>
- Gleason, M. M., Zamfirescu, A., Egger, H. L., Nelson, C. A., Fox, N. A., Zeanah, C. H. J. E. C., & Psychiatry, A. (2011). Epidemiology of psychiatric disorders in very young children in a Romanian pediatric setting. *European Child and Adolescent Psychiatry*, *20*(10), 527. <https://doi.org/10.1007/s00787-011-0214-0>
- Goemans, A., van Geel, M., van Beem, M., & Vedder, P. (2016). Developmental outcomes of foster children: A meta-analytic comparison with children from the general population and children at risk who remained at home. *Child Maltreatment*, *21*(3), 198-217. <https://doi.org/10.1177/1077559516657637>
- Goldfarb, W. (1945). Effects of psychological deprivation in infancy and subsequent stimulation. *American Journal of Psychiatry*, *102*(1), 18-33.
- Green, J. G., McLaughlin, K. A., Berglund, P. A., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychiatric disorders in the national comorbidity survey

- replication I: associations with first onset of DSM-IV disorders. *Archives of General Psychiatry*, 67(2), 113-123. <https://doi.org/doi:10.1001/archgenpsychiatry.2009.186>
- Greger, H. K. (2017). *Youth at risk : childhood adversity, psychopathology, and quality of life among adolescents in residential youth care*. (Publication Number 2017:147) [Thesis for the degree of Philosophiae Doctor (PhD), NTNU Norwegian University of Science and Technology, Faculty of Medicine and Health Sciences]. Trondheim.
- Greger, H. K., Myhre, A. K., Klöckner, C. A., & Jozefiak, T. (2017). Childhood maltreatment, psychopathology and well-being: The mediator role of global self-esteem, attachment difficulties and substance use. *Child Abuse and Neglect*, 70, 122-133. <https://doi.org/10.1016/j.chiabu.2017.06.012>
- Greger, H. K., Myhre, A. K., Lydersen, S., & Jozefiak, T. (2015). Previous maltreatment and present mental health in a high-risk adolescent population. *Child Abuse and Neglect*, 45, 122-134. <https://doi.org/10.1016/j.chiabu.2015.05.003>
- Grilo, C. M., & Masheb, R. M. (2001). Childhood psychological, physical, and sexual maltreatment in outpatients with binge eating disorder: frequency and associations with gender, obesity, and eating-related psychopathology. *Obesity Research*, 9(5), 320-325. <https://doi.org/10.1038/oby.2001.40>
- Groh, A. M., Fearon, R. P., Bakermans-Kranenburg, M. J., van Ijzendoorn, M. H., Steele, R. D., & Roisman, G. I. (2014). The significance of attachment security for children's social competence with peers: a meta-analytic study. *Attachment & Human Development*, 16(2), 103-136. <https://doi.org/10.1080/14616734.2014.883636>
- Groh, A. M., Roisman, G. I., van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., & Fearon, R. P. (2012). The significance of insecure and disorganized attachment for children's internalizing symptoms: a meta-analytic study. *Child Development*, 83(2), 591-610. <https://doi.org/10.1111/j.1467-8624.2011.01711.x>
- Guyon-Harris, K. L., Humphreys, K. L., Degnan, K., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2019). A prospective longitudinal study of reactive attachment disorder following early institutional care: considering variable- and person-centered approaches. *Attachment & Human Development*, 21(2), 95-110. <https://doi.org/10.1080/14616734.2018.1499208>
- Guyon-Harris, K. L., Humphreys, K. L., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2018). Course of disinhibited social engagement disorder from early childhood to early adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 57(5), 329-335 e322. <https://doi.org/10.1016/j.jaac.2018.02.009>
- Guyon-Harris, K. L., Humphreys, K. L., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2019). Signs of attachment disorders and social functioning among early adolescents with a history of institutional care. *Child Abuse and Neglect*, 88, 96-106. <https://doi.org/10.1016/j.chiabu.2018.11.005>
- Guyon-Harris, K. L., Humphreys, K. L., Miron, D., Gleason, M. M., Nelson, C. A., Fox, N. A., & Zeanah, C. H. (2019). Disinhibited social engagement disorder in early childhood predicts reduced competence in early adolescence. *Journal of Abnormal Child Psychology*, 47(10), 1735-1745. <https://doi.org/10.1007/s10802-019-00547-0>
- Guyon-Harris, K. L., Humphreys, K. L., & Zeanah, C. H. (2021). Adverse caregiving in early life: The trauma and deprivation distinction in young children. *Infant Mental Health Journal*, 42(1), 87-95. <https://doi.org/10.1002/imhj.21892>
- Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and adolescents: A meta-analytical review. *Journal of Clinical Child Psychology*, 27(4), 423-433. [https://doi.org/10.1207/s15374424jccp2704\\_6](https://doi.org/10.1207/s15374424jccp2704_6)
- Harter, S. (2012). *The construction of the self; developmental and sociocultural foundations* (2nd ed.). The Guilford Press.
- Haslam, N., Holland, E., & Kuppens, P. (2012). Categories versus dimensions in personality and psychopathology: a quantitative review of taxometric research. *Psychological Medicine*, 42(5), 903-920. <https://doi.org/10.1017/S0033291711001966>

- Haugen, T., Ommundsen, Y., & Seiler, S. (2013). The relationship between physical activity and physical self-esteem in adolescents: The role of physical fitness indices. *Pediatric Exercise Science*, 25(1), 138-153. <https://doi.org/10.1123/pes.25.1.138>
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900-1902. <https://doi.org/10.1126/science.1128898>
- Heckman, J. J. (2007). The economics, technology, and neuroscience of human capability formation. *Proceedings of the National Academy of Sciences*, 104(33), 13250-13255. <https://doi.org/10.1073/pnas.0701362104>
- Heiervang, E., Stormark, K. M., Lundervold, A. J., Heimann, M., Goodman, R., Posserud, M.-B., Ullebø, A. K., Plessen, K. J., Bjelland, I. M., Lie, S. A., & Gillberg, C. (2007). Psychiatric disorders in Norwegian 8- to 10-year-olds. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46(4), 438-447. <https://doi.org/10.1097/chi.0b013e31803062bf>
- Helsedirektoratet. (2020). *Pakkeforløp for kartlegging og utredning av psykisk helse og rus hos barn og unge i barnevernet [Standard course for the assessment of mental health and substance use of young people in the Child Protection Service]*. The Norwegian Directorate of Health. Retrieved April 30 from <https://www.helsedirektoratet.no/nyheter/pakkeforlop-for-kartlegging-og-utredning-av-psykisk-helse-og-rus-hos-barn-og-unge-i-barnevernet>
- Heradstveit, O., Gjertsen, N., Iversen, A. C., Nilsen, S. A., Askeland, K. G., Christiansen, Ø., & Hysing, M. (2020). Substance-related problems among adolescents in child welfare services: A comparison between individuals receiving in-home services and those in foster care. *Children and Youth Services Review*, 118, 105344. <https://doi.org/10.1016/j.childyouth.2020.105344>
- Hillis, S., Mercy, J., Amobi, A., & Kress, H. (2016). Global prevalence of past-year violence against children: a systematic review and minimum estimates. *Pediatrics*, 137(3). <https://doi.org/10.1542/peds.2015-4079>
- Hornor, G. (2019). Attachment Disorders. *Journal of Pediatric Health Care*, 33(5), 612-622. <https://doi.org/10.1016/j.pedhc.2019.04.017>
- Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *The Lancet Public Health*, 2(8), e356-e366. [https://doi.org/10.1016/S2468-2667\(17\)30118-4](https://doi.org/10.1016/S2468-2667(17)30118-4)
- Humphreys, K. L., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2017). Psychopathology following severe deprivation: History, research, and implications of the Bucharest early intervention project. In *Child maltreatment in residential care: history, research, and current practice* (pp. 129-148). Springer International Publishing. [https://doi.org/10.1007/978-3-319-57990-0\\_6](https://doi.org/10.1007/978-3-319-57990-0_6)
- Humphreys, K. L., Gleason, M. M., Drury, S. S., Miron, D., Nelson, C. A., Fox, N. A., & Zeanah, C. H. (2015). Effects of institutional rearing and foster care on psychopathology at age 12 years in Romania: Follow-up of an open, randomised controlled trial. *The Lancet Psychiatry*, 2(7), 625-634. [https://doi.org/10.1016/S2215-0366\(15\)00095-4](https://doi.org/10.1016/S2215-0366(15)00095-4)
- Humphreys, K. L., Guyon-Harris, K. L., Tibu, F., Wade, M., Nelson, C. A., Fox, N. A., & Zeanah, C. H. (2020). Psychiatric outcomes following severe deprivation in early childhood: follow-up of a randomized controlled trial at age 16. *Journal of Consulting and Clinical Psychology*, 88(12), 1079-1090. <https://doi.org/10.1037/ccp0000613>
- Humphreys, K. L., Nelson, C. A., Fox, N. A., & Zeanah, C. H. (2017). Signs of reactive attachment disorder and disinhibited social engagement disorder at age 12 years: Effects of institutional care history and high-quality foster care. *Development and Psychopathology*, 29(2), 675-684. <https://doi.org/10.1017/S0954579417000256>
- Humphreys, K. L., & Zeanah, C. H. (2015). Deviations from the expectable environment in early childhood and emerging psychopathology. *Neuropsychopharmacology*, 40(1), 154-170. <https://doi.org/10.1038/npp.2014.165>
- Iversen, A. C., Jakobsen, R., Havik, T., Hysing, M., & Stormark, K. M. (2007). Mental health problems among child welfare clients living at home. *Child care in practice : Northern Ireland journal of multi-disciplinary child care practice*, 13(4), 387-399. <https://doi.org/10.1080/13575270701488790>

- John, S. G., Brandt, T. W., Secrist, M. E., Mesman, G. R., Sigel, B. A., & Kramer, T. L. (2019). Empirically-guided assessment of complex trauma for children in foster care: A focus on appropriate diagnosis of attachment concerns. *Psychological Services, 16*(1), 120-133. <https://doi.org/10.1037/ser0000263>
- Jones, R., Everson-Hock, E., Papaioannou, D., Guillaume, L., Goyder, E., Chilcott, J., Cooke, J., Payne, N., Duenas, A., Sheppard, L., & Swann, C. (2011). Factors associated with outcomes for looked-after children and young people: a correlates review of the literature. *Child: Care, Health and Development, 37*(5), 613-622. <https://doi.org/10.1111/j.1365-2214.2011.01226.x>
- Jonkman, C. S., Oosterman, M., Schuengel, C., Bolle, E. A., Boer, F., & Lindauer, R. J. L. (2014). Disturbances in attachment: Inhibited and disinhibited symptoms in foster children. *Child and Adolescent Psychiatry and Mental Health, 8*(21). <https://doi.org/10.1186/1753-2000-8-21>
- Jozefiak, T., Kayed, N., Rimehaug, T., Wormdal, A., Brubakk, A., & Wichstrøm, L. (2016). Prevalence and comorbidity of mental disorders among adolescents living in residential youth care. *European Child and Adolescent Psychiatry, 25*(1), 33-47. <https://doi.org/10.1007/s00787-015-0700-x>
- Jozefiak, T., Kayed, N. S., Ranøyen, I., Greger, H. K., Wallander, J. L., & Wichstrøm, L. (2017). Quality of life among adolescents living in residential youth care: do domain-specific self-esteem and psychopathology contribute? *Quality of Life Research, 26*(10), 2619-2631. <https://doi.org/10.1007/s11136-017-1603-8>
- Jozefiak, T., Larsson, B., Wichstrøm, L., & Rimehaug, T. (2012). Competence and emotional/behavioural problems in 7-16-year-old Norwegian school children as reported by parents. *Nord J Psychiatry, 66*(5), 311-319. <https://doi.org/10.3109/08039488.2011.638934>
- Ju, S., & Lee, Y. (2018). Developmental trajectories and longitudinal mediation effects of self-esteem, peer attachment, child maltreatment and depression on early adolescents. *Child Abuse and Neglect, 76*, 353-363. <https://doi.org/10.1016/j.chiabu.2017.11.015>
- Kaufman, J., Birmaher, B., Brent, D., Rao, U. M. A., Flynn, C., Moreci, P., Williamson, D., & Ryan, N. (1997). Schedule for affective disorders and schizophrenia for school-age children - present and lifetime version (K-SADS-PL): Initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*(7), 980-988. <https://doi.org/10.1097/00004583-199707000-00021>
- Kay, C., & Green, J. (2013). Reactive attachment disorder following early maltreatment: Systematic evidence beyond the institution. *Journal of Abnormal Child Psychology, 41*(4), 571-581. <https://doi.org/10.1007/s10802-012-9705-9>
- Kay, C., Green, J., & Sharma, K. (2016). Disinhibited attachment disorder in UK adopted children during middle childhood: Prevalence, validity and possible developmental origin. *Journal of Abnormal Child Psychology, 44*(7), 1375-1386. <https://doi.org/10.1007/s10802-016-0131-2>
- Kayed, N. S., Jozefiak, T., Rimehaug, T., Tjelflaat, T., Brubakk, A.-M., & Wichstrøm, L. (2015). *Resultater fra forskningsprosjektet Psykisk helse hos barn og unge i barneverninstitusjoner [Results from the research project Mental Health in Adolescents Living in Residential Youth Care]*. NTNU. [https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport\\_RKBU.pdf](https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport_RKBU.pdf)
- Kennedy, M., Kreppner, J., Knights, N., Kumsta, R., Maughan, B., Golm, D., Hill, J., Rutter, M., Schlotz, W., & Sonuga-Barke, E. (2017). Adult disinhibited social engagement in adoptees exposed to extreme institutional deprivation: examination of its clinical status and functional impact. *The British journal of psychiatry, 211*(5), 289. <https://doi.org/10.1192/bjp.bp.117.200618>
- Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., Aguilar-Gaxiola, S., Alhamzawi, A. O., Alonso, J., & Angermeyer, M. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British journal of psychiatry, 197*(5), 378-385. <https://doi.org/10.1192/bjp.bp.110.080499>
- Kieling, C., Baker-Henningham, H., Belfer, M., Conti, G., Ertem, I., Omigbodun, O., Rohde, L. A., Srinath, S., Ulkuer, N., & Rahman, A. (2011). Child and adolescent mental health worldwide: evidence for action. *The Lancet, 378*(9801), 1515-1525. [https://doi.org/10.1016/S0140-6736\(11\)60827-1](https://doi.org/10.1016/S0140-6736(11)60827-1)
- Knudsen, A. K., Hotopf, M., Skogen, J. C., Overland, S., & Mykletun, A. (2010). The health status of nonparticipants in a population-based health study the Hordaland Health Study. *American Journal of Epidemiology, 172*(11), 1306-1314. <https://doi.org/10.1093/aje/kwq257>

- Kocovska, E., Puckering, C., Follan, M., Smillie, M., Gorski, C., Barnes, J., Wilson, P., Young, D., Lidstone, E., Pritchett, R., Hockaday, H., & Minnis, H. (2012). Neurodevelopmental problems in maltreated children referred with indiscriminate friendliness. *Research in Developmental Disabilities, 33*(5), 1560-1565. <https://doi.org/10.1016/j.ridd.2012.02.016>
- Kojan, B. H., & Lonne, B. (2012). A comparison of systems and outcomes for safeguarding children in Australia and Norway. *Child & Family Social Work, 17*(1), 96-107. <https://doi.org/10.1111/j.1365-2206.2011.00776.x>
- Konijn, C., Admiraal, S., Baart, J., van Rooij, F., Stams, G.-J., Colonnaesi, C., Lindauer, R., & Assink, M. (2019). Foster care placement instability: A meta-analytic review. *Children and Youth Services Review, 96*, 483-499. <https://doi.org/10.1016/j.childyouth.2018.12.002>
- Lacey, R. E., & Minnis, H. (2020). Practitioner Review: Twenty years of research with adverse childhood experience scores – Advantages, disadvantages and applications to practice. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 61*(2), 116-130. <https://doi.org/10.1111/jcpp.13135>
- Lang, J., Kerr, D. M., Petri-Romão, P., McKee, T., Smith, H., Wilson, N., Zavrou, M., Shiels, P., & Minnis, H. (2020). The hallmarks of childhood abuse and neglect: A systematic review. *PLoS One, 15*(12), e0243639. <https://doi.org/10.1371/journal.pone.0243639>
- Lansford, J. E., Dodge, K. A., Pettit, G. S., Bates, J. E., Crozier, J., & Kaplow, J. (2002). A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics and Adolescent Medicine, 156*(8), 824-830. <https://doi.org/10.1001/archpedi.156.8.824>
- Lauterbach, D., & Armour, C. (2016). Symptom trajectories among child survivors of maltreatment: Findings from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). *Journal of Abnormal Child Psychology, 44*(2), 369-379. <https://doi.org/10.1007/s10802-015-9998-6>
- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology, 68*(3), 518-530. <https://doi.org/10.1037/0022-3514.68.3.518>
- Leeb, R. T., Paulozzi, L. J., Melanson, C., Simon, T. R., & Arias, I. (2008). *Child Maltreatment Surveillance: Uniform Definitions for Public Health and Recommended Data Elements*. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.
- Legrand, F. D. (2014). Effects of exercise on physical self-concept, global self-esteem, and depression in women of low socioeconomic status with elevated depressive symptoms. *Journal of Sport & Exercise Psychology, 36*(4), 357-365. <https://doi.org/10.1123/jsep.2013-0253>
- Lehmann, S. (2015). *Mental disorders in foster children: a study of prevalence, comorbidity, and risk factors* [Dissertation for the degree of philosophiae doctor (PhD), The University of Bergen].
- Lehmann, S., Breivik, K., Heiervang, E. R., Havik, T., & Havik, O. E. (2016). Reactive attachment disorder and disinhibited social engagement disorder in school-aged foster children: a confirmatory approach to dimensional measures. *Journal of Abnormal Child Psychology, 44*(3), 445-457. <https://doi.org/10.1007/s10802-015-0045-4>
- Lehmann, S., Breivik, K., Monette, S., & Minnis, H. (2020). Potentially traumatic events in foster youth, and association with DSM-5 trauma- and stressor related symptoms. *Child Abuse and Neglect, 101*. <https://doi.org/10.1016/j.chiabu.2020.104374>
- 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*(1), 39. <https://doi.org/10.1186/1753-2000-7-39>
- Lehmann, S., & Kaye, N. S. (2018). Children placed in alternate care in Norway: A review of mental health needs and current official measures to meet them. *International Journal of Social Welfare, 27*(4), 364-371. <https://doi.org/https://doi.org/10.1111/ijsw.12323>
- Lehmann, S., Monette, S., Egger, H., Breivik, K., Young, D., Davidson, C., & Minnis, H. (2018). Development and Examination of the Reactive Attachment Disorder and Disinhibited Social Engagement Disorder Assessment Interview. *Assessment, 23*(12), 1187-1200. <https://doi.org/10.1177/1073191118797422>



- Levy, R. J. (1947). Effects of institutional vs. boarding home care on a group of infants. *Journal of Personality*, 15(3), 233-241.
- Lewis, S. J., Arseneault, L., Caspi, A., Fisher, H. L., Matthews, T., Moffitt, T. E., Odgers, C. L., Stahl, D., Teng, J. Y., & Danese, A. (2019). The epidemiology of trauma and post-traumatic stress disorder in a representative cohort of young people in England and Wales. *The Lancet Psychiatry*, 6(3), 247-256. [https://doi.org/10.1016/S2215-0366\(19\)30031-8](https://doi.org/10.1016/S2215-0366(19)30031-8)
- Lovdata.no. (2008). *Forskrift om krav til kvalitet og internkontroll i barneverninstitusjoner [Regulation concerning requirements to quality and internal control in child welfare institutions]*. Barne- og familiedepartementet [The Norwegian Ministry of Children and Families]. <https://lovdata.no/dokument/SF/forskrift/2008-06-10-580>
- Lovdata.no. (2014). *Lov om styrking av menneskerettighetenes stilling i norsk rett (menneskerettsloven): Vedlegg 7. FNs konvensjon om barnets rettigheter med protokoller [Act relating to the strengthening of the status of human rights in Norwegian law (The Human Rights Act): Attachment 7: Conventions on the Rights of the Child]*. Justis- og beredskapsdepartementet [Norwegian Ministry of Justice and Public Security]. Retrieved March 30 from <https://lovdata.no/dokument/NLE/lov/1999-05-21-30>
- Lovdata.no. (2020). *Lov om barneverntjenester [Act relating to child protection services]*. Barne- og familiedepartementet [The Norwegian Ministry of Children and Families]. [https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL\\_4#KAPITTEL\\_4](https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL_4#KAPITTEL_4)
- Lyons-Ruth, K., Bureau, J.-F., Riley, C. D., & Atlas-Corbett, A. F. (2009). Socially indiscriminate attachment behavior in the Strange Situation: Convergent and discriminant validity in relation to caregiving risk, later behavior problems, and attachment insecurity. *Development and Psychopathology*, 21(2), 355-372. <https://doi.org/10.1017/S0954579409000376>
- Lyons-Ruth, K., & Jacobvitz, D. (1999). Attachment disorganization: Unresolved loss, relational violence, and lapses in behavioral and attentional strategies. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 520-554). The Guilford Press.
- Lyons-Ruth, K., & Jacobvitz, D. (2016). Attachment disorganization from infancy to adulthood: Neurobiological correlates, parenting contexts, and pathways to disorder. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (3 ed., pp. 1221-1273). The Guilford Press.
- Mackenbach, J. P., Kunst, A. E., Cavelaars, A. E. J. M., Groenhouf, F., & Geurts, J. J. M. (1997). Socioeconomic inequalities in morbidity and mortality in western Europe. *The Lancet*, 349(9066), 1655-1659. [https://doi.org/10.1016/S0140-6736\(96\)07226-1](https://doi.org/10.1016/S0140-6736(96)07226-1)
- Maclean, M., Sims, S., Hansen, M., Leonard, H., Bourke, J., Bower, C., & O'Donnell, M. (2017). Abuse and neglect in children with disabilities: risk varies by type of disability. *International journal of population data science*, 1(1). <https://doi.org/10.23889/ijpds.v1i1.197>
- Madigan, S., Bakermans-Kranenburg, M. J., Van Ijzendoorn, M. H., Moran, G., Pederson, D. R., & Benoit, D. (2006). Unresolved states of mind, anomalous parental behavior, and disorganized attachment: A review and meta-analysis of a transmission gap. *Attachment and Human Development*, 8(2), 89-111. <https://doi.org/10.1080/14616730600774458>
- Magro, S. W., Utesch, T., Dreiskämper, D., & Wagner, J. (2019). Self-esteem development in middle childhood: Support for sociometer theory. *International Journal of Behavioral Development*, 43(2), 118-127. <https://doi.org/10.1177/0165025418802462>
- Mangerud, W. L., Bjerkeset, O., Holmen, T. L., Lydersen, S., & Indredavik, M. S. (2014). Smoking, alcohol consumption, and drug use among adolescents with psychiatric disorders compared with a population based sample. *Journal of Adolescence*, 37(7), 1189-1199. <https://doi.org/10.1016/j.adolescence.2014.08.007>
- Markon, K. E., Chmielewski, M., & Miller, C. J. (2011). The reliability and validity of discrete and continuous measures of psychopathology: a quantitative review. *Psychological Bulletin*, 137(6), 1093-1093. <https://doi.org/10.1037/a0025727>

- Marsh, H. W., Parada, R. H., & Ayotte, V. (2004). A multidimensional perspective of relations between self-concept (Self Description Questionnaire II) and adolescent mental health (Youth Self-Report). *Psychological Assessment, 16*(1), 27-41. <https://doi.org/10.1037/1040-3590.16.1.27>
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology, 22*(3), 491-495. <https://doi.org/10.1017/S0954579410000222>
- Mayes, S. D., Calhoun, S. L., Waschbusch, D. A., & Baweja, R. (2017). Autism and reactive attachment/disinhibited social engagement disorders: Co-occurrence and differentiation. *Clinical Child Psychology and Psychiatry, 22*(4), 620-631. <https://doi.org/10.1177/1359104516678039>
- Mayes, S. D., Calhoun, S. L., Waschbusch, D. A., Breaux, R. P., & Baweja, R. (2017). Reactive attachment/disinhibited social engagement disorders: Callous-unemotional traits and comorbid disorders. *Research in Developmental Disabilities, 63*, 28-37. <https://doi.org/10.1016/j.ridd.2017.02.012>
- Mazefsky, C. A., Kao, J., & Oswald, D. P. (2011). Preliminary evidence suggesting caution in the use of psychiatric self-report measures with adolescents with high-functioning autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*(1), 164-174. <https://doi.org/10.1016/j.rasd.2010.03.006>
- McGoron, L., Gleason, M. M., Smyke, A. T., Drury, S. S., Nelson, C. A., Gregas, M. C., Fox, N. A., & Zeanah, C. H. (2012). Recovering from early deprivation: attachment mediates effects of caregiving on psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*(7), 683-693. <https://doi.org/10.1016/j.jaac.2012.05.004>
- McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2012). Childhood adversities and first onset of psychiatric disorders in a national sample of US adolescents. *Archives of General Psychiatry, 69*(11), 1151-1160. <https://doi.org/10.1001/archgenpsychiatry.2011.2277>
- McLaughlin, K. A., & Lambert, H. K. (2017). Child trauma exposure and psychopathology: mechanisms of risk and resilience. *Current Opinion in Psychology, 14*, 29-34. <https://doi.org/10.1016/j.copsyc.2016.10.004>
- McLaughlin, K. A., Sheridan, M. A., & Lambert, H. K. (2014). Childhood adversity and neural development: deprivation and threat as distinct dimensions of early experience. *Neuroscience and Biobehavioral Reviews, 47*, 578-591. <https://doi.org/10.1016/j.neubiorev.2014.10.012>
- McLaughlin, K. A., Sheridan, M. A., & Nelson, C. A. (2017). Neglect as a violation of species-expectant experience: neurodevelopmental consequences. *Biological Psychiatry, 82*(7), 462-471. <https://doi.org/10.1016/j.biopsych.2017.02.1096>
- McLaughlin, K. A., Weissman, D., & Bitrán, D. (2019). Childhood adversity and neural development: a systematic review. *Annual review of developmental psychology, 1*, 277-312. <https://doi.org/10.1146/annurev-devpsych-121318-084950>
- Mennen, F. E., Brelsilver, M., & Trickett, P. K. (2010). Do maltreated children who remain at home function better than those who are placed? *Children and Youth Services Review, 32*(12), 1675-1682. <https://doi.org/10.1016/j.childyouth.2010.07.010>
- Mesman, J., van Ijzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2009). The many faces of the Still-Face Paradigm: A review and meta-analysis. *Developmental Review, 29*(2), 120-162. <https://doi.org/https://doi.org/10.1016/j.dr.2009.02.001>
- Mesman, J., Van Ijzendoorn, M. H., & Sagi-Schwartz, A. (2016). Cross-cultural patterns of attachment. *Handbook of attachment: Theory, research, and clinical applications*, 852-877.
- Millward, R., Kennedy, E., Towlson, K., & Minnis, H. (2006). Reactive attachment disorder in looked-after children. *Emotional and Behavioural Difficulties, 11*(4), 273-279. <https://doi.org/10.1080/13632750601022212>
- Minnis, H. (2013). Maltreatment-associated psychiatric problems: an example of environmentally triggered ESSENCE? *The Scientific World Journal 2013*(6), 148468. <https://doi.org/10.1155/2013/148468>
- Minnis, H., Green, J., O'Connor, T. G., Liew, A., Glaser, D., Taylor, E., Follan, M., Young, D., Barnes, J., Gillberg, C., Pelosi, A., Arthur, J., Burston, A., Connolly, B., & Sadiq, F. A. (2009). An exploratory study of the association between reactive attachment disorder and attachment narratives in early

- school-age children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 50(8), 931-942. <https://doi.org/10.1111/j.1469-7610.2009.02075.x>
- Minnis, H., Macmillan, S., Pritchett, R., Young, D., Wallace, B., Butcher, J., Sim, F., Baynham, K., Davidson, C., Gillberg, C., & Minnis, H. (2013). Prevalence of reactive attachment disorder in a deprived population. *British Journal of Psychiatry*, 202, 342-346. <https://doi.org/10.1192/bjp.bp.112.114074>
- Minnis, H., Reekie, J., Young, D., O'Connor, T., Ronald, A., Gray, A., & Plomin, R. (2007). Genetic, environmental and gender influences on attachment disorder behaviours. *British Journal of Psychiatry*, 190, 490-495. <https://doi.org/10.1192/bjp.bp.105.019745>
- Monette, S., Cyr, C., Terradas, M. M., Couture, S., Minnis, H., & Lehmann, S. (2020). Development and validation of a measure of attachment disorders based on DSM-5 criteria: The Early TRAuma-Related Disorders Questionnaire (ETRADQ). *Assessment*, 1073191120981763-1073191120981763. <https://doi.org/10.1177/1073191120981763>
- Moran, K., McDonald, J., Jackson, A., Turnbull, S., & Minnis, H. (2017). A study of attachment disorders in young offenders attending specialist services. *Child Abuse and Neglect*, 65, 77-87. <https://doi.org/10.1016/j.chiabu.2017.01.009>
- Mukerji, C. E., Wade, M., Fox, N. A., Zeanah, C. H., & Nelson, C. A. (2021). Growth in self-regulation over the course of adolescence mediates the effects of foster care on psychopathology in previously institutionalized children: a randomized clinical trial. *Clinical Psychological Science*. <https://doi.org/10.1177/2167702621993887>
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.) Los Angeles, CA: Muthén & Muthén.
- Myhre, M., Thoresen, S., & Hjemdal, O. K. (2015). *Vold og voldtekt i oppveksten: En nasjonal intervjuundersøkelse av 16-og 17-åringer [Physical and sexual childhood abuse: A national interview study of 16- and 17-year-olds]* Nasjonalt kunnskapssenter om vold og traumatisk stress (NKVTS) [Norwegian centre for violence and traumatic stress]. [https://www.nkvts.no/content/uploads/2015/08/vold\\_voldtekt\\_i\\_oppveksten.pdf](https://www.nkvts.no/content/uploads/2015/08/vold_voldtekt_i_oppveksten.pdf)
- Mykletun, A., Knudsen, A. K., & Mathiesen, K. S. (2009). *Psykiske lidelser i Norge: Et folkehelseperspektiv [Mental disorders in Norway: a public health perspective]* (2009:8). <https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2009-og-eldre/rapport-20098-pdf-.pdf>
- Myrvold, T. M., Christiansen, Ø., Haune, M. C., Sarfi, M., & Heiervang, E. R. (2020). *Evaluering av CARE-modellen. Tverrfaglig kartlegging av utsatte barns helse og omsorgsbehov [Evaluation of the CARE model]*. University of Oslo. [https://www.med.uio.no/klinmed/forskning/prosjekter/barn-i-risiko/Videolansering%20av%20evalueringsrapport/evaluering\\_caremodellen\\_2020\\_godkjent.pdf](https://www.med.uio.no/klinmed/forskning/prosjekter/barn-i-risiko/Videolansering%20av%20evalueringsrapport/evaluering_caremodellen_2020_godkjent.pdf)
- Negriff, S., Gordis, E. B., Susman, E. J., Kim, K., Peckins, M. K., Schneiderman, J. U., & Mennen, F. E. (2019). The Young Adolescent Project: A longitudinal study of the effects of maltreatment on adolescent development. *Development and Psychopathology*, 32(4), 1-20. <https://doi.org/10.1017/s0954579419001391>
- Nelson, C. A., Zeanah, C. H., Fox, N. A., Marshall, P. J., Smyke, A. T., & Guthrie, D. (2007). Cognitive recovery in socially deprived young children: The Bucharest Early Intervention Project. *Science*, 318(5858), 1937-1940. <https://doi.org/10.1126/science.1143921>
- Nelson, R., Chadwick, G., Bruce, M., Young-Southward, G., & Minnis, H. (2020). Can reactive attachment disorder persist in nurturing placements? A systematic review and clinical case series. *Developmental child welfare*, 2(2), 110-131. <https://doi.org/10.1177/2516103220940326>
- Nilsen, S. A., Askeland, K. G., Loro, D. P. J., Iversen, A. C., Havnen, K. J. S., Bøe, T., & Heradstveit, O. (2021). Mental health, adverse life events and health service use among Norwegian youth in the child welfare system: Results from a population-based study. *Child & Family Social Work*. <https://doi.org/10.1111/cfs.12842>
- Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis *PLoS Medicine*, 9(11), e1001349. <https://doi.org/10.1371/journal.pmed.1001349>

- Nøvik, T. S. (1999). *Validity and use of the child behavior checklist in Norwegian children and adolescents: an epidemiological and clinical study* [Thesis for the degree of Philosophiae Doctor, University of Oslo]. Oslo.
- O'Connor, T. G., Rutter, M., Andersen-Wood, L., Beckett, C., Bredenkamp, D., Castle, J., Dunn, J., Groothues, C., Ehrich, K., Harborne, A., Hay, D., Jewett, J., Keaveney, L., Kreppner, J. M., Messer, J., Quinton, D., & White, A. (2000). Attachment disorder behavior following early severe deprivation: Extension and longitudinal follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(6), 703-712. <https://doi.org/10.1097/00004583-200006000-00008>
- O'Mara, A. J., Marsh, H. W., Craven, R. G., & Debus, R. L. (2006). Do self-concept interventions make a difference? A synergistic blend of construct validation and meta-analysis. *Educational Psychologist*, 41(3), 181-206. [https://doi.org/10.1207/s15326985ep4103\\_4](https://doi.org/10.1207/s15326985ep4103_4)
- Oliveira, P. S., Soares, I., Martins, C., Silva, J. R., Marques, S., Baptista, J., & Lyons-Ruth, K. (2012). Indiscriminate behavior observed in the strange situation among institutionalized toddlers: Relations to caregiver report and to early family risk. *Infant Ment Health Journal*, 33(2), 187-196. <https://doi.org/10.1002/imhj.20336>
- Oosterman, M., & Schuengel, C. (2008). Attachment in foster children associated with caregivers' sensitivity and behavioral problems. *Infant Mental Health Journal*, 29(6), 609-623. <https://doi.org/10.1002/imhj.20198>
- Oosterman, M., Schuengel, C., Wim Slot, N., Bullens, R. A. R., & Doreleijers, T. A. H. (2007). Disruptions in foster care: A review and meta-analysis. *Children and Youth Services Review*, 29(1), 53-76. <https://doi.org/10.1016/j.childyouth.2006.07.003>
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current Directions in Psychological Science*, 23(5), 381-387. <https://doi.org/10.1177/0963721414547414>
- Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, 102(6), 1271-1288. <https://doi.org/10.1037/a0025558>
- Owens, J., Goldfine, M., Evangelista, N., Hoza, B., & Kaiser, N. (2007). A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clinical Child and Family Psychology Review*, 10(4), 335-351. <https://doi.org/10.1007/s10567-007-0027-3>
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior*, 30(3), 241-256. <https://doi.org/10.2307/2136956>
- Pears, K., Bruce, J., Fisher, P. A., & Kim, H. (2010). Indiscriminate friendliness in maltreated foster children. *Child Maltreatment*, 15(1), 64-75. <https://doi.org/10.1177/1077559509337891>
- Pedersen, W., & Hegna, K. (2000). Children and adolescents selling sex. *Tidsskrift for den Norske Laegeforening*, 120(2), 215-220.
- Petrucelli, K., Davis, J., & Berman, T. (2019). Adverse childhood experiences and associated health outcomes: A systematic review and meta-analysis. *Child Abuse and Neglect*, 97, 104127-104127. <https://doi.org/10.1016/j.chiabu.2019.104127>
- Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of child psychology and psychiatry, and allied disciplines*, 56(3), 345-365. <https://doi.org/10.1111/jcpp.12381>
- Pritchett, R., Pritchett, J., Marshall, E., Davidson, C., & Minnis, H. (2013). Reactive attachment disorder in the general population: a hidden ESSENCE disorder. *The Scientific World Journal*, 2013. <https://doi.org/10.1155/2013/818157>
- Pritchett, R., Rochat, T. J., Tomlinson, M., & Minnis, H. (2013). Risk factors for vulnerable youth in urban townships in South Africa: the potential contribution of reactive attachment disorder. *Vulnerable Children and Youth Studies*, 8(4), 310-320. <https://doi.org/10.1080/17450128.2012.756569>
- Pösö, T., Skivenes, M., & Hestbæk, A.-D. (2014). Child protection systems within the Danish, Finnish and Norwegian welfare states - time for a child centric approach? *European journal of social work*, 17(4), 475-490. <https://doi.org/10.1080/13691457.2013.829802>

- Reading, R., Bissell, S., Goldhagen, J., Harwin, J., Masson, J., Moynihan, S., Parton, N., Pais, M. S., Thoburn, J., & Webb, E. (2009). Promotion of children's rights and prevention of child maltreatment. *The Lancet*, 373(9660), 332-343. [https://doi.org/10.1016/S0140-6736\(08\)61709-2](https://doi.org/10.1016/S0140-6736(08)61709-2)
- Reed-Fitzke, K. (2020). The role of self-concepts in emerging adult depression: A systematic research synthesis. *Journal of Adult Development*, 27(1), 36-48. <https://doi.org/10.1007/s10804-018-09324-7>
- Reneflot, A., Aarø, L. E., Aase, H., Reichborn-Kjennerud, T., Tambs, K., & Øverland, S. (2018). *Psykisk helse i Norge [Mental health in Norway]* (ISBN: 978-82-8082-878-1 Electronic version). Folkehelseinstituttet. [https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/psykisk\\_helse\\_i\\_norge2018.pdf](https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/psykisk_helse_i_norge2018.pdf)
- Rescorla, L., Ivanova, M. Y., Achenbach, T. M., Begovac, I., Chahed, M., Drugli, M. B., Emerich, D. R., Fung, D. S. S., Haider, M., Hansson, K., Hewitt, N., Jaimes, S., Larsson, B., Maggiolini, A., Marković, J., Mitrović, D., Moreira, P., Oliveira, J. T., Olsson, M., Ooi, Y. P., Petot, D., Pisa, C., Pomalima, R., da Rocha, M. M., Rudan, V., Sekulić, S., Shahini, M., de Mattos Silveiras, E. F., Szivovicza, L., Valverde, J., Vera, L. A., Villa, M. C., Viola, L., Woo, B. S. C., & Zhang, E. Y. (2012). International epidemiology of child and adolescent psychopathology II: Integration and applications of dimensional findings From 44 Societies. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51(12), 1273-1283.e1278. <https://doi.org/10.1016/j.jaac.2012.09.012>
- Reuben, A., Moffitt, T. E., Caspi, A., Belsky, D. W., Harrington, H., Schroeder, F., Hogan, S., Ramrakha, S., Poulton, R., & Danese, A. (2016). Lest we forget: comparing retrospective and prospective assessments of adverse childhood experiences in the prediction of adult health. *Journal of Child Psychology and Psychiatry*, 57(10), 1103-1112. <https://doi.org/10.1111/jcpp.12621>
- Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging*, 17(3), 423-434. <https://doi.org/10.1037/0882-7974.17.3.423>
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: different concepts, different outcomes. *American Sociological Review*, 60(1), 141-156. <https://doi.org/10.2307/2096350>
- Rubin, K. H., Bukowski, W. M., & Parker, J. G. (2007). Peer interactions, relationships, and groups. In *Handbook of child psychology* (Vol. 3). <https://doi.org/10.1002/9780470147658>
- Rutter, M., Colvert, E., Kreppner, J., Beckett, C., Castle, J., Groothues, C., Hawkins, A., O'Connor T. G., Stevens, S. E., & Sonuga-Barke, E. J. S. (2007). Early adolescent outcomes for institutionally-deprived and non-deprived adoptees. I: Disinhibited attachment. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 48(1), 17-30. <https://doi.org/10.1111/j.1469-7610.2006.01688.x>
- Rutter, M., Kreppner, J., & Sonuga-Barke, E. (2009). Emanuel Miller Lecture: Attachment insecurity, disinhibited attachment, and attachment disorders: where do research findings leave the concepts? *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 50(5), 529-543. <https://doi.org/10.1111/j.1469-7610.2009.02042.x>
- Rutter, M., O'Connor, T. G., English, & Romanian Adoptees Study, T. (2004). Are there biological programming effects for psychological development? Findings from a study of Romanian adoptees. *Developmental Psychology*, 40(1), 81-94. <https://doi.org/10.1037/0012-1649.40.1.81>
- Rutter, M., & Sroufe, L. A. (2000). Developmental psychopathology: Concepts and challenges. *Development and Psychopathology*, 12(3), 265-296. <https://doi.org/https://doi.org/10.1017/S0954579400003023>
- Sachser, C., Berliner, L., Holt, T., Jensen, T. K., Jungbluth, N., Risch, E., Rosner, R., & Goldbeck, L. (2016). International development and psychometric properties of the Child and Adolescent Trauma Screen (CATS). *Journal of Affective Disorders*, 210, 189-195. <https://doi.org/10.1016/j.jad.2016.12.040>
- Sadiq, F., Slator, L., Skuse, D., Law, J., Gillberg, C., & Minnis, H. (2012). Social use of language in children with reactive attachment disorder and autism spectrum disorders. *European Child and Adolescent Psychiatry*, 21(5), 267-276. <https://doi.org/10.1007/s00787-012-0259-8>

- Salmivalli, C. (2001). Feeling good about oneself, being bad to others? Remarks on self-esteem, hostility, and aggressive behavior. *Aggression and violent behavior, 6*(4), 375-393.  
[https://doi.org/10.1016/S1359-1789\(00\)00012-4](https://doi.org/10.1016/S1359-1789(00)00012-4)
- Sameroff, A. J. (2009). *The transactional model of development : how children and contexts shape each other*. American Psychological Association.
- Scheper, F. Y., Groot, C. R. M., de Vries, A. L. C., Doreleijers, T. A. H., Jansen, L. M. C., & Schuengel, C. (2018). Course of disinhibited social engagement behavior in clinically referred home-reared preschool children. *Journal of Child Psychology and Psychiatry, 60*(5), 555-565.  
<https://doi.org/https://doi.org/10.1111/icpp.12994>
- Schore, J. R., & Schore, A. N. (2008). Modern attachment theory: the central role of affect regulation in development and treatment. *Clinical Social Work Journal, 36*(1), 9-20.  
<https://doi.org/10.1007/s10615-007-0111-7>
- Schroder, M., Ludtke, J., Fux, E., Izat, Y., Boltzen, M., Gloger-Tippelt, G., Suess, G. J., & Schmid, M. (2019). Attachment disorder and attachment theory - Two sides of one medal or two different coins? *Comprehensive Psychiatry, 95*(152139). <https://doi.org/10.1016/j.comppsy.2019.152139>
- Scott, E. L., Keary, C., King, J. M., Zeanah, C. H., & McDougale, C. J. (2018). Reactive attachment disorder and disinhibited social engagement disorder. In F. J. Stoddard, D. M. Benedek, M. R. Milad, & R. J. Ursano (Eds.), *Trauma-and Stressor-Related Disorders* (1 ed., pp. 6-18). Oxford University Press.
- Sheridan, M. A., & McLaughlin, K. A. (2014). Dimensions of early experience and neural development: deprivation and threat. *Trends in Cognitive Sciences, 18*(11), 580-585.  
<https://doi.org/10.1016/j.tics.2014.09.001>
- Singstad, M. T., Wallander, J. L., Lydersen, S., Wichstrøm, L., & Kayed, N. S. (2020). Perceived social support among adolescents in Residential Youth Care. *Child & Family Social Work, 25*(2), 384-393.  
<https://doi.org/10.1111/cfs.12694>
- Skogen, J. C., Smith, O. R., Aarø, L. E., Siqveland, J., & Øverland, S. (2018). *Barn og unges psykiske helse: Forebyggende og helsefremmende folkehelseiltak. En kunnskapsoversikt [Mental health among children and adolescents. Healthpromoting and preventive public health interventions. A summary of evidence about effects]*. Folkehelseinstituttet [Norwegian Institute of Public Health].  
[https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/barn\\_og\\_unge\\_psykiske\\_helse\\_forebyggende.pdf](https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/barn_og_unge_psykiske_helse_forebyggende.pdf)
- Skovgaard, A. M., Houmann, T., Christiansen, E., Landorph, S., Jørgensen, T., Team, C. S., Olsen, E., Heering, K., Kaas-Nielsen, S., & Samberg, V. (2007). The prevalence of mental health problems in children 1½ years of age—the Copenhagen Child Cohort 2000. *Journal of Child Psychology and Psychiatry, 48*(1), 62-70. <https://doi.org/10.1111/j.1469-7610.2006.01659.x>
- Smyke, A. T., Dumitrescu, A., & Zeanah, C. H. (2002). Attachment disturbances in young children. I: The continuum of caretaking casualty. *Journal of the American Academy of Child and Adolescent Psychiatry, 41*(8), 972-982. <https://doi.org/10.1097/00004583-200208000-00016>
- Smyke, A. T., Zeanah, C. H., Fox, N. A., Nelson, C. A., & Guthrie, D. (2010). Placement in foster care enhances quality of attachment among young institutionalized children. *Child Development, 81*(1), 212-223. <https://doi.org/10.1111/j.1467-8624.2009.01390.x>
- Smyke, A. T., Zeanah, C. H., Gleason, M. M., Drury, S. S., Fox, N. A., Nelson, C. A., & Guthrie, D. (2012). A randomized controlled trial comparing foster care and institutional care for children with signs of reactive attachment disorder. *American Journal of Psychiatry, 169*(5), 508-514.  
<https://doi.org/10.1176/appi.ajp.2011.11050748>
- Soler, L., Kirchner, T., Paretilla, C., & Forn, M. (2013). Impact of poly-victimization on mental health: the mediator and/or moderator role of self-esteem. *Journal of Interpersonal Violence, 28*(13), 2695-2712. <https://doi.org/10.1177/0886260513487989>
- Soler, L., Paretilla, C., Kirchner, T., & Forn, M. (2012). Effects of poly-victimization on self-esteem and post-traumatic stress symptoms in Spanish adolescents. *European Child and Adolescent Psychiatry, 21*(11), 645-653. <https://doi.org/10.1007/s00787-012-0301-x>
- Sonuga-Barke, E. J. S., Kennedy, M., Kumsta, R., Knights, N., Golm, D., Rutter, M., Maughan, B., Schlotz, W., & Kreppner, J. (2017). Child-to-adult neurodevelopmental and mental health trajectories after early

- life deprivation: the young adult follow-up of the longitudinal English and Romanian Adoptees study. *The Lancet*, 389(10078), 1539-1548. [https://doi.org/10.1016/S0140-6736\(17\)30045-4](https://doi.org/10.1016/S0140-6736(17)30045-4)
- Spangler, G., Bovenschen, I., Jorjadze, N., Zimmermann, J., Werner, A., Riedel, N., Gabler, S., Kliewer-Neumann, J. D., & Nowacki, K. (2019). Inhibited symptoms of attachment disorder in children from institutional and foster care samples. *Attachment & Human Development*, 21(2), 132-151. <https://doi.org/10.1080/14616734.2018.1499210>
- Spence, J. C., McGannon, K. R., & Poon, P. (2005). The effect of exercise on global self-esteem: a quantitative review. *Journal of Sport & Exercise Psychology*, 27(3), 311-334. <https://doi.org/10.1123/jsep.27.3.311>
- Spilt, J. L., Vervoort, E., Koenen, A.-K., Bosmans, G., & Verschueren, K. (2016). The socio-behavioral development of children with symptoms of attachment disorder: An observational study of teacher sensitivity in special education. *Research in Developmental Disabilities*, 56, 71-82. <https://doi.org/10.1016/j.ridd.2016.05.014>
- Sroufe, L. A. (2013). The promise of developmental psychopathology: Past and present. *Development and Psychopathology*, 25(4), 1215-1224. <https://doi.org/10.1017/S0954579413000576>
- Sroufe, L. A., Carlson, E. A., Levy, A. K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. *Development and Psychopathology*, 11(1), 1-13. <https://doi.org/10.1017/S0954579499001923>
- Staer, T. (2016). Risk and marginalization in the Norwegian welfare society: a national cohort study of child welfare involvement. *Child Indicators Research*, 9(2), 445-470. <https://doi.org/10.1007/s12187-015-9319-1>
- Stafford, B., Zeanah, C. H., Scheeringa, M., Guedeney, A., & Maestro, S. (2003). Exploring psychopathology in early childhood: PTSD and attachment disorders in DC: 0-3 and DSM-IV. *Infant Mental Health Journal*, 24(4), 398-409. <https://doi.org/10.1002/imhj.10064>
- Statistisk sentralbyrå. (2021). *Statistics Norway - official statistics about Norwegian society*. Retrieved April 30 from [www.ssb.no](http://www.ssb.no)
- Stein, J. A., Leslie, M. B., & Nyamathi, A. (2002). Relative contributions of parent substance use and childhood maltreatment to chronic homelessness, depression, and substance abuse problems among homeless women: mediating roles of self-esteem and abuse in adulthood. *Child Abuse and Neglect*, 26(10), 1011-1027. [https://doi.org/10.1016/s0145-2134\(02\)00382-4](https://doi.org/10.1016/s0145-2134(02)00382-4)
- Steinkopf, H., Nordanger, D., Stige, B., & Milde, A. M. (2021). Experiences of becoming emotionally dysregulated. A qualitative study of staff in youth residential care. *Child & Youth Services*, 1-19. <https://doi.org/10.1080/0145935X.2021.1918541>
- Stern, A., Agnew-Blais, J., Danese, A., Fisher, H. L., Jaffee, S. R., Matthews, T., Polanczyk, G. V., & Arseneault, L. (2018). Associations between abuse/neglect and ADHD from childhood to young adulthood: A prospective nationally-representative twin study. *Child Abuse and Neglect*, 81, 274-285. <https://doi.org/10.1016/j.chiabu.2018.04.025>
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., Alink, L. R., & Van Ijzendoorn, M. H. (2012). The universality of childhood emotional abuse: a meta-analysis of worldwide prevalence. *Journal of Aggression, Maltreatment & Trauma*, 21(8), 870-890. <https://doi.org/10.1080/10926771.2012.708014>
- Strandheim, A., Bjerkeset, O., Gunnell, D., Bjørnelv, S., Holmen, T. L., & Bentzen, N. (2014). Risk factors for suicidal thoughts in adolescence - a prospective cohort study: the Young-HUNT study. *BMJ Open* 4, e005867. <https://doi.org/10.1136/bmjopen-2014-005867>
- Strandheim, A., Bratberg, G. H., Holmen, T. L., Coombes, L., & Bentzen, N. (2011). The influence of behavioural and health problems on alcohol and drug use in late adolescence - a follow up study of 2 399 young Norwegians. *Child and Adolescent Psychiatry and Mental Health*, 5(1), 17-17. <https://doi.org/10.1186/1753-2000-5-17>
- Strandheim, A., Holmen, T. L., Coombes, L., & Bentzen, N. (2009). Alcohol intoxication and mental health among adolescents - a population review of 8983 young people, 13-19 years in North-Trøndelag, Norway: the Young-HUNT Study. *Child and Adolescent Psychiatry and Mental Health*, 3(1), 18-18. <https://doi.org/10.1186/1753-2000-3-18>

- Swanson, E., Owens, E., & Hinshaw, S. (2012). Is the positive illusory bias illusory? Examining discrepant self-perceptions of competence in girls with ADHD. *Journal of Abnormal Child Psychology*, 40(6), 987-998. <https://doi.org/10.1007/s10802-012-9615-x>
- Tarren-Sweeney, M. (2013). An investigation of complex attachment- and trauma-related symptomatology among children in foster and kinship care. *Child Psychiatry and Human Development*, 44(6), 727-741. <https://doi.org/10.1007/s10578-013-0366-x>
- Tarren-Sweeney, M. (2018). *Mental Health Screening and Monitoring for Children in Care: A Short Guide for Children's Agencies and Post-adoption Services*. Routledge.
- Tizard, B., & Rees, J. (1975). The effect of early institutional rearing on the behaviour problems and affectional relationships of four-year-old children. *Journal of Child Psychology and Psychiatry*, 16(1), 61-73.
- Torvik, F. A., & Rognmo, K. (2011). *Barn av foreldre med psykiske lidelser eller alkoholmisbruk [Children of parents with psychiatric disorders or alcohol misuse]*. Folkehelseinstituttet [The Norwegian Institute of Public Health]. <https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2011/rapport-20114-pdf.pdf>
- Trent, L. M. Y., Russell, G., & Cooney, G. (1994). Assessment of self-concept in early adolescence. *Australian Journal of Psychology*, 46(1), 21-28. <https://doi.org/10.1080/00049539408259465>
- Trickett, P. K., Negriff, S., Ji, J., & Peckins, M. (2011). Child maltreatment and adolescent development. *Journal of research on adolescence*, 21(1), 3-20. <https://doi.org/10.1111/j.1532-7795.2010.00711.x>
- Tronick, E., Als, H., Adamson, L., Wise, S., & Brazelton, T. B. (1978). The infant's response to entrapment between contradictory messages in face-to-face interaction. *Journal of the American Academy of Child Psychiatry*, 17(1), 1-13. [https://doi.org/10.1016/S0002-7138\(09\)62273-1](https://doi.org/10.1016/S0002-7138(09)62273-1)
- Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., Caspi, A., & García Coll, C. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*, 42(2), 381-390. <https://doi.org/10.1037/0012-1649.42.2.381>
- Turner, H. A., Shattuck, A., Finkelhor, D., & Hamby, S. (2015). Effects of poly-victimization on adolescent social support, self-concept, and psychological distress. *Journal of Interpersonal Violence*, 32(5), 755-780. <https://doi.org/10.1177/0886260515586376>
- UN General Assembly. (1989). *Convention on the rights of the child*. United Nations, Treaty Series, vol. 1577.
- United Nations Association of Norway. (2021, February 8, 2021). *Norge (Norway)*. Retrieved April 30 from <https://www.fn.no/Land/norge>
- United Nations Development Programme. (2020a). *Human Development Index (HDI) Ranking*. Retrieved April 30 from <http://hdr.undp.org/en/data>
- United Nations Development Programme. (2020b). *Inequality-adjusted Human Development Index*. Retrieved May 14 from <http://hdr.undp.org/en/indicators/138806>
- Vacaru, V. S., Sterkenburg, P. S., & Schuengel, C. (2018). Self-concept in institutionalized children with disturbed attachment: The mediating role of exploratory behaviours. *Child: Care, Health and Development*, 44(3), 476-484. <https://doi.org/10.1111/cch.12521>
- Valset, K. (2014). Ungdom utsatt for omsorgssvikt - hvordan presterer de på skolen? [Maltreated adolescents - how do they perform in school?]. In E. Backe-Hansen, C. Madsen, L. B. Kristofersen, & B. Hvinden (Eds.), *Barnevern i Norge 1990-2010: en longitudinell studie [Child welfare in Norway 1990-2010: A longitudinal study]* (Vol. NOVA Report 9/14). Norsk institutt for forskning om oppvekst, velferd og aldring (NOVA) [Norwegian Social Research]. <https://oda.oslomet.no/oda-xmlui/handle/20.500.12199/5074>
- van Buuren, S. (2018). *Flexible imputation of missing data* (Second edition. ed.). CRC Press.
- van Ijzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2003). Attachment disorders and disorganized attachment: similar and different. *Attach Hum Dev*, 5(3), 313-320. <https://doi.org/10.1080/14616730310001593938>



- Van Ijzendoorn, M. H., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*, *11*(2), 225-250. <https://doi.org/10.1017/s0954579499002035>
- Vasileva, M., Graf, R. K., Reinelt, T., Petermann, U., & Petermann, F. (2021). Research review: A meta-analysis of the international prevalence and comorbidity of mental disorders in children between 1 and 7 years. *Journal of Child Psychology and Psychiatry*, *62*(4), 372-381. <https://doi.org/10.1111/jcpp.13261>
- Verhage, M. L., Schuengel, C., Madigan, S., Fearon, R. M. P., Oosterman, M., Cassibba, R., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2016). Narrowing the transmission gap: a synthesis of three decades of research on intergenerational transmission of attachment. *Psychological Bulletin*, *142*(4), 337-366. <https://doi.org/10.1037/bul0000038>
- Verschueren, K., & Koomen, H. M. Y. (2012). Teacher–child relationships from an attachment perspective. *Attachment & Human Development*, *14*(3), 205-211. <https://doi.org/10.1080/14616734.2012.672260>
- Vervoort, E., Bosmans, G., Doumen, S., Minnis, H., & Verschueren, K. (2014). Perceptions of self, significant others, and teacher–child relationships in indiscriminately friendly children. *Research in Developmental Disabilities*, *35*(11), 2802-2811. <https://doi.org/10.1016/j.ridd.2014.07.004>
- Vervoort, E., De Schipper, J., Bosmans, G., & Verschueren, K. (2013). Screening symptoms of reactive attachment disorder: Evidence for measurement invariance and convergent validity. *International Journal of Methods in Psychiatric Research*, *22*(3), 256-265. <https://doi.org/10.1002/mpr.1395>
- von Soest, T., von Soest, T., Wichstrøm, L., & Wichstrøm, L. (2014). Secular trends in depressive symptoms among Norwegian adolescents from 1992 to 2010. *Journal of Abnormal Child Psychology*, *42*(3), 403-415. <https://doi.org/10.1007/s10802-013-9785-1>
- von Soest, T., Wichstrøm, L., & Kvaalem, I. L. (2016). The development of global and domain-specific self-esteem from age 13 to 31. *Journal of Personality and Social Psychology*, *110*(4), 592-608. <https://doi.org/10.1037/pspp0000060>
- Weyandt, L. L., Clarkin, C. M., Holding, E. Z., May, S. E., Maccacini, M. E., Gudmundsdottir, B. G., Shepard, E., & Thompson, L. (2020). Neuroplasticity in children and adolescents in response to treatment intervention: A systematic review of the literature. *Clinical and Translational Neuroscience*, *4*(2). <https://doi.org/10.1177/2514183X20974231>
- Whelan, C. T., Nolan, B., & Maitre, B. (2014). Multidimensional poverty measurement in Europe: An application of the adjusted headcount approach. *Journal of European Social Policy*, *24*(2), 183-197. <https://doi.org/10.1177/0958928713517914>
- Wichstrøm, L. (1995). Harter's Self-Perception Profile for Adolescents: Reliability, validity, and evaluation of the question format. *Journal of Personality Assessment*, *65*(1), 100-116. [https://doi.org/10.1207/s15327752jpa6501\\_8](https://doi.org/10.1207/s15327752jpa6501_8)
- Wichstrøm, L. (1999). The emergence of gender difference in depressed mood during adolescence: the role of intensified gender socialization. *Developmental Psychology*, *35*(1), 232-245. <https://doi.org/10.1037/0012-1649.35.1.232>
- Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry*, *53*(6), 695-705. <https://doi.org/10.1111/j.1469-7610.2011.02514.x>
- Wichstrøm, L., & Von Soest, T. (2016). Reciprocal relations between body satisfaction and self-esteem: A large 13-year prospective study of adolescents. *Journal of Adolescence*, *47*, 16-27. <https://doi.org/10.1016/j.adolescence.2015.12.003>
- Wolke, D., Waylen, A., Samara, M., Steer, C., Goodman, R., Ford, T., & Lamberts, K. (2009). Selective drop-out in longitudinal studies and non-biased prediction of behaviour disorders. *British Journal of Psychiatry*, *195*(3), 249-256. <https://doi.org/10.1192/bjp.bp.108.053751>
- Woolgar, M., & Baldock, E. (2015). Attachment disorders versus more common problems in looked after and adopted children: Comparing community and expert assessments. *Child and Adolescent Mental Health*, *20*(1), 34-40. <https://doi.org/10.1111/camh.12052>

- Woolgar, M., & Scott, S. (2014). The negative consequences of over-diagnosing attachment disorders in adopted children: The importance of comprehensive formulations. *Clinical Child Psychology and Psychiatry*, 19(3), 355-366. <https://doi.org/10.1177/1359104513478545>
- Woolgar, M., & Simmonds, J. (2019). The diverse neurobiological processes and legacies of early adversity: implications for practice. *Adoption & fostering*, 43(3), 241-255. <https://doi.org/10.1177/0308575919877012>
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. World Health Organization.
- World Health Organization. (2018). *International Statistical Classification of Diseases and Related Health Problems (ICD-11)*. <https://www.who.int/classifications/classification-of-diseases>.
- Wykes, T., Haro, J. M., Belli, S. R., Obradors-Tarragó, C., Arango, C., Ayuso-Mateos, J. L., Bitter, I., Brunn, M., Chevreul, K., Demotes-Mainard, J., Elfeddali, I., Evans-Lacko, S., Fiorillo, A., Forsman, A. K., Hazo, J.-B., Kuepper, R., Knappe, S., Leboyer, M., Lewis, S. W., Linszen, D., Luciano, M., Maj, M., McDaid, D., Miret, M., Papp, S., Park, A. L., Schumann, G., Thornicroft, G., van der Feltz-Cornelis, C., van Os, J., Wahlbeck, K., Walker-Tilley, T., & Wittchen, H.-U. Mental health research priorities for Europe. *The Lancet Psychiatry*, 2(11), 1036-1042. [https://doi.org/10.1016/S2215-0366\(15\)00332-6](https://doi.org/10.1016/S2215-0366(15)00332-6)
- Young-Southward, G., Eaton, C., O'Connor, R., & Minnis, H. (2020). Investigating the causal relationship between maltreatment and cognition in children: A systematic review. *Child Abuse and Neglect*, 107, 104603. <https://doi.org/10.1016/j.chiabu.2020.104603>
- Zeanah, C. H., Chesher, T., & Boris, N. W. (2016). Practice parameter for the assessment and treatment of children and adolescents with reactive attachment disorder and disinhibited social engagement disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 55(11), 990. <https://doi.org/10.1016/j.jaac.2016.08.004>
- Zeanah, C. H., Egger, H. L., Smyke, A. T., Nelson, C. A., Fox, N. A., Marshall, P. J., & Guthrie, D. (2009). Institutional rearing and psychiatric disorders in Romanian preschool children. *The American Journal of Psychiatry*, 166(7), 777-785. <https://doi.org/10.1176/appi.ajp.2009.08091438>
- Zeanah, C. H., & Gleason, M. M. (2010). *Reactive Attachment Disorder: A Review for DSM-V* [Report]. American Psychiatric Association. [https://www.researchgate.net/profile/Charles\\_Zeanah/publication/228683818\\_Reactive\\_Attachment\\_Disorder\\_a\\_review\\_for\\_DSM-V/links/0deec51e86576d1e8c000000/Reactive-Attachment-Disorder-a-review-for-DSM-V.pdf](https://www.researchgate.net/profile/Charles_Zeanah/publication/228683818_Reactive_Attachment_Disorder_a_review_for_DSM-V/links/0deec51e86576d1e8c000000/Reactive-Attachment-Disorder-a-review-for-DSM-V.pdf)
- Zeanah, C. H., & Gleason, M. M. (2015). Annual research review: Attachment disorders in early childhood - clinical presentation, causes, correlates, and treatment. *Journal of Child Psychology and Psychiatry*, 56(3), 207-222. <https://doi.org/10.1111/jcpp.12347>
- Zeanah, C. H., & Humphreys, K. L. (2018). Child abuse and neglect. *Journal of the American Academy of Child and Adolescent Psychiatry*, 57(9), 637-644. <https://doi.org/10.1016/j.jaac.2018.06.007>
- Zeanah, C. H., Scheeringa, M., Boris, N. W., Heller, S. S., Smyke, A. T., & Trapani, J. (2004). Reactive attachment disorder in maltreated toddlers. *Child Abuse and Neglect*, 28(8), 877-888. <https://doi.org/10.1016/j.chiabu.2004.01.010>
- Zeanah, C. H., Smyke, A. T., & Dumitrescu, A. (2002). Attachment disturbances in young children. II: Indiscriminate behavior and institutional care. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(8), 983-989. <https://doi.org/10.1097/00004583-200208000-00017>
- Zeanah, C. H., Smyke, A. T., Koga, S. F., Carlson, E., Nelson, C. A., Parker, S. W., Fox, N. A., Marshall, P. J., & Woodward, H. R. (2005). Attachment in institutionalized and community children in Romania. *Child Development*, 76(5), 1015-1028. <https://doi.org/10.1111/j.1467-8624.2005.00894.x>
- Zeanah, C. H., & Sonuga-Barke, E. J. S. (2016). Editorial: The effects of early trauma and deprivation on human development – from measuring cumulative risk to characterizing specific mechanisms. *Journal of Child Psychology and Psychiatry*, 57(10), 1099-1102. <https://doi.org/10.1111/jcpp.12642>
- Zeigler-Hill, V. (2011). The connections between self-esteem and psychopathology. *Journal of Contemporary Psychotherapy*, 41(3), 157-164. <https://doi.org/10.1007/s10879-010-9167-8>
- Zephyr, L., Cyr, C., Monette, S., Archambault, M., Lehmann, S., & Minnis, H. (2021). Meta-analyses of the associations between disinhibited social engagement behaviors and child attachment insecurity or

disorganization. *Research on Child and Adolescent Psychopathology*, 1-14.

<https://doi.org/10.1007/s10802-021-00777-1>

Zimmermann, P., & Iwanski, A. (2019). Attachment Disorder behavior in early and middle childhood: associations with children's self-concept and observed signs of negative internal working models.

*Attachment & Human Development*, 21(2), 170-189.

<https://doi.org/10.1080/14616734.2018.1499212>

Zimmermann, P., & Soares, I. (2019). Recent contributions for understanding inhibited reactive attachment disorder. *Attachment & Human Development*, 21(2), 87-94.

<https://doi.org/10.1080/14616734.2018.1499207>



## Appendix

### Appendix A

Table A1. Distribution of age at first out-of-home placement

Age in years	Total ( <i>n</i> )	Cumulative %	RAD ( <i>n</i> )	DSED ( <i>n</i> )
0	2	.5	0	1
1	7	2.3	0	1
2	9	4.7	2	0
3	5	6.0	1	0
4	3	6.8	0	0
5	7	8.6	1	1
6–11	62	24.9	3	8
12–17	281	98.7	26	20
Missing	5	100		
Total	381	100	33	31

**Table A2**

Post hoc linear regression analyses with age at first placement and number of placements as the dependent variables, and RAD and DSED symptom loads as covariates. These analyses were performed using the unimputed data file ( $N = 381$ ), where  $n = 5$  (1.3 %) had missing data for the age at first placement (none of whom had RAD or DSED diagnoses), and  $n = 29$  (7.6 %) had missing data for the number of placements (of whom  $n = 2$  had RAD diagnosis and  $n = 1$  had DSED diagnosis).

Table A2. RAD and DSED symptom loads in adolescence and association with age at first placement and number of placements

	RAD symptom load (0–11)			DSED symptom load (0–4)		
	$\beta$	CI	<i>p</i>	$\beta$	CI	<i>p</i>
Age at first placement	-0.14	.037 to 0.09	.24	-0.48	-1.06 to 0.10	.10
Number of placements	-0.03	-0.17 to 0.11	.67	0.26	-0.17 to 0.68	.23

Note. Linear regression with RAD/DSED symptom load as covariates.  
 $\beta$  Unstandardised regression coefficient.

## Appendix B

Table B1. Number and percentage of available and missing RAD and DSED items among 381 participants with primary contact interviews yielding information about RAD and DSED

RAD items	Available	Missing	
	<i>n</i>	<i>n</i>	%
Inhibition during social interactions	381	0	0.0
Lack of interest in family members and peers	376	5	1.3
Does not seek comfort when distressed	377	4	1.0
Lack of emotional sensitivity	375	6	1.6
Difficulty being affectionate	377	4	1.0
Avoids physical contact	380	1	0.3
Constricted range of facial expression	375	6	1.6
Avoids eye contact	380	1	0.3
Highly ambivalent and contradictory responses	370	11	2.9
Negative reunion responses	376	5	1.3
Hypervigilance	361	20	5.2
DSED items			
Indiscriminate adult relationships	380	1	0.3
Indiscriminate peer relationships	374	7	1.8
Indiscriminate willingness to leave with unfamiliar adult	371	10	2.6
Minimal checking with caregiver in unfamiliar settings	368	13	3.4

## Appendix C

### Comparisons of complete case and multiple imputation analyses in Paper II.

Table C1. Prevalence and odds ratio for co-occurring psychiatric disorders among adolescents with and without RAD or DSED diagnoses and symptoms. Results from analyses based on complete case (CC) and multiple imputation (MI).

Disorder	Total				RAD diagnosis				RAD symptom load				DSED diagnosis				DSED symptom load				
	<i>n</i> / <i>N</i>	<i>n</i>	%	OR	CI	<i>p</i>	OR	CI	<i>p</i>	OR	CI	<i>p</i>	%	<i>n</i>	OR	CI	<i>p</i>	OR	CI	<i>p</i>	
	N = 381				n = 33				Range 0–11				n = 31				Range 0–4				
Depression	CC	122/322	9/25	36.0	0.95	0.40 to 2.30	.92	<b>1.14</b>	<b>1.01 to 1.29</b>	<b>.037</b>	1.6/28	57.1	1.74	0.77 to 3.92	.19	1.31	0.93 to 1.85	.12			
	MI	156.8	14.3	43.3	1.08	0.47 to 2.47	.85	<b>1.13</b>	<b>1.004 to 1.28</b>	<b>.043</b>	17.3	55.8	1.47	0.66 to 3.26	.35	1.18	0.85 to 1.65	.32			
Anxiety	CC	155/322	9/25	36.0	1.03	0.44 to 2.43	.95	<b>1.18</b>	<b>1.05 to 1.33</b>	<b>.007</b>	15/28	53.6	1.98	0.89 to 4.41	.093	<b>1.40</b>	<b>1.00 to 1.96</b>	<b>.052</b>			
	MI	148.8	14.1	42.7	1.18	0.52 to 2.69	.70	<b>1.17</b>	<b>1.04 to 1.31</b>	<b>.009</b>	17.2	55.5	1.93	0.87 to 4.26	.10	1.33	0.96 to 1.86	.088			
CD/ODD	CC	69/322	9/25	36.0	2.28	0.94 to 5.53	.069	1.02	0.89 to 1.17	.79	9/28	32.1	<b>2.64</b>	<b>1.08 to 6.47</b>	<b>.034</b>	<b>1.70</b>	<b>1.15 to 2.49</b>	<b>.007</b>			
	MI	95.1	13.3	40.3	2.22	0.95 to 5.19	.066	1.03	0.90 to 1.17	.72	10.0	32.3	1.89	0.75 to 4.75	.18	1.40	0.95 to 2.07	.091			
ADHD	CC	122	6/33	18.2	0.45	0.18 to 1.12	.084	1.02	0.91 to 1.14	.79	15/31	48.4	<b>2.50</b>	<b>1.17 to 5.36</b>	<b>.018</b>	<b>1.14</b>	<b>1.02 to 1.93</b>	<b>.035</b>			
	MI	122	6	18.2	0.45	0.18 to 1.12	.084	1.02	0.91 to 1.14	.79	15	48.4	<b>2.50</b>	<b>1.17 to 5.36</b>	<b>.018</b>	<b>1.14</b>	<b>1.02 to 1.93</b>	<b>.035</b>			
Any	CC	241	16/33	48.5	0.51	0.25 to 1.05	.068	1.03	0.92 to 1.15	.61	27/31	87.1	<b>4.26</b>	<b>1.45 to 12.54</b>	<b>.009</b>	<b>1.94</b>	<b>1.29 to 2.92</b>	<b>.002</b>			
	MI	274.0	21.4	64.8	0.68	0.31 to 1.48	.33	1.13	.99 to 1.29	.064	27.9	90.0	<b>3.48</b>	<b>1.02 to 11.86</b>	<b>.046</b>	<b>1.89</b>	<b>1.17 to 3.05</b>	<b>.010</b>			

Note. Reference group: adolescents without RAD or DSED, respectively. All analyses are adjusted for age and sex. Logistic regression analyses with the comorbid disorder as the dependent variable and the RAD/DSED diagnosis or symptom load as the covariate. Bold text signifies  $p < .05$ . *ADHD* attention deficit hyperactivity disorder; *CD* conduct disorder; *DSED* disinhibited social engagement disorder; *ODD* oppositional defiant disorder; *RAD* reactive attachment disorder

Table C2. Prevalence and odds ratio for co-occurring psychosocial problems among adolescents with and without RAD or DSED diagnoses and symptoms. Results from analyses based on complete case (CC) and multiple imputation (MI).

Psychosocial factor	RAD diagnosis										RAD symptom load										DSED diagnosis										DSED symptoms									
	n = 33					n = 31					Range 0-11					n = 31					Range 0-4					n = 31					Range 0-4									
	n/N	n	%	OR	CI	p	OR	CI	p	n	%	OR	CI	p	n	%	OR	CI	p	n	%	OR	CI	p	n	%	OR	CI	p	n	%	OR	CI	p						
Suicidal thoughts	CC	38/319	6/25	24.0	<b>2.87</b>	<b>1.04 to 7.93</b>	<b>.042</b>	1.12	0.94 to 1.31	.23	9/27	33.3	<b>3.49</b>	<b>1.39 to 8.74</b>	<b>.008</b>	1.93	<b>1.28 to 2.89</b>	<b>.002</b>	MI	68.3	11.0	33.3	<b>2.51</b>	<b>1.00 to 6.29</b>	<b>.049</b>	1.09	0.94 to 1.27	.27	11.2	36.1	<b>2.49</b>	<b>1.01 to 6.13</b>	<b>.047</b>	1.53	<b>1.03 to 2.27</b>	<b>.037</b>				
	CC	12/316	2/25	8.0	2.44	0.51 to 11.82	.27	1.14	0.88 to 1.48	.33	3/25	12.0	<b>4.27</b>	<b>1.08 to 16.93</b>	<b>.039</b>	2.08	<b>1.12 to 3.86</b>	<b>.020</b>	MI	46.5	6.2	18.8	1.69	0.50 to 5.69	.40	1.11	0.92 to 1.35	.27	6.1	19.7	1.61	0.44 to 5.83	.47	1.35	0.78 to 2.33	.28				
Suicidal plan	CC	115/320	6/25	24.0	0.53	0.20 to 1.38	.19	1.02	0.90 to 1.15	.80	14/27	51.9	1.84	0.81 to 4.17	.15	1.24	0.88 to 1.75	.22	MI	148.2	9.8	29.7	0.65	0.27 to 1.57	.34	1.02	0.90 to 1.15	.80	16.3	52.6	1.68	0.74 to 3.80	.21	1.19	0.85 to 1.67	.31				
	CC	14/315	2/24	8.3	2.19	0.46 to 10.45	.33	1.05	0.81 to 1.37	.72	5/27	18.5	<b>7.04</b>	<b>2.02 to 24.54</b>	<b>.002</b>	1.95	<b>1.08 to 3.50</b>	<b>.026</b>	MI	47.6	6.9	20.9	1.90	0.54 to 6.67	.32	1.07	0.88 to 1.30	.48	7.0	22.6	2.26	0.67 to 7.68	.19	1.22	0.70 to 2.13	.48				
Self-harm	CC	74/348	5/25	20.0	1.33	0.45 to 3.97	.61	<b>1.18</b>	<b>1.01 to 1.37</b>	<b>.033</b>	9/27	33.3	1.58	0.64 to 3.92	.32	1.37	0.93 to 2.01	.12	MI	91.0	10.9	33.0	1.60	0.65 to 3.96	.31	<b>1.16</b>	<b>1.00 to 1.33</b>	<b>.047</b>	10.8	34.8	1.27	0.52 to 3.10	.60	1.17	0.80 to 1.69	.42				
	CC	120/368	7/33	21.2	0.51	0.21 to 1.22	.13	1.04	0.92 to 1.16	.55	13/30	43.3	1.34	0.62 to 2.92	.13	1.21	0.88 to 1.66	.24	MI	123.1	7.0	21.2	0.51	0.21 to 1.23	.14	1.04	0.93 to 1.17	.51	13.4	43.2	1.33	0.61 to 2.88	.48	1.20	0.88 to 1.65	.25				
Contact with police	CC	206/313	17/25	68.0	1.07	0.44 to 2.59	.88	0.99	0.87 to 1.11	.81	20/28	71.4	1.70	0.70 to 4.18	.24	1.26	0.87 to 1.81	.23	MI	243.6	21.0	63.6	1.04	0.44 to 2.47	.94	0.99	0.88 to 1.12	.85	21.4	69.0	1.49	0.62 to 3.62	.38	1.20	0.83 to 1.74	.33				
	CC	26/282	1/24	4.2	0.41	0.05 to 3.26	.40	0.95	0.77 to 1.19	.67	8/26	30.8	<b>5.77</b>	<b>2.01 to 16.56</b>	<b>.001</b>	2.22	<b>1.36 to 3.63</b>	<b>.001</b>	MI	74.7	5.4	16.4	0.69	0.15 to 3.22	.63	1.06	0.89 to 1.26	.54	10.4	33.5	2.14	0.76 to 6.01	.15	1.36	0.83 to 2.21	.22				
Substance use	CC	182/322	15/25	60.0	1.11	0.48 to 2.59	.80	0.95	0.84 to 1.06	.34	17/28	60.7	1.46	0.64 to 3.33	.38	1.26	0.88 to 1.79	.20	MI	212.1	18.8	57.0	1.15	0.51 to 2.61	.74	0.97	0.87 to 1.09	.64	18.4	59.4	1.35	0.59 to 3.07	.48	1.21	0.85 to 1.72	.28				
	CC	26/320	3/25	12.0	1.63	0.45 to 5.92	.46	0.96	0.78 to 1.20	.74	9/28	32.1	<b>8.14</b>	<b>3.01 to 22.01</b>	<b>&lt;.001</b>	2.41	<b>1.52 to 3.81</b>	<b>&lt;.001</b>	MI	54.3	6.8	20.6	1.61	0.50 to 5.14	.42	1.03	0.85 to 1.25	.74	10.4	33.5	<b>3.80</b>	<b>1.23 to 11.70</b>	<b>.020</b>	1.63	0.99 to 2.70	.055				

Note. Reference group: adolescents without RAD or DSED, respectively. Analyses are adjusted for age and sex, except for suicidal plan (unadjusted due to low n). Logistic regression analyses with the psychosocial problem as the dependent variable and the RAD/DSED diagnosis or symptom load as the covariate. Bold text signifies p<.05. DSED disinhibited social engagement disorder; RAD reactive attachment disorder; Substance use Daily alcohol use or ever having used cannabis or hard drugs; Suic.beh w/o intent Suicidal behaviour without suicidal intention.



**PAPERS I—III**



# Paper I





# Validity of reactive attachment disorder and disinhibited social engagement disorder in adolescence

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## Abstract

Although reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) are acknowledged as valid disorders in young children, controversy remains regarding their validity in adolescence. An unresolved question is whether symptoms of RAD and DSED are better conceptualized as other psychiatric disorders at this age. All adolescents ( $N=381$ ; 67% consent; 12–20 years old) living in residential youth care in Norway were interviewed to determine the symptoms and diagnosis of RAD/DSED and other common psychiatric disorders using the Child and Adolescent Psychiatric Assessment (CAPA). The construct validity of RAD and DSED, including structural and discriminant validity, was investigated using confirmatory factor analysis and latent profile analysis. Two-factor models distinguishing between symptoms of RAD and DSED and differentiating these symptoms from the symptoms of other psychiatric disorders revealed better fit than one-factor models. Symptoms of RAD and DSED defined two distinct latent groups in a profile analysis. The prevalence of RAD was 9% (95% CI 6–11%), and the prevalence of DSED was 8% (95% CI 5–11%). RAD and DSED are two distinct latent factors not accounted for by other common psychiatric disorders in adolescence. RAD and DSED are not uncommon among adolescents in residential youth care and therefore warrant easy access to qualified health care and prevention in high-risk groups.

**Keywords** Adolescence · Reactive attachment disorder · Disinhibited social engagement disorder · Mental health · Residential youth care · Validity

## Introduction

Reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) are socially disabling disorders caused by insufficient care, such as social neglect, deprivation or limited opportunity to form stable and selective attachments to caregivers [1]. Although research on these disorders has increased considerably in

recent years [2, 3], RAD and DSED remain among the least studied and most poorly understood psychiatric disorders in the Diagnostic and Statistical Manual of Mental Disorders (DSM) [4]. Further, most existing research examines young children, and the question of whether RAD and DSED diagnoses should be reserved for the youngest or whether they also apply to older children and adolescents has been raised [1, 2, 5]. Although there is growing evidence that RAD and DSED symptoms may persist into adolescence and early adulthood [5–9], controversy remains regarding their diagnostic classification. Whereas some denominate RAD and DSED as valid diagnostic constructs in adolescence, others question whether symptoms of RAD and DSED may then be better conceptualized as more common psychiatric disorders [2, 10]. Hitherto, RAD and DSED have been evidenced as distinct from other psychopathology until middle childhood [11–16], but their discriminant validity in adolescence remains unstudied. Clarifying uncertainties regarding the possible existence and appearance of RAD and DSED in adolescence has been deemed a priority [3] and

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is addressed herein by assessing their construct validity, including discriminant validity.

Further, the controversy of RAD and DSED beyond early childhood relates to differences in study populations and measurement [2]. Longitudinal studies of RAD and DSED primarily examine children exposed to early severe institutional deprivation [6, 7, 17–22], a group having contributed considerably to the DSM criteria of RAD and DSED, but for whom the generalizability to less deprived populations is questioned [6, 23]. No gold standard for assessment in older children exists. Although RAD and DSED are reported in cross-sectional studies of older children without early institutionalization, measurement issues have induced uncertainty as to whether the described RAD and DSED in these children differ exceedingly from the presentation in early institutionalized children, or whether the former also qualify for the disorders as defined by DSM-5 [2, 3]. To clarify this, we investigate whether RAD and DSED can be identified in a high-risk group of adolescents, mainly unexposed to early institutionalization but with likely exposure to early in-family social neglect and pathogenic care, using an in-depth psychiatric interview developed and validated for younger children in accordance with DSM [15, 24].

In DSM-5, RAD is characterized by minimally seeking and responding to comfort, concurrent with limited positive affect, minimal social/emotional responsiveness to others and/or unexplained irritability/sadness/fearfulness when interacting with caregivers [1]. Whereas disordered attachment behaviour is core to RAD, DSED may occur regardless of attachment status [25] and is characterized by socially disinhibited behaviour in unfamiliar settings or in interactions with strangers [1]. RAD and DSED are defined as two separate disorders in DSM-5, whereas their corresponding diagnostic constructs in DSM-IV were categorized as two subtypes (inhibited and disinhibited) of one disorder (reactive attachment disorder) [26]. The separation into two disorders derived from research indicating that although RAD and DSED share an aetiology, they differ in phenomenology, course, correlates and treatment response [3, 25]. This distinction between RAD and DSED is well founded in young children [3, 25, 27] and is evident in school-aged children [11, 28]. Although less studied in adolescence, confirmatory factor analysis (CFA) has revealed a clear distinction between RAD and DSED in foster care adolescents [8]. Therefore, we hypothesize that symptoms of RAD and DSED in adolescents living in residential youth care (RYC) will form two definite clusters, assessed both with a dimensional factor analytic approach and a categorical/typological latent profile approach. If so, the discriminant validity of RAD and DSED vis-à-vis other psychiatric disorders will be studied.

In summary, by approaching all adolescents living in Norwegian RYC and using in-depth semi-structured psychiatric

interviews, we (1) estimate the prevalence of symptoms and the diagnosis of RAD and DSED in a high-risk group of adolescents mainly unexposed to early institutionalization; (2) hypothesize that RAD and DSED symptoms in adolescence cluster corresponding to the DSM-5 definitions using both CFA and latent profile analysis (LPA); and (3) hypothesize that RAD and DSED symptoms in adolescence tap into diagnostic phenomena that are distinct from other psychiatric disorders.

## Methods

### Participants

All residents aged 12–23 years living in Norwegian RYC between 2011 and 2014 were invited to participate in the research project Mental Health in Adolescents living in Residential Youth Care [29]. A flowchart of the recruitment process is depicted in Figure S1 (Supplementary material). In short, 400 of 601 eligible adolescents consented to participate. Participants with a completed primary contact interview ( $N=381$ ) yielding information about RAD and DSED had the following characteristics: 57.7% girls ( $n=220$ ); age 12.2–20.2 years ( $M=16.7$ ,  $SD=1.4$ ); age at first out-of-home placement:  $M=12.5$  years ( $SD=3.9$ ), median 14.0 years (details in Table S1); mean number of out-of-home placements: 3.3 ( $SD=2.4$ ); and 78% ethnic Norwegian.

### Setting

The Norwegian child protection services (CPS) provide support to approximately 2.5% ( $n=37,124$  ultimo 2014, which was the final year of data collection in the present study) of individuals aged 0–22 years in Norway, primarily aiming to aid children within their families [30]. Placement in out-of-home care (0.99%,  $n=14,495$  in 2014) is only relevant when in-family support fails to fulfil a child's basic needs [30]. In that case, foster care is both preferred and most common; only a small minority (0.09%,  $n=1255$  in 2014) of the population aged 0–22 years are in RYC [30], representing the last resort in Norwegian CPS [31]. In accordance with the CPS criteria [32], looked-after minors have likely been exposed to social neglect, inadequate care or maltreatment prior to out-of-home placement. A previous study, also part of the current mental health project on adolescents in Norwegian RYC, revealed that 78.1% of girls and 60.4% of boys self-reported exposure to maltreatment, and the authors concluded that virtually all had likely experienced some form of neglect [33]. Moreover, adolescents in the current mental health project have reported high levels of parental chronic illness,

mental illness or drug use [29], indicating increased risk of pathogenic care prior to out-of-home placement [10]. Furthermore, serious neglect was reported for 86% of school-aged foster children in Norway [34], a group regarded as exposed to less risk than adolescents in RYC. Therefore, participants were considered to likely fulfil the RAD/DSED criteria of exposure to insufficient care.

RYC institutions in Norway are typically small units resembling family homes and are strictly regulated by law, with explicit requirements regarding quality and internal control [35]. RYC institutions are obliged to ensure ethically and professionally sound methods based on currently accepted knowledge. There are defined material requirements regarding maintenance, hygiene, adequate play areas and other social and creative activities. Staff requirements specify that the personnel must have adequate levels of professional competency and that the worktime arrangement must ensure continuity and stability for the adolescents living in RYC. There are specific competency requirements for the leaders of RYCs and for the professional training and guidance of all staff. Every child has a designated primary contact among the staff who on a daily basis has individual responsibility for that particular child and who aims to fulfil the various roles of a primary caregiver. Because of the small size of Norwegian RYC institutions, which typically house three to five residents, and the focus on the continuity and stability of personnel, the setting generally allows the primary contacts to know the residents well and vice versa. As a rule, each resident gets to keep their designated primary contact throughout their stay, and 90% of the participants reported having lived in RYC for a minimum of 3 months prior to the data collection [36]. As a whole, primary contacts were therefore considered to have known the residents long enough to enable the establishment of a trusting relationship and to have acquired sufficient knowledge of the residents to be reliable informants.

## Procedure

Data were collected at the RYC institutions by four trained research assistants with relevant higher education and extensive work experience with children and families. Semi-structured psychiatric interviews were completed with the adolescents and their primary contacts. Data were collected from June 2011 until July 2014. The Norwegian Regional Committee for Medical and Health Research Ethics, Central Norway approved the study. Written, informed consent was acquired for all participants.

## Instruments

### Interview with the adolescents

The Child and Adolescent Psychiatric Assessment (CAPA) [37] is a semi-structured psychiatric interview for children and adolescents designed to determine a wide range of DSM-IV-defined psychiatric disorders. The CAPA includes both required and optional follow-up questions and information concerning the impairment, intensity, onset, duration and frequency of symptoms. Interviewers must ensure that interviewees understand the questions and probe until clarifying whether symptoms are present or not, according to predefined criteria. In this study, symptoms of the following diagnostic categories were assessed using CAPA: major depressive disorder (MDD); dysthymia; generalized anxiety disorder (GAD); panic attacks; other anxiety disorders; conduct disorder (CD); oppositional defiant disorder (ODD); and posttraumatic stress disorder (PTSD). Details are in Table S2.

### Interview with the adolescents' primary contacts

Previous research indicates that adolescents are less reliable informants regarding symptoms of attention deficit hyperactive disorder (ADHD) and autism spectrum disorder (ASD) than adults who know them well [38–40]. Likewise, as self-acknowledging signs of RAD and DSED would require substantial mentalisation and individuals with these disorders likely have lacked the supportive caregiving relationships necessary to promote this ability [41], the adolescents were expected to be sub-optimal informants of RAD and DSED symptoms. Therefore, symptoms of ADHD, ASD, RAD and DSED were assessed using the adolescents' primary contacts as informers. The caregiver version of CAPA was used to assess ADHD, whereas RAD and DSED were assessed using the RAD module in the Preschool Age Psychiatric Assessment (PAPA) [24]. As ASD symptoms are not included in CAPA, ASD was evaluated using the Asperger Syndrome Diagnostic Interview (ASDI) [42]. Details are in Table S2.

Regular and random checks of the interviews were conducted to ensure adherence to the interview protocol and to prevent interviewer drift. A randomly drawn proportion ( $n = 42$ ; 10.5%) of interview audio recordings were re-coded by blinded raters to provide inter-rater reliability estimates. In previous findings, inter-rater reliability for DSM-IV diagnoses estimated by Gwet's  $AC_1$  and rater pair agreement rate (%) ranged from  $AC_1 = 0.74$  to  $AC_1 = 1.0$  (83–100%) [29].

## Assessment of RAD and DSED

The PAPA is a caregiver report preschool version of CAPA, including a module with questions targeted at assessing DSM-IV inhibited and disinhibited RAD, corresponding to RAD and DSED as defined in DSM-5. Table 1 shows the 15 available items, the corresponding DSM-5 criteria for RAD and DSED and the frequency of symptoms that satisfied predefined severity levels for diagnostic contribution, requiring high rates of symptom load and functional impairment (specifications in Table 1, notes). In the computation of prevalence rates, adolescents who fulfilled the RAD A1 criteria (minimally seeks comfort) and a minimum of one item for two or more B criteria (minimal social and emotional responsiveness; limited positive affect; unexplained irritability/sadness/fearfulness during non-threatening interactions) were classified as having RAD. We lacked a measure of the RAD A2 criteria ‘rarely or minimally responds to comfort when distressed’ [1] and were therefore unable to include this in the diagnostics. In accordance with DSM-5, individuals with co-occurring RAD and ASD ( $n = 5$ ) were considered not to have RAD when calculating disorder prevalence

rates. Adolescents who fulfilled at least two of the DSED criteria were classified as having DSED.

## Statistical analysis

Because PAPA has been constructed and validated for use in young children and studies differentiating RAD and DSED in adolescence are scarce, we used two complimentary approaches to evaluate whether the PAPA measure defines and distinguishes RAD and DSED in adolescence. First, conceptualizing RAD/DSED as latent dimensional factors, one- versus two-factor CFA solutions were compared, applying commonly used fit indices. A two-step procedure for chi-square difference testing using the diff-test option was performed, as advised when using a means- and variance-adjusted weighted least squares (WLSMV) estimator [43]. Second, conceptualizing RAD/DSED as categorical constructs, LPA was used to compare 1–4 classes according to their entropy, prevalence, and the Vuong-Lo-Mendell-Rubin (VLMR) likelihood ratio test of  $k$  versus  $k - 1$  classes [44].

To determine discriminant validity, one-factor solution CFAs containing symptoms of RAD/DSED and a differential disorder (in separate models) (i.e. MDD, dysthymia,

**Table 1** Symptom frequencies and categorization according to DSM-5 criteria for reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED)

RAD criteria	RAD items	<i>n</i>	%
A1 Minimally seeks comfort	Does not seek comfort when distressed <sup>a</sup>	62/377	16.4
B1 Minimal social and emotional responsiveness	Inhibited social interactions	69/381	18.1
	Lacks interest in people <sup>b</sup>	26/376	6.9
	Avoids eye contact	39/380	10.3
	Avoids physical contact <sup>c</sup>	81/380	21.3
	Lacks emotional sensitivity	80/375	21.3
B2 Limited positive affect	Difficulty being affectionate	100/377	26.5
	Constricted facial expression	71/375	18.9
B3 Unexplained irritability/sadness/fearfulness	Highly ambivalent and contradictory responses <sup>d</sup>	128/370	34.6
	Negative reunion responses <sup>e</sup>	9/376	2.4
	Hypervigilance <sup>f</sup>	31/361	8.6
DSED criteria	DSED items	<i>n</i>	%
A1 Reduced reticence with unfamiliar adults	Indiscriminate adult relationships <sup>g</sup>	28/380	7.4
A2 Overly familiar verbal or physical behaviour	Indiscriminate peer relationships <sup>g</sup>	39/374	10.4
A3 Diminished checking back with caregiver	Minimal checking with caregiver in unfamiliar settings <sup>g</sup>	13/368	3.5
A4 Willingness to go off with unfamiliar adult	Indiscriminate willingness to leave with unfamiliar adult <sup>g</sup>	41/371	11.1

<sup>a</sup>Regularly, in most activities

<sup>b</sup>Adult family members and peers

<sup>c</sup>Often or always

<sup>d</sup>Affecting  $\geq 2$  activities and interfering with relationships

<sup>e</sup>Positive interaction cannot be restored within one hour

<sup>f</sup>Interfering with  $\geq 2$  activities

<sup>g</sup>To a problematic degree



GAD, panic attacks, other anxiety disorders, ADHD inattentive type, ADHD hyperactive/impulsive type, CD, ODD, PTSD and ASD) were compared to two-factor solutions (as above, using model fit indices and chi-square difference testing), where symptoms loaded separately on RAD/DSED and each differential disorder. Due to low prevalence rates in the sample [29], the following psychiatric disorders were not analysed: bipolar disorder, obsessive compulsive disorder, bulimia, anorexia nervosa and Tourette syndrome. Although the diagnosis of PTSD was also rare [29], symptoms of PTSD were sufficiently frequent (range  $n=6-64$ ) for factor analysis [45], and were therefore included.

The LPA and all CFAs were conducted in Mplus, version 8 [43]; symptoms were treated as categorical variables using a WLSMV estimator. All other analyses were conducted in SPSS version 25.0 [46].

## Results

### Prevalence

As shown in Table 1, the frequency of individual RAD symptoms ranged from 2.4 to 34.6%; negative reunion responses were infrequent, whereas difficulties being affectionate and highly ambivalent and contradictory responses were prevalent. The frequency of DSED symptoms ranged from 3.5 to 11.1%; minimal checking with caregivers in unfamiliar settings was relatively rare, whereas indiscriminate willingness to leave with an unfamiliar adult and indiscriminate behaviour with peers were more frequent. In all, 16.3% (95% CI 12.6–20.0%;  $n=62$ ) fulfilled the criteria for either RAD or DSED, with 8.7% having RAD (95% CI 6.0–11.0%;  $n=33$ ), 8.1% having DSED (95% CI 5.4–10.9%;  $n=31$ ) and 0.5% ( $n=2$ ) having both disorders. There were no gender differences for RAD (57.6% girls; age adjusted OR = 1.06, 95% CI 0.51–2.21,  $p=0.88$ ), but girls were over-represented among adolescents with DSED (80.6% girls; age adjusted OR = 3.90, 95% CI 1.52–10.01,  $p=0.005$ ). No differences were found between adolescents with and without RAD or DSED for the remaining characteristics (age, age at first placement, number of out-of-home placements and ethnicity).

### RAD versus DSED

In the CFA, a two-factor solution, with RAD and DSED as separate latent variables as in DSM-5, fit the data better than a one-factor solution, corresponding to the DSM-IV diagnostic construct of a single RAD disorder (Table 2). The comparative fit index and the Tucker–Lewis index showed suboptimal values in the two-factor model of RAD and DSED. However, the root mean square error of

approximation was satisfactory, having a narrow confidence interval with an upper limit of  $<0.06$ , signalling that the hypothesized two-factor model of RAD and DSED fit the data well enough [47]. Further, the correlation between the two factors was modest (Figure S2; Est. = 0.23,  $p=0.010$ ). Although a k2 LPA fit the data better than a one-class solution, VLMN-2LL = 311.42,  $p<0.001$ , a k3 solution proved better than a k2 solution, VLMN -2LL = 100.64,  $p<0.001$ , whereas a k4 solution, VLMN -2LL = 49.39,  $p=0.24$ , did not improve fit. Entropy for the k3 was 0.79, with estimated prevalence rates of 32.0% ('RAD'), 12.5% ('DSED') and 55.5% ('Neither'). Therefore, the three-class solution was preferred. The RAD and DSED classes were characterized by symptoms of RAD and DSED, respectively (Table 3), except for the RAD symptoms 'lacks emotional sensitivity' and 'highly ambivalent and contradictory responses', also being found in the DSED class. In addition, 'negative reunion responses' and 'hypervigilance' were found equally frequently in the RAD and DSED classes.

### Discriminant validity

Because a distinction between RAD and DSED was supported by the above, subsequent analyses were conducted separately for the two disorders. For all differential disorders, the examined two-factor solutions distinguishing between symptoms of RAD or DSED and the disorder in question evidenced better fit than one-factor combined RAD or DSED and differential psychiatric disorder solutions (Table 2). Even though a two-factor solution of RAD and ASD proved to have better fit than a one-factor solution, it should be observed that the two latent constructs correlated highly (Table 4). In contrast, the correlations between RAD and other disorders were modest (Table 4). Between DSED and other disorders, the correlations were modest for MDD, GAD, panic attack, PTSD, other anxieties, CD and ASD and were moderate for dysthymia, ADHD (both types) and ODD (Table 4).

## Discussion

To help clarify existing controversy concerning RAD and DSED as diagnostic constructs in adolescence, we studied their construct validity, including structural and discriminant validity, in a high-risk group of adolescents living in Norwegian RYC. An interviewer-based measure developed and validated for young children revealed frequencies of RAD symptoms ranging from 2 to 35% and of DSED symptoms ranging from 4 to 11%. The prevalence according to DSM-5 criteria was 9% RAD and 8% DSED, with 0.5% having both disorders. Furthermore, dimensional (CFA) and categorical/typological (LPA) approaches converged in discriminating

**Table 2** Confirmatory factor analysis: symptoms of reactive attachment disorder (RAD), disinhibited social engagement disorder (DSED) and differential psychiatric disorders. Model fit indices for one-factor models (1) and two-factor models (2.)

Disorders	Model	Chi-square				RMSEA	90% CI	CFI	TLI	Diff. test			
		$\chi^2$	df	p	$\chi^2/df$					$\chi^2$	df	p	
RAD vs. DSED	1	227.60	90	<0.01	2.5	0.06	0.05–0.07	0.76	0.71	50.4	1	<0.001	
	2	151.17	89	<0.01	1.7	0.04	0.03–0.05	0.89	0.87				
MDD	RAD	1	574.83	170	<0.01	3.4	0.08	0.07–0.09	0.68	0.65	88.72	1	<0.001
	2	245.22	169	<0.01	1.5	0.03	0.02–0.04	0.94	0.93				
DSED	1	175.33	65	<0.01	2.7	0.07	0.06–0.08	0.90	0.88	40.84	1	<0.001	
	2	91.44	64	0.01	1.4	0.03	0.02–0.05	0.98	0.97				
Dysthymia	RAD	1	478.79	135	<0.01	3.6	0.08	0.07–0.09	0.63	0.58	81.41	1	<0.001
	2	173.96	134	0.01	1.3	0.03	0.01–0.04	0.96	0.95				
DSED	1	107.08	44	<0.01	2.4	0.06	0.05–0.08	0.91	0.89	31.31	1	<0.001	
	2	39.84	43	0.61	0.9	0.00	0.00–0.03	1	1.01				
GAD	RAD	1	504.60	152	<0.01	3.3	0.09	0.08–0.09	0.93	0.92	82.25	1	<0.001
	2	235.98	151	<0.01	1.6	0.04	0.03–0.05	0.98	0.98				
DSED	1	151.74	54	<0.01	2.8	0.08	0.06–0.09	0.98	0.98	47.12	1	<0.001	
	2	70.63	53	0.05	1.3	0.03	0.00–0.05	1	1.00				
Panic attack	RAD	1	614.10	230	<0.01	2.7	0.07	0.07–0.08	0.98	0.98	82.84	1	<0.001
	2	255.74	229	0.11	1.1	0.02	0.00–0.03	1	1.00				
DSED	1	174.05	104	<0.01	1.7	0.05	0.03–0.06	1	1.00	49.17	1	<0.001	
	2	97.69	103	0.63	1.0	0.00	0.00–0.03	1	1.00				
PTSD	RAD	1	691.58	405	<0.01	1.7	0.05	0.04–0.05	0.96	0.96	89.11	1	<0.001
	2	444.88	404	0.08	1.1	0.02	0.00–0.03	1.0	1.0				
DSED	1	285.53	230	0.01	1.2	0.03	0.02–0.04	0.99	0.99	42.07	1	<0.001	
	2	246.41	229	0.20	1.1	0.01	0.00–0.03	1.0	1.0				
Other anxiety	RAD	1	499.48	209	<0.01	2.4	0.07	0.06–0.07	0.71	0.68	75.67	1	<0.001
	2	262.55	208	0.01	1.3	0.03	0.02–0.04	0.95	0.94				
DSED	1	176.85	90	<0.01	2.0	0.06	0.04–0.07	0.90	0.88	41.12	1	<0.001	
	2	123.92	89	0.01	1.4	0.04	0.02–0.05	0.96	0.95				
ADHD-1	RAD	1	552.98	170	<0.01	3.3	0.08	0.07–0.08	0.80	0.77	63.66	1	<0.001
	2	271.01	169	<0.01	1.6	0.04	0.03–0.05	0.95	0.94				
DSED	1	163.72	65	<0.01	2.5	0.06	0.05–0.08	0.94	0.93	36.79	1	<0.001	
	2	94.24	64	0.01	1.5	0.04	0.02–0.05	0.98	0.98				
ADHD-2	RAD	1	689.53	170	<0.01	4.1	0.09	0.08–0.10	0.77	0.75	80.70	1	<0.001
	2	400.45	169	<0.01	2.4	0.06	0.05–0.07	0.90	0.89				
DSED	1	236.38	65	<0.01	3.6	0.08	0.07–0.10	0.92	0.90	40.76	1	<0.001	
	2	174.24	64	<0.01	2.7	0.07	0.06–0.08	0.95	0.93				
CD	RAD	1	415.03	209	<0.01	2.0	0.05	0.04–0.06	0.65	0.62	78.78	1	<0.001
	2	247.96	208	0.03	1.9	0.02	0.01–0.03	0.93	0.93				
DSED	1	171.73	90	<0.01	1.9	0.05	0.04–0.06	0.69	0.64	48.56	1	<0.001	
	2	100.21	89	0.20	1.1	0.02	0.00–0.03	0.96	0.95				
ODD	RAD	1	405.35	152	<0.01	2.7	0.07	0.06–0.07	0.60	0.55	86.67	1	<0.001
	2	206.36	151	<0.01	1.4	0.03	0.02–0.04	0.91	0.90				
DSED	1	102.54	54	<0.01	1.9	0.05	0.03–0.06	0.87	0.84	24.65	1	<0.001	
	2	63.55	53	0.15	1.2	0.02	0.00–0.04	0.97	0.96				
ASD	RAD	1	253.14	119	<0.01	2.1	0.05	0.04–0.06	0.92	0.90	15.20	1	<0.001
	2	219.44	118	<0.01	1.9	0.05	0.04–0.06	0.93	0.92				
DSED	1	144.77	35	<0.01	4.1	0.09	0.08–0.11	0.79	0.73	41.43	1	<0.001	
	2	67.58	34	<0.01	2.0	0.05	0.03–0.07	0.94	0.91				

*ADHD-1* attention deficit hyperactive disorder (ADHD) attention deficit type, *ADHD-2* ADHD hyperactive and impulsive type; *ASD* autism spectrum disorder, *CD* conduct disorder, *CFI* comparative fit index, *CI* confidence interval, *Diff. test* Chi-square two-step difference testing of Model 1 versus Model 2 using the Mplus diff-test option, *GAD* generalized anxiety disorder, *MDD* major depressive disorder, *ODD* oppositional defiant disorder, *PTSD* posttraumatic stress disorder, *RMSEA* root mean square error of approximation, *TLI* Tucker–Lewis index

**Table 3** Percentage with symptoms of reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) in 3 latent classes. Latent profile analysis

Item	Criteria	Class 1	Class 2	Class 3
		(32.0%) RAD	(12.5%) DSED	(55.5%) Neither
y1	Inhibited social interactions	41.9	9.0	6.4
y2	Lacks interest in people	18.3	0.0	2.0
y3	Does not seek comfort when distressed	34.1	0.0	10.1
y4	Lacks emotional sensitivity	42.6	29.6	7.3
y5	Difficulty being affectionate	68.9	5.6	7.1
y6	Avoids physical contact	51.9	19.3	4.2
y7	Constricted facial expression	48.5	10.8	4.0
y8	Avoids eye contact	28.3	0.0	2.1
y9	Highly ambivalent and contradictory responses	55.2	44.5	20.3
y10	Negative reunion responses	5.1	4.4	0.4
y11	Hypervigilance	14.3	14.5	4.1
y12	Indiscriminate adult relationships	6.2	32.8	2.3
y13	Indiscriminate peer relationships	4.8	60.9	2.8
y14	Indiscriminate willingness to leave with unfamiliar adult	10.3	61.4	0.3
y15	Minimal checking with caregiver in unfamiliar settings	5.2	14.6	0.0

**Table 4** Covariance of symptoms of reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) with symptoms of other psychiatric disorders in adolescence

Disorder	RAD			DSED		
	Estimate	S.E	<i>p</i>	Estimate	S.E	<i>p</i>
MDD	0.24	0.08	0.003	0.36	0.09	<0.001
Dysthymia	0.22	0.09	0.012	0.42	0.10	<0.001
GAD	0.32	0.07	<0.001	0.24	0.10	0.015
Panic attack	0.21	0.09	0.019	0.22	0.13	0.094
PTSD	0.23	0.09	0.012	0.30	0.10	0.004
Other anxiety	0.23	0.08	0.003	0.20	0.10	0.040
CD	-0.12	0.09	0.19	0.11	0.12	0.38
ODD	0.11	0.10	0.27	0.45	0.11	<0.001
ADHD-1	0.38	0.07	<0.001	0.45	0.08	<0.001
ADHD-2	0.27	0.06	<0.001	0.44	0.08	<0.001
ASD	0.84	0.04	<0.001	0.28	0.10	0.004

*S.E.* standard error, *p* two-tailed *p* value, *ADHD-1* attention deficit hyperactive disorder (ADHD) attention deficit type, *ADHD-2* ADHD hyperactive and impulsive type, *ASD* autism spectrum disorder, *CD* conduct disorder, *GAD* general anxiety disorder, *MDD* major depressive disorder, *ODD* oppositional defiant disorder, *PTSD* posttraumatic stress disorder

between RAD and DSED. Finally, both RAD and DSED were distinguishable from MDD, dysthymia, various anxiety disorders, PTSD, ADHD, CD, ODD and ASD. Taken together, the results suggest that in adolescence, RAD and DSED are distinct and valid diagnostic constructs not accounted for by more common psychopathology.

## Prevalence

Although all measured symptoms of RAD and DSED were present, negative reunion responses and to some extent minimal checking were rather infrequent, perhaps indicating that

these behaviours are not age-typical symptoms of RAD and DSED, respectively, in adolescence. Some RAD symptoms were more prevalent than any DSED symptom. This might be due to the inclusion of almost three times as many RAD as DSED symptoms, thus increasing the probability that some RAD symptoms would be prevalent. Such a view is consonant with the fact that many participants reported RAD symptoms without qualifying for a RAD disorder, whereas the frequencies of the most prevalent DSED symptoms were more consonant with the prevalence of DSED disorder. Accordingly, the PAPA RAD items may look less specific than the DSED items in adolescence. However, the factor

analyses indicated that the RAD items were quite specific for RAD.

The prevalence of RAD and DSED vary greatly depending on risk exposure, thereby limiting generalizability. Nonetheless, our findings (16% RAD/DSED) are concordant with the prevalence (19% inhibited/disinhibited RAD, DSM-IV) among school-aged foster children in Norway [34], a group with lower risk of exposure than adolescents living in Norwegian RYC. Compared to the current RYC sample, the foster children had significantly lower mean age at first out-of-home placement (3.74 years ( $SD=2.98$ ) versus 12.5 years ( $SD=3.9$ )), lower mean number of placements (0.90 ( $SD=0.85$ ) versus 3.3 ( $SD=2.4$ )) and lower point prevalence of psychiatric disorders (50.9% versus 76.2%) [34]. In a systematic review that included 92 studies, higher age at first out-of-home placement and a higher number of placements were identified as key factors associated with a range of negative health-related outcomes [48]. The Norwegian CPS has a family-preserving focus, typically providing in-home interventions for three years prior to the first out-of-home placement of a child [49]. In result, children may experience prolonged exposure to pathogenic care if living with parents who despite interventions by CPS prove unable to provide their child with the necessary nurture and developmental support [50]. These considerations taken together, adolescents in Norwegian RYC may therefore be considered at increased risk of early adversity compared to foster children in Norway, and the comparability of prevalence rates for these two groups indicates the unlikelihood of RAD/DSED being over-diagnosed in this study. The preponderance of girls with DSED was surprising, as it is undescribed in previous research in adolescence [6, 8, 9]. Possible explanations include rater bias, such as primary contacts being more concerned by indiscriminate behaviour in girls than boys, or sample bias, such as gender differences in types and frequencies of adverse experiences [33].

### **RAD versus DSED**

Finding a two-factor structure and two corresponding clusters of RAD and DSED in adolescence is consistent with the understanding of RAD/DSED in younger children (reviewed in [2]; [25]) and is concordant with the revision into two distinct disorders in DSM-5. Even so, the RAD symptoms of ambivalence and lack of emotional sensitivity were also seen in the DSED profile, and hypervigilance and negative reunion responses were equally frequent in both profiles. This is consonant with the high correlation found between symptoms of DSED and the RAD B criteria in foster-placed adolescents [8] and may reflect that such potential effects of relational trauma and inadequate developmental support are not specific to RAD but may also co-exist with DSED behaviour in adolescence. Replications are needed (also in

young children) before considering possible implications of the RAD/DSED criteria.

### **Discriminant validity**

In line with the understanding of RAD and DSED in younger children [11–15] is the finding that symptoms of RAD/DSED are distinct from symptoms of other psychiatric disorders in adolescence. Due to overlapping social difficulties, a significant clinical challenge is differentiating RAD from ASD. Finding a high covariance between RAD and ASD is reflective of this. Nonetheless, the model differential test indicated that RAD and ASD are best conceptualized as different disorders, supporting previous findings that RAD and ASD are indeed differentiable [12, 51].

### **Strengths and limitations**

The use of in-depth psychiatric interviews for diagnostic assessment and examining a nation-wide very high-risk population are clear strengths. Given the lack of validated assessment tools for RAD and DSED in adolescents, we used a DSM-IV-based diagnostic caregiver interview developed and validated for young children. Although this could be questioned, it is arguably a methodological strength because one of the key questions is whether RAD and DSED, as seen in young children and defined by DSM, also exist in adolescents. After the completion of data collection in the current study, an instrument – the RAD and DSED assessment interview (RADA) [8] was developed by a different research group specifically to assess DSM-5-defined RAD and DSED in adolescents. Critically, there is substantial overlap between RADA and the measurement of RAD/DSED as per PAPA, lending support to the age relevance of the items used in the current study. Therefore, we expect that a potential adjustment of PAPA to DSM-5 and adolescent age would alter or add very few items and not critically affect the factor structure we revealed. However, to assess possible heterotypic continuity would require longitudinal studies, and to assess whether the diagnostic phenomena we describe differ importantly from early institutionalized samples would require comparative studies.

Further, possibly important limitations are the lack of observational data and multiple methods of assessment (triangulation), contrary to expert recommendations for the clinical assessment of RAD and DSED [2, 52]. Although common in research on RAD and DSED, also in adolescent samples [6–8], the sole use of caregiver report could generate rater bias. In a school-aged sample, a study of the convergence between another semi-structured interview (disturbance of attachment interview, DAI) with primary caretakers and the clinical diagnosis of RAD and DSED using DSM-5 criteria (based on clinical observation and

the child's attachment history) found 33% of the children to be categorized with RAD or DSED based on the DAI, whereas only 18% received a clinical RAD or DSED diagnosis. The DAI was found to be consistent with a clinical diagnosis of RAD or DSED in 75% of the cases and was categorized as having only fairly strong predictive validity for RAD and DSED [53]. Notably, the DAI diagnoses only required three positive RAD items or two positive DSED items, respectively, where items were positively scored if either somewhat/sometimes or considerably/frequently present. In the clinical diagnostics, however, the DSM-5 criteria were applied, setting stricter requirements for the fulfilment of RAD and DSED. The authors conclude that diagnosing RAD and DSED based solely on a semi-structured interview (DAI) with primary caretakers may lead to overdiagnosis. Therefore, as we lacked direct observational measures of attachment behaviours, we took action to reduce the risk of overdiagnosis in this study. First, we predefined requirements with high levels of symptom load and functional impairment for positive scores (e.g. symptoms must affect at least two activities, interfere with relationships or be present to a problematic degree). Second, we organized the RAD and DSED items according to the DSM-5 A and B criteria for RAD and the A1–A4 criteria for DSED, assuring that the diagnostic algorithms were met. Although we cannot exclude the possibility of rater bias, the diagnostic procedure used herein is clearly stricter than the DAI-based diagnostic mentioned above. Therefore, we expect the risk of false positive RAD and DSED diagnoses to be more limited. Further, numerous studies, albeit in younger children, have shown considerable convergence between observational data and caregiver reports for symptoms of RAD/DSED (reviewed in [3]), also using PAPA [15], thus lending support to the validity of our findings.

Another possible limitation regarding the assessment of RAD (but not DSED) in adolescents living in RYC is that absent or aberrant attachment behaviour toward their primary contact in RYC may not be representative of attachment behaviours toward previous caregivers. Further, as we only have general knowledge of the Norwegian laws, regulations and practices for out-of-home placements, we can substantiate but not be fully certain that all participants identified as having RAD or DSED satisfy the diagnostic criteria of exposure to extremes of insufficient care and symptom debut before age 5 (RAD only). Additionally, the DSM-5 RAD criteria require both minimal seeking and responding to comfort, whereas we lacked information on the latter, potentially inflating the reported prevalence of RAD. Nonetheless, we consider overdiagnosis of RAD/DSED to be unlikely, given the general high-risk nature of the sample and prevalence comparability to school-aged foster children in Norway.

The use of different informants (primary contact and adolescents) for different types of psychopathology may be regarded as a strength, as it allows avoiding common-rater bias in many of our findings. On the other hand, the use of different informants may be problematic in assessing discriminant validity, as differences may at least partially be due to informant discrepancies. However, symptoms of ADHD and ASD, which like RAD and DSED were caregiver-informed, were also found to be distinct from those of RAD and DSED. As differentiation of DSED from ADHD [1] and RAD from ASD [1, 12] is considered to be particularly challenging, this lends support to our overall findings of discriminant validity. Although our results demonstrate that RAD and DSED are distinct from many psychiatric disorders, this conclusion is limited to the disorders studied.

### Clinical implications

Undoubtedly, identifying RAD and DSED while overlooking other common disorders may be detrimental due to missed treatment of other treatable disorders [54]. Yet, overlooking RAD or DSED may be equally damaging, as an incomplete or incorrect case formulation may reduce the likelihood of adequate developmental support for a child. In cases with RAD or DSED, caregivers may need specialized interventions, aiming to enhance their sensitivity, emotional availability and commitment to the child [2, 3]. Such interventions are not necessarily offered when treating adolescents who have other psychiatric disorders without RAD or DSED (e.g. depression, anxiety, PTSD, ADHD, ASD). Inadequate caregiver support may not only lead to continued suffering but also the increased risk of placement breakdown [55], further adding to the individual burdens and societal costs of RAD and DSED. By contrast, correctly identifying and acknowledging RAD and DSED in adolescence may enhance the likelihood of meeting the child's developmental needs. Based on our results indicating the existence and validity of these disorders in adolescence, we advocate that clinicians assess and acknowledge RAD and DSED beyond early childhood. Moreover, the relatively high prevalence rates of RAD and DSED among adolescents in RYC warrant that all RYC personnel receive appropriate training and education (ensuring knowledge of treatment recommendations [2]) to enable them to understand the underlying reasons for the residents' behaviours and to provide developmentally supportive relational experiences. As for other primary caretakers, the RYC personnel may need specialized guidance to help them enhance and maintain their sensitivity and emotional availability when interacting with the residents over time, as RAD and DSED behaviour may be relationally challenging and can easily provoke negative responses from the caretakers, further aggravating rather than ameliorating the underlying struggles of the child.

The high covariance between RAD and ASD and the risk of misinterpreting, for example, RAD as depression or anxiety (or vice versa) or DSED as ADHD (or vice versa) warrants clinical thoroughness and comprehensive psychiatric assessment of individuals exposed to childhood adversity, as advised in the practice parameter for RAD and DSED [2]. Further, high-risk groups, such as individuals living in RYC, should have easy access to high-quality psychiatric assessment and care.

Because RAD and DSED are in principle preventable, as their common aetiology involves exposure to extremes of insufficient care, measures ensuring adequate care and support for all young children and their families could have long-lasting benefits for the individuals, families and societies involved, empowered by further collaboration between researchers, child protection services, clinicians, public health planners and policy makers. Further research on associations between RAD/DSED and other mental health factors, as well as homotypic and heterotypic continuity into adulthood, could illuminate possible treatment targets in adolescence.

## Conclusion

In a very high-risk RYC adolescent sample, RAD and DSED emerged as two distinct latent factors not accounted for by other common psychiatric disorders. RAD and DSED are not uncommon among adolescents in RYC. To alleviate individual suffering and societal costs and because RAD and DSED are preventable and may imply treatment approaches not otherwise offered, it is pertinent that RAD and DSED in both childhood and adolescence be acknowledged by clinicians, child protection services, public health planners and policy makers.

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## Compliance with ethical standards

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

**Ethical approval** The Norwegian Regional Committee for Medical and Health Research Ethics (REK) approved the study (reference number: 2015/1474/REK Middle Norway).

**Informed consent** Written informed consent was acquired for all participants, and the study was conducted in accordance with current ethical standards.

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## References

1. American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders : DSM-5, 5th edn. American Psychiatric Association, Washington
2. Zeanah CH, Chesher T, Boris NW (2016) Practice parameter for the assessment and treatment of children and adolescents with reactive attachment disorder and disinhibited social engagement disorder. *J Am Acad Child Adolesc Psychiatry* 55(11):990. <https://doi.org/10.1016/j.jaac.2016.08.004>
3. Zeanah CH, Gleason MM (2015) Annual research review: Attachment disorders in early childhood clinical presentation, causes, correlates, and treatment. *J Child Psychol Psychiatry* 56(3):207–222. <https://doi.org/10.1111/jcpp.12347>
4. Kay C, Green J, Sharma K (2016) Disinhibited attachment disorder in uk adopted children during middle childhood: prevalence, validity and possible developmental origin. *J Abnorm Child Psychol* 44(7):1375–1386. <https://doi.org/10.1007/s10802-016-0131-2>
5. Guyon-Harris KL, Humphreys KL, Degnan K, Fox NA, Nelson CA, Zeanah CH (2018) A prospective longitudinal study of reactive attachment disorder following early institutional care: considering variable- and person-centered approaches. *Attach Hum Dev*. <https://doi.org/10.1080/14616734.2018.1499208>
6. Sonuga-Barke EJS, Kennedy M, Kumsta R, Knights N, Golm D, Rutter M, Maughan B, Schlotz W, Kreppner J (2017) Child-to-adult neurodevelopmental and mental health trajectories after early life deprivation: the young adult follow-up of the longitudinal English and Romanian Adoptees study. *Lancet* 389(10078):1539–1548. [https://doi.org/10.1016/S0140-6736\(17\)30045-4](https://doi.org/10.1016/S0140-6736(17)30045-4)
7. Humphreys KL, Nelson CA, Fox NA, Zeanah CH (2017) Signs of reactive attachment disorder and disinhibited social engagement disorder at age 12 years: effects of institutional care history and high-quality foster care. *Dev Psychopathol* 29(2):675–684. <https://doi.org/10.1017/S0954579417000256>
8. Lehmann S, Monette S, Egger H, Breivik K, Young D, Davidson C, Minnis H (2018) Development and examination of the reactive attachment disorder and disinhibited social engagement disorder assessment interview. *Assessment*. <https://doi.org/10.1177/1073191118797422>
9. Guyon-Harris KL, Humphreys KL, Fox NA, Nelson CA, Zeanah CH (2018) Course of disinhibited social engagement disorder from early childhood to early adolescence. *J Am Acad Child Adolesc Psychiatry* 57(5):329–335.e322. <https://doi.org/10.1016/j.jaac.2018.02.009>

10. John SG, Brandt TW, Secrist ME, Mesman GR, Sigel BA, Kramer TL (2019) Empirically-guided assessment of complex trauma for children in foster care: a focus on appropriate diagnosis of attachment concerns. *Psychol Serv* 16(1):120–133. <https://doi.org/10.1037/ser0000263>
11. Lehmann S, Breivik K, Heiervang ER, Havik T, Havik OE (2016) Reactive attachment disorder and disinhibited social engagement disorder in school-aged foster children: a confirmatory approach to dimensional measures. *J Abnorm Child Psychol* 44(3):445–457. <https://doi.org/10.1007/s10802-015-0045-4>
12. Davidson C, O'hare A, Mactaggart F, Green J, Young D, Gillberg C, Minnis H (2015) Social relationship difficulties in autism and reactive attachment disorder: Improving diagnostic validity through structured assessment. *Res Dev Disabil* 40:63–72. <https://doi.org/10.1016/j.ridd.2015.01.007>
13. Minnis H, Reekie J, Young D, O'Connor T, Ronald A, Gray A, Plomin R (2007) Genetic, environmental and gender influences on attachment disorder behaviours. *Br J Psychiatry* 190:490–495. <https://doi.org/10.1192/bjp.bp.105.019745>
14. Follan M, Anderson S, Huline-Dickens S, Lidstone E, Young D, Brown G, Minnis H (2011) Discrimination between attention deficit hyperactivity disorder and reactive attachment disorder in school aged children. *Res Dev Disabil* 32(2):520–526. <https://doi.org/10.1016/j.ridd.2010.12.031>
15. Gleason MM, Fox NA, Drury S, Smyke A, Egger HL, Nelson CA, Gregas MC, Zeanah CH (2011) Validity of evidence-derived criteria for reactive attachment disorder: indiscriminately social/disinhibited and emotionally withdrawn/inhibited types. *J Am Acad Child Adolesc Psychiatry* 50(3):216–231. <https://doi.org/10.1016/j.jaac.2010.12.012>
16. Giltaj HP, Sterkenburg PS, Schuengel C (2015) Psychiatric diagnostic screening of social maladaptive behaviour in children with mild intellectual disability: Differentiating disordered attachment and pervasive developmental disorder behaviour. *J Intellect Disabil Res* 59(2):138–149. <https://doi.org/10.1111/jir.12079>
17. O'Connor TG, Bredenkamp D, Rutter M, Anderson-Wood L, Beckett C, Castle J, Dunn J, Groothues C, Enrich K, Harborne A, Hay D, Jewitt J, Keaveney L, Kreppner J, Messer J, Quinton D, White A (1999) Attachment disturbances and disorders in children exposed to early severe deprivation. *Infant Ment Health J* 20(1):10–29
18. Fox N, Nelson C, Zeanah C (2017) The effects of psychosocial deprivation on attachment: lessons from the bucharest early intervention project. *Psychodyn Psychiatry* 45(4):441–450. <https://doi.org/10.1521/pdps.2017.45.4.441>
19. Smyke AT, Dumitrescu A, Zeanah CH (2002) Attachment disturbances in young children. I: the continuum of caretaking casualty. *J Am Acad Child Adolesc Psychiatry* 41(8):972–982. <https://doi.org/10.1097/00004583-200208000-00016>
20. O'Connor TG, Rutter M (2000) Attachment disorder behavior following early severe deprivation: extension and longitudinal follow-up. English and Romanian Adoptees Study Team. *J Am Acad Child Adolesc Psychiatry* 39(6):703–712
21. Rutter M, Colvert E, Kreppner J, Beckett C, Castle J, Groothues C, Hawkins A, O'Connor TG, Stevens SE, Sonuga-Barke EJ (2007) Early adolescent outcomes for institutionally-deprived and non-deprived adoptees. I: disinhibited attachment. *J Child Psychol Psychiatry* 48(1):17–30. <https://doi.org/10.1111/j.1469-7610.2006.01688.x>
22. Rutter M, Sonuga-Barke EJ, Beckett C, Castle J, Kreppner J, Kumsta R, Schlotz W, Stevens S, Bell CA, Gunnar MR (2010) Deprivation-specific psychological patterns: effects of institutional deprivation. *Monogr Soc Res Child Dev* 75(1):1–252
23. Kreppner J, Kumsta R, Rutter M, Beckett C, Castle J, Stevens S, Sonuga-Barke EJ (2010) Developmental course of deprivation-specific psychological patterns: early manifestations, persistence to age 15, and clinical features. *Monogr Soc Res Child Dev* 75(1):79–101. <https://doi.org/10.1111/j.1540-5834.2010.00551.x>
24. Egger HL, Erkanli A, Keeler G, Potts E, Walter BK, Angold A (2006) Test-retest reliability of the preschool age psychiatric assessment (PAPA). *J Am Acad Child Adolesc Psychiatry* 45(5):538–549. <https://doi.org/10.1097/01.chi.0000205705.71194.b8>
25. Zeanah CH, Gleason MM (2010) Reactive attachment disorder: a review for dsm-v. american psychiatric association [https://www.researchgate.net/profile/Charles\\_Zeanah/publication/228683818\\_Reactive\\_Attachment\\_Disorder\\_a\\_review\\_for\\_DSM-V/links/0deec51e86576d1e8c000000/Reactive-Attachment-Disorder-a-review-for-DSM-V.pdf](https://www.researchgate.net/profile/Charles_Zeanah/publication/228683818_Reactive_Attachment_Disorder_a_review_for_DSM-V/links/0deec51e86576d1e8c000000/Reactive-Attachment-Disorder-a-review-for-DSM-V.pdf)
26. American Psychiatric Association Task Force on DSM-IV (2000) Diagnostic and statistical manual of mental disorders : DSM-IV-TR, 4th edn. American Psychiatric Association, Washington
27. Rutter M, Kreppner J, Sonuga-Barke E (2009) Emanuel miller lecture: attachment insecurity, disinhibited attachment, and attachment disorders: where do research findings leave the concepts? *J Child Psychol Psychiatry* 50(5):529–543. <https://doi.org/10.1111/j.1469-7610.2009.02042.x>
28. Vervoort E, De Schipper J, Bosmans G, Verschueren K (2013) Screening symptoms of reactive attachment disorder: evidence for measurement invariance and convergent validity. *Int J Methods Psychiatr Res* 22(3):256–265
29. Jozefiak T, Kaye NS, Rimehaug T, Wormdal AK, Brubakk AM, Wichstrøm L (2016) Prevalence and comorbidity of mental disorders among adolescents living in residential youth care. *Eur Child Adolesc Psychiatry* 25(1):33–47. <https://doi.org/10.1007/s00787-015-0700-x>
30. Barnevernsstatistikk (2018) Barne-ungdoms- og familiedirektoratet (The Norwegian Directorate for Children, Youth and Family Affairs) [https://www.bufdir.no/Statistikk\\_og\\_analyse/Barnevern/](https://www.bufdir.no/Statistikk_og_analyse/Barnevern/)
31. Backe-Hansen E, Bakketeig E, Gautun H, Grønningseter AB (2011) Institusjonsplassering - siste utvei. Betydningen av barnevernsreformen fra 2004 for institusjonstilbudet (Placement in institutions - the last opportunity. The importance of the child welfare reform in 2004 for placement policy in institutions) (Report 21/2011). NOVA-Norsk institutt for forskning om oppvekst, velferd og aldring, Oslo
32. Lov om barneverntjenester (2019) The Norwegian Ministry of Children and Families, The Child Welfare Act, LOV-1992-07-17-100, chap 4 (1992, last updated 2019). [https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL\\_4#KAPITTEL\\_4](https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL_4#KAPITTEL_4)
33. Greger HK, Myhre AK, Lydersen S, Jozefiak T (2015) Previous maltreatment and present mental health in a high-risk adolescent population. *Child Abuse Negl* 45:122–134. <https://doi.org/10.1016/j.chiabu.2015.05.003>
34. Lehmann S, Havik OE, Havik T, Heiervang ER (2013) Mental disorders in foster children: a study of prevalence, comorbidity and risk factors. *Child Adolesc Psychiatry Ment Health* 7(1):39. <https://doi.org/10.1186/1753-2000-7-39>
35. Forskrift om krav til kvalitet og internkontroll i barneverninstusjoner (2008) The Norwegian Ministry of Children and Families, Regulation on requirements of quality and internal control in child welfare institutions, FOR-2008-06-10-580. <https://lovdata.no/dokument/SF/forskrift/2008-06-10-580>
36. Kaye NS, Jozefiak T, Rimehaug T, Tjelflaa T, Brubakk A-M, Wichstrøm L (2015) Resultater fra forskningsprosjektet Psykisk helse hos barn og unge i barneverninstusjoner (Results from the research project Mental Health in Adolescent Residents in the Child Welfare System). Norwegian University of Science and Technology, NTNU, Regional Centre for Child and Youth Mental Health and Child Welfare, Trondheim. [https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport\\_RKBU.pdf/fb0b753b-bdab-4224-b607-5bfe2f1ee32e](https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport_RKBU.pdf/fb0b753b-bdab-4224-b607-5bfe2f1ee32e)

37. Angold A, Costello EJ (2000) The child and adolescent psychiatric assessment (CAPA). *J Am Acad Child Adolesc Psychiatry* 39(1):39–48. <https://doi.org/10.1097/00004583-200001000-00015>
38. Owens J, Goldfine M, Evangelista N, Hoza B, Kaiser N (2007) A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clin Child Fam Psychol Rev* 10(4):335–351. <https://doi.org/10.1007/s10567-007-0027-3>
39. Mazefsky CA, Kao J, Oswald DP (2011) Preliminary evidence suggesting caution in the use of psychiatric self-report measures with adolescents with high-functioning autism spectrum disorders. *Res Autism Spectr Disord* 5(1):164–174. <https://doi.org/10.1016/j.rasd.2010.03.006>
40. Swanson E, Owens E, Hinshaw S (2012) Is the positive illusory bias illusory? examining discrepant self-perceptions of competence in girls with ADHD. *J Abnorm Child Psychol* 40(6):987–998. <https://doi.org/10.1007/s10802-012-9615-x>
41. Fonagy P (2002) Affect regulation, mentalization, and the development of the self. Other Press, New York
42. Gillberg C, Gillberg C, Råstam M, Wentz E, Gillberg IC, Råstam M (2001) The Asperger Syndrome (and high-functioning autism) Diagnostic Interview (ASDI): a preliminary study of a new structured clinical interview. *Autism* 5(1):57–66. <https://doi.org/10.1177/1362361301005001006>
43. Muthén LK, Muthén BO (1998) Mplus user's guide, 8th edn. Muthén and Muthén, Los Angeles
44. Asparouhov T, Muthén BO (2012) Using Mplus TECH11 and TECH14 to test the number of latent classes. Mplus Web Notes: No. 14. <https://www.statmodel.com/examples/webnotes/webnote14.pdf>
45. De Vet HCW, Terwee CB, Mokkink LB, Knol DL (2011) Measurement in medicine. Practical guides to biostatistics and epidemiology. Cambridge University Press, Cambridge
46. IBM Corp (2017) IBM SPSS Statistics for Windows. 25.0. Armonk, New York
47. Byrne BM (2012) Structural equation modeling with Mplus: Basic concepts, applications, and programming. Multivariate Applications Series. Routledge, New York
48. Jones R, Everson-Hock E, Papaioannou D, Guillaume L, Goyder E, Chilcott J, Cooke J, Payne N, Duenas A, Sheppard L, Swann C (2011) Factors associated with outcomes for looked-after children and young people: a correlates review of the literature. *Child Care Health Dev* 37(5):613–622. <https://doi.org/10.1111/j.1365-2214.2011.01226.x>
49. Christiansen Ø, Anderssen N (2010) From concerned to convinced: reaching decisions about out-of-home care in Norwegian Child Welfare Services. *Child Fam Soc Work* 15(1):31–40. <https://doi.org/10.1111/j.1365-2206.2009.00635.x>
50. Lehmann S (2015) Mental disorders in foster children: a study of prevalence, comorbidity, and risk factors. Dissertation for the degree of philosophiae doctor (PhD), The University of Bergen.
51. Mayes SD, Calhoun SL, Waschbusch DA, Baweja R (2017) Autism and reactive attachment/disinhibited social engagement disorders: co-occurrence and differentiation. *Clin Child Psychol Psychiatry* 22(4):620–631. <https://doi.org/10.1177/1359104516678039>
52. O'Connor TG, Zeanah CH (2003) Attachment disorders: assessment strategies and treatment approaches. *Attach Hum Dev* 5(3):223–244. <https://doi.org/10.1080/14616730310001593974>
53. Giltaij HP, Sterkenburg PS, Schuengel C (2017) Convergence between observations and interviews in clinical diagnosis of reactive attachment disorder and disinhibited social engagement disorder. *Clin Child Psychol Psychiatry* 22(4):603–619. <https://doi.org/10.1177/1359104517709049>
54. Woolgar M, Scott S (2014) The negative consequences of over-diagnosing attachment disorders in adopted children: the importance of comprehensive formulations. *Clin Child Psychol Psychiatry* 19(3):355–366. <https://doi.org/10.1177/1359104513478545>
55. Oosterman M, Schuengel C, Wim Slot N, Bullens RAR, Doreleijers TAH (2007) Disruptions in foster care: a review and meta-analysis. *Child Youth Serv Rev* 29(1):53–76. <https://doi.org/10.1016/j.chidyouth.2006.07.003>



## Online Resource

**Article:** Validity of RAD and DSED in adolescence

**Journal:** Journal of European Child and Adolescent Psychiatry

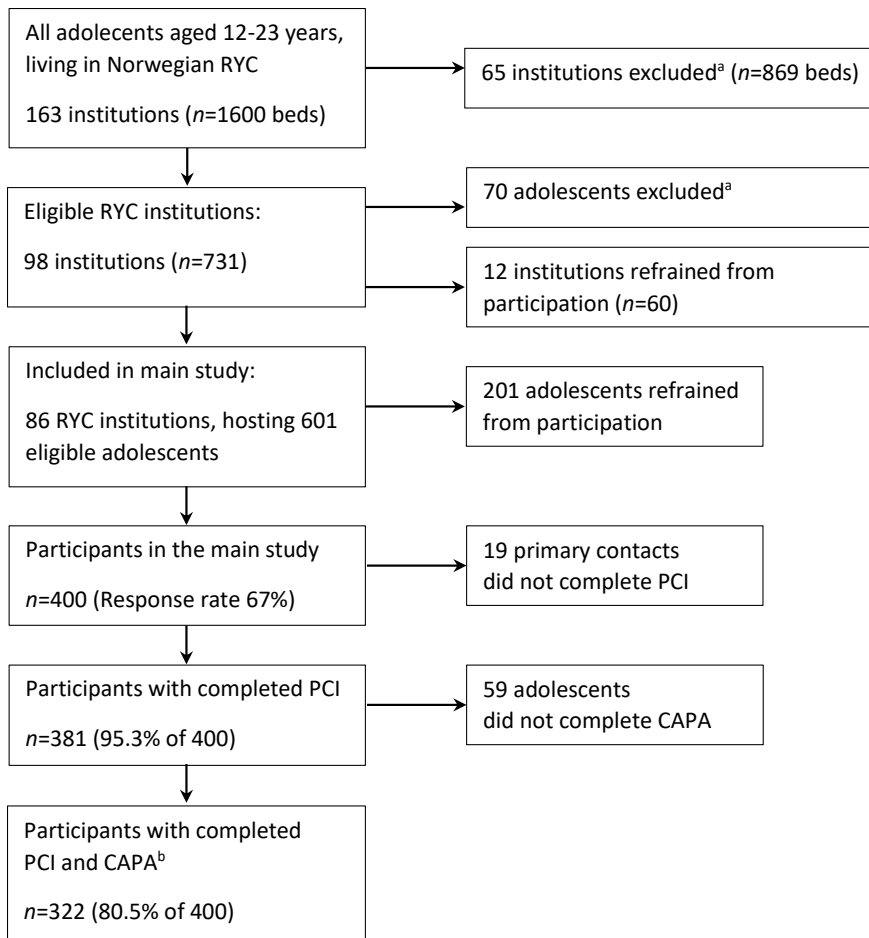


Figure S1. Participants and recruitment. *RYC* residential youth care; *PCI* primary contact interview; *CAPA* Child and Adolescent Psychiatric Assessment.

<sup>a</sup> Exclusion criteria: Adolescents in acute placement and unaccompanied minors without asylum in Norway were excluded from the study for ethical reasons, as they were considered to be in such a high state of crisis that data collection should not be prioritized. Those with insufficient Norwegian language qualifications to be interviewed were also excluded. Nonetheless, for adolescents registered as unaccompanied minors living in regular RYC who had received a residence permit from Norwegian authorities and who were sufficiently fluent in the Norwegian language, requesting permission to participate in the study was considered ethically acceptable.

<sup>b</sup> To evaluate the representativeness of the data for participants with available CAPA and PCI data ( $n=322$ ), mean scores of the Child Behavior Checklist (CBCL) syndrome subscales were compared to participants where CAPA was not completed ( $n=59$ ). None of the subscales showed statistically significant differences in mean values. Therefore, the participants with both CAPA and PCI were considered to be representative of the whole sample when comparing RAD and DSED symptoms (from PCI) to symptoms of other disorders (from CAPA).

Table S1. Distribution of age at first out-of-home placement

Age in years	<i>n</i>	Cumulative %
0	2	.5
1	7	2.3
2	9	4.7
3	5	6.0
4	3	6.8
5	7	8.6
6–11	62	24.9
12–17	281	98.7
Missing	5	100
Total	381	100

Table S2. Symptom clusters for differential psychiatric disorders included in the confirmatory factor analysis (CFA)

Disorder	CAPA-derived symptoms included in CFA
MDD	Depressed or irritable mood Anhedonia or loss of interest Weight loss/gain or appetite disturbance Insomnia or hypersomnia Psychomotor agitation/retardation Fatigue or loss of energy Feelings of worthlessness or guilt Problems with thinking or deciding Suicidal thoughts, suicidal plan or attempted suicide
Dysthymia	Prolonged depressed mood (>45 days) Weight loss or gain Insomnia or hypersomnia Loss of energy Low self-esteem Problems with thinking Hopelessness
GAD	Nervous tension Anxious foreboding Feeling keyed up or on edge Being easily fatigued Difficulty concentrating or mind going blank Irritability Muscle tension Sleep disturbance
Panic attack <sup>a</sup>	Discrete period of intense fear or discomfort Palpitations or accelerated heart rate Sweating Trembling or shaking Sensations of shortness of breath or smothering Feeling of choking Chest pain or discomfort Nausea or abdominal distress Feeling dizzy or lightheaded Depersonalization Fear of going crazy Fear of dying
PTSD	Traumatic life event Acute emotional response to traumatic life event Distressing recollections of event, externally cued Distressing recollections of event, not externally cued Nightmares Re-living traumatic event Physiological reactivity to reminders of event Efforts to avoid reminders of the event Inability to recall important aspects of the trauma Feeling of detachment or estrangement from others Restricted range of positive affect

	<ul style="list-style-type: none"> <li>Restricted range of negative affect</li> <li>Sense of a foreshortened future</li> <li>Sleep problems</li> <li>Irritability</li> <li>Outbursts of anger</li> <li>Difficulties concentrating</li> <li>Hypervigilance</li> <li>Exaggerated startle response</li> </ul>
Other anxieties	<ul style="list-style-type: none"> <li>Hypochondriasis</li> <li>Social anxiety</li> <li>Fear of activities in public</li> <li>Agoraphobia</li> <li>Animal fears</li> <li>Fear of injury</li> <li>Fear of blood/injection</li> <li>Other specific phobias</li> <li>Situational anxiety</li> <li>Free floating anxiety</li> <li>Selective mutism</li> </ul>
CD <sup>b</sup>	<ul style="list-style-type: none"> <li>Fights more than once per month</li> <li>Used weapon more than once</li> <li>Cruel to animals</li> <li>Stealing without confrontation</li> <li>Stealing with confrontation</li> <li>Deliberately started fire</li> <li>Deliberately damaged others' property</li> <li>Broken into house, building or car</li> <li>Lies at least weekly</li> <li>Has run away overnight twice or more</li> <li>Often truant from school</li> </ul>
ODD	<ul style="list-style-type: none"> <li>Loses temper</li> <li>Argues</li> <li>Defies requests or rules</li> <li>Deliberately annoys people</li> <li>Blames others for own mistakes or misbehaviour</li> <li>Touchy or easily annoyed</li> <li>Angry and resentful</li> <li>Spiteful or vindictive</li> </ul>
Disorder	PCI-derived symptoms included in CFA
ADHD-1	<ul style="list-style-type: none"> <li>Fails to give close attention to details or makes careless mistakes</li> <li>Difficulty sustaining attention in tasks or play activities</li> <li>Does not seem to listen when spoken to</li> <li>Problems in following through on instructions</li> <li>Difficulty in organizing tasks and activities</li> <li>Avoids tasks that require sustained mental effort</li> <li>Often loses things</li> <li>Easily distracted</li> <li>Forgetful in daily activities</li> </ul>
ADHD-2	<ul style="list-style-type: none"> <li>Fidgets or squirms in seat</li> <li>Leaves seat</li> </ul>

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	Runs about or climbs excessively
	Difficulty playing or engaging in leisure activities quietly
	'On the go' or 'driven by a motor'
	Talks excessively
	Blurts out answers
	Difficulty awaiting turn
	Interrupts or intrudes on others
<hr/>	
ASD	Severe impairment in reciprocal social interaction
	All-absorbing narrow interest
	Imposition of routines and interests
	Speech and language problems
	Non-verbal communication problems
	Motor clumsiness

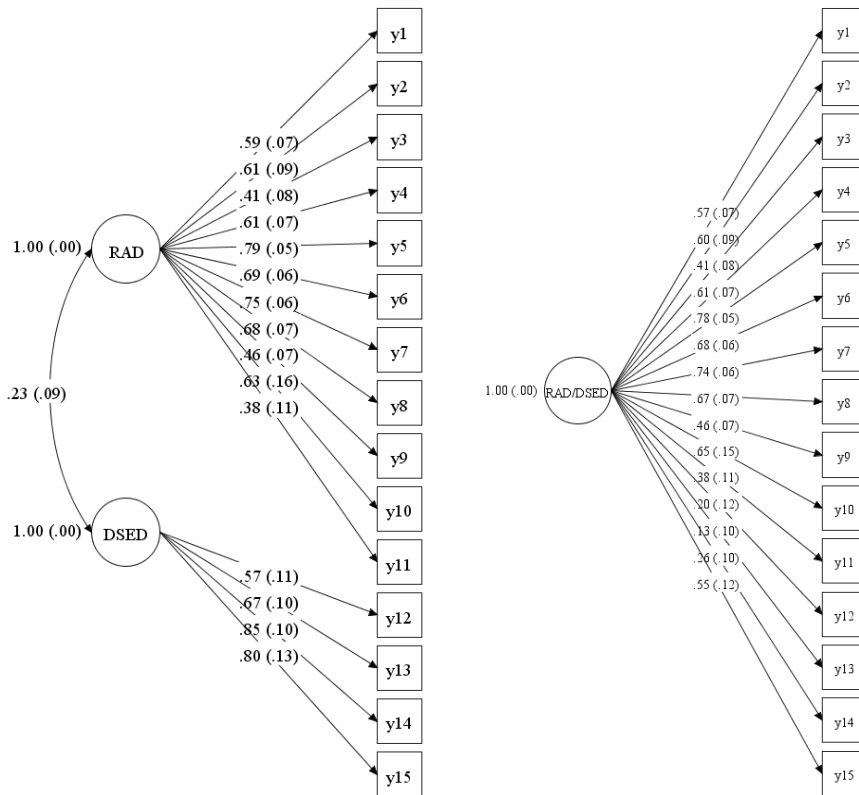
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Note: *ADHD-1* attention deficit hyperactive disorder (ADHD) attention deficit type; *ADHD-2* ADHD hyperactive and impulsive type; *ASD* autism spectrum disorder; *CAPA* Child and Adolescent Psychiatric Interview; *CD* conduct disorder; *GAD* generalized anxiety disorder; *MDD* major depressive disorder; *ODD* oppositional defiant disorder; *PCI* primary contact interview; *PTSD* posttraumatic stress disorder.

<sup>a</sup> Panic attacks: The items for 'paresthesia' ( $n=0$ ) and 'chills or hot flushes' ( $n=0$ ) were excluded in the statistical analysis due to no positive scores.

<sup>b</sup> Conduct disorder (CD): The items 'forced someone into sexual activity' ( $n=0$ ) and 'cruel to people' ( $n=2$ ) were excluded due to few cases, thus not fulfilling the requirements for CFA.

Figure S2. Confirmatory factor analysis of reactive attachment disorder (RAD) versus disinhibited social engagement disorder (DSED) in a two-factor and one-factor model, respectively. Standardized factor loadings with standard errors in parenthesis.



- y1 = Inhibition during social interactions
- y2 = Lack of interest in family members and peers
- y3 = Does not seek comfort when distressed
- y4 = Lack of emotional sensitivity
- y5 = Difficulty being affectionate
- y6 = Avoids physical contact
- y7 = Constricted range of facial expression
- y8 = Avoids eye contact
- y9 = Highly ambivalent and contradictory responses
- y10 = Negative reunion responses
- y11 = Hypervigilance
- y12 = Indiscriminate adult relationships
- y13 = Indiscriminate peer relationships
- y14 = Indiscriminate willingness to leave with unfamiliar adult
- y15 = Minimal checking with caregiver in unfamiliar settings

# Paper II







# Reactive attachment disorder and disinhibited social engagement disorder in adolescence: co-occurring psychopathology and psychosocial problems

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## Abstract

Insufficient care is associated with most psychiatric disorders and psychosocial problems, and is part of the etiology of reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED). To minimize the risk of misdiagnosis, and aid treatment and care, clinicians need to know to which degree RAD and DSED co-occur with other psychopathology and psychosocial problems, a topic little researched in adolescence. In a national study of all adolescents ( $N=381$ ; 67% consent; 12–20 years old; 58% girls) in Norwegian residential youth care, the Child and Adolescent Psychiatric Assessment interview yielded information about psychiatric diagnoses and psychosocial problems categorized as present/absent, and the Child Behavior Check List questionnaire was applied for dimensional measures of psychopathology. Most adolescents with a RAD or DSED diagnosis had several cooccurring psychiatric disorders and psychosocial problems. Prevalence rates of both emotional and behavioral disorders were high in adolescent RAD and DSED, as were rates of suicidality, self-harm, victimization from bullying, contact with police, risky sexual behavior and alcohol or drug misuse. Although categorical measures of co-occurring disorders and psychosocial problems revealed few and weak associations with RAD and DSED, dimensional measures uncovered associations between both emotional and behavioral problems and RAD/DSED symptom loads, as well as DSED diagnosis. Given the high degree of comorbidity, adolescents with RAD or DSED—or symptoms thereof—should be assessed for co-occurring psychopathology and related psychosocial problems. Treatment plans should be adjusted accordingly.

**Keywords** Adolescence · Child welfare · Comorbidity · Disinhibited social engagement disorder · Mental health · Psychosocial problems · Reactive attachment disorder

## Introduction

Childhood maltreatment and neglect are associated with a wide range of psychiatric disorders and psychosocial problems [1–3] and may, in severe cases, cause reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) [4]. Distinguishing between various health effects of childhood adversity may be clinically challenging, and there is a particular risk and tendency to misdiagnose RAD and DSED [5, 6], either by the under-identification of common psychiatric disorders and neurodevelopmental problems and the over-identification of attachment problems [5, 7–9] or vice versa [10, 11]. Misdiagnosis may result in missed treatment and developmental support, prolonging individual suffering, functional impairment, and societal costs. To improve diagnostic precision and aid the development of appropriate treatment plans, health and social

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workers need to be knowledgeable about the degree of co-occurrence between RAD or DSED and other psychopathology and psychosocial problems. However, at present, we know comparatively little about this co-occurrence in adolescence. Although several studies have investigated the associations between RAD and DSED and other psychopathology in preschool and school-aged children, existing results are inconsistent and may be prone to type-II error due to categorical approaches and small sample sizes [12, 13]. Moreover, because of heterotypic continuity and differences in rates of psychopathology between childhood and adolescence [2, 14, 15], findings in younger children cannot necessarily be ascribed to adolescents. The psychiatric comorbidities of RAD and DSED may also differ in different contexts, and remain largely unexplored among adolescents exposed to in-family maltreatment and neglect where placement in well-functioning foster or adoptive families has failed, thus culminating in institutional care. Furthermore, additional psychosocial problems known to be associated with maltreatment and neglect, including suicidality, self-harm, alcohol or drug misuse, victimization from bullying, risky sexual behavior and criminal behavior [1, 3], may influence care and treatment for children with RAD or DSED. At present, we do not know the extent to which such problems are present in RAD and DSED. Therefore, to help clinicians and services attend to the complex clinical picture often presented in individuals exposed to early adversity, while having access to a national high-risk sample, we investigate the rates of co-occurrence and strengths of associations between RAD and DSED and other psychiatric disorders and emotional, behavioral and psychosocial problems among adolescents living in residential youth care (RYC).

RAD is characterized by social withdrawal and aberrant attachment behavior with failure to seek and respond to comfort, whereas DSED is characterized by socially disinhibited behavior and the lack of reticence in unfamiliar settings or interactions with strangers [4]. Both RAD and DSED have been demonstrated as valid diagnostic constructs, distinct from other psychopathology in childhood and adolescence [16–22], and symptoms may persist into adolescence and early adulthood, with potentially large individual and societal costs [2, 23–26]. Because the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) defines the concepts corresponding with RAD and DSED as two subtypes of one disorder [27], contrary to the two distinct disorders in the DSM-5 [4], previous research often investigated RAD and DSED as a combined diagnostic concept. A combined RAD and DSED is reported to frequently co-occur with both emotional symptoms and disorders (such as depression and anxiety) and behavioral symptoms and disorders (such as oppositional defiant disorder (ODD), conduct disorder (CD) or attention deficit hyperactive disorder (ADHD)) [28–37]. When distinguishing between RAD and

DSED, scientists have expected RAD (or the ‘RAD inhibited type’ in studies using the DSM-IV), with its socially withdrawn phenotype, to be associated with emotional problems and DSED (or the ‘RAD disinhibited type’ in studies using the DSM-IV), with its indiscriminate phenotype, to be associated with behavioral problems [22].

Some studies on RAD have confirmed these expectations in preschool and school-aged children [13, 38, 39]. Others have found that symptoms of RAD in preschoolers have no correlations with any psychopathology [36], or found ambiguous associations depending on the sample [40]. Contrary are findings that RAD symptoms or disorder in school-age and early adolescence may be associated with both emotional and behavioral problems [26, 41–43]. Beyond age 12, the comorbidity for RAD remains unstudied.

Similarly, for DSED in preschool and school-aged children, some studies have confirmed the above expectations, either by investigating associations with behavioral and not emotional problems [11, 19] or by investigating both and finding associations only with behavioral problems [41, 44, 45]. Conversely, others have found that DSED in preschool and school-age children may co-occur [31, 38, 42] or be positively associated [36, 39, 46] with both emotional and behavioral disorders or problems. Beyond school age, persistent DSED symptoms in young adults adopted from early institutional deprivation to well-functioning families in preschool age have been found to be associated with symptoms of ADHD and callous-unemotional traits (CU), though unrelated to depression, anxiety and CD symptoms [47]. Of note, generalizability to populations unexposed to early severe deprivation in institutions has been questioned [2, 48]. Early institutionalization is no longer a common practice in industrialized countries [46]. However, exposure to in-family maltreatment and neglect remains a major public health concern [1, 49]. In non-institutionalized adolescents exposed to in-family maltreatment, DSED symptoms have been found to be associated with both emotional and behavioral problems [46], but prevalence rates of co-occurring psychiatric disorders and psychosocial problems remain undescribed.

To allow for advantages regarding both categorical and dimensional approaches to psychopathology [50], we use four approaches to illuminate the co-occurrence between RAD and DSED and other psychopathology and psychosocial problems. First, we investigate the degree to which other psychiatric disorders and categorical psychosocial problems (categorized as present or absent) co-occur with RAD and DSED diagnoses. This approach may be of clinical value, as diagnoses are clinical tools comprising more than mere cut-off values of symptom loads (i.e., taking into account onset, duration, distress, impairment and exclusion criteria). Second, we investigate whether the risks of having co-occurring psychiatric disorders and categorical psychosocial problems

change with increasing RAD or DSED symptom loads. This approach affords higher statistical power than treating RAD and DSED as dichotomous variables and allows the inclusion of cases with sub-threshold levels of RAD and DSED symptom loads, where the psychiatric burden and impairment may be high despite the unfulfillment of some diagnostic criteria [50]. Third, inversely, as individuals with RAD or DSED may also be debilitated by other sub-threshold psychopathology, we investigate the levels of dimensionally measured emotional and behavioral problems for adolescents with RAD and DSED diagnoses compared to those without. Finally, we apply a dimensional approach to all variables and investigate whether emotional and behavioral problems are associated with RAD or DSED symptom loads. This final approach further increases statistical power and allows the analysis of sub-threshold cases with respect to both co-occurring psychopathology and RAD/DSED. Because RAD and DSED are distinct disorders in adolescence [21, 24], they are investigated separately in each approach.

In sum, we aim to study the rates of co-occurrence and strengths of associations between RAD and DSED, respectively, and other psychopathology and psychosocial problems in adolescence. We do so by assessing high-risk adolescents living in Norwegian RYC using in-depth psychiatric interviews and investigate psychiatric disorders and psychosocial problems (categorized as present or absent) and their (1) prevalence and odds in adolescents with RAD and DSED diagnoses; (2) association with increasing RAD and DSED symptom loads. Further, using a dimensional approach to other psychopathology, we investigate (3) the levels of emotional and behavioral problems in adolescents with RAD and DSED diagnoses; (4) whether emotional and behavioral problems are associated with RAD and DSED symptom loads.

## Methods

### Participants

The research project Mental Health in Adolescent Residents in the Child Welfare System [51] invited all residents aged 12–23 years living in Norwegian RYC between 2011 and 2014 to participate. Due to a presumed state of high crisis, adolescents in acute placements and unaccompanied minors without Norwegian asylum were excluded, as were adolescents without sufficient Norwegian language proficiency to complete the psychiatric interviews. In total, 400 of 601 (67%) eligible adolescents in 86 RYC institutions consented, with  $N=381$  yielding information about RAD and DSED. The recruitment flowchart is shown in Figure S1 (Online Resource). The participants were between 12.2 and 20.2 years old ( $M=16.7$ ,  $SD 1.4$ ), 57.7% were girls

( $n=220$ ), and 78.2% were ethnic Norwegian. The mean age at the first out-of-home placement was 12.5 years ( $SD 3.9$ ), and the mean number of out-of-home placements was 3.3 ( $SD 2.4$ ). In total,  $n=8$  participants had previously been diagnosed with mild intellectual disability, whereof  $n=1$  qualified for RAD and  $n=2$  for DSED. Previous studies of the same participants revealed very high rates of psychiatric morbidity and high levels of parental risk factors, such as drug use or mental or chronic illness [51]. Virtually, all the participants were likely exposed to in-family neglect, and 71% self-reported exposure to maltreatment [52]. We have previously reported the symptom frequency range for RAD and DSED as 2–35 and 4–11%, respectively, and the diagnose prevalence rates as 9% RAD ( $n=33$ ) and 8% DSED ( $n=31$ ), with 0.5% ( $n=2$ ) having both disorders [21].

### Setting

The primary aim of the Norwegian child protection services (CPS) is to provide in-family support to children and families in need and invoke out-of-home placements only when considered necessary to secure provision of a child's basic needs [53]. In such cases, foster care is preferred, and RYC represents a last resort [54]. In accordance with the CPS criteria for out-of-home placements [55], adolescents living in Norwegian RYC have likely been exposed to social neglect, inadequate care or maltreatment prior to placement. Although placements due to behavioral problems or drug use are more frequent for adolescents in RYC than in foster care, traits of the caregiving environment (e.g., parental mental illness or drug use, lack of caregiving ability or other factors in the home) are the most common reasons for placement, regardless of placement type [54].

Norwegian RYC institutions typically resemble family homes with three–eight residents and are strictly regulated by law and quality requirements to ensure that all residents are provided with basic needs and a secure, developmentally supportive environment [56]. There is awareness of the importance of relational continuity. Every resident has a designated primary contact whose aims are to establish a trusting relationship and fulfill the role of a primary caretaker for their designated resident. Given these circumstances, and the fact that 90% of the participants reported to have lived at least three months in RYC prior to the data collection [57], the primary contacts were trusted as reliable informants. Further details on the setting are given in [21, 51].

### Procedure

The data were collected at RYC institutions from June 2011 to July 2014. Four trained research assistants with relevant professional backgrounds completed semi-structured psychiatric interviews with the participants and their primary

contacts. The study was approved by the Norwegian Regional Committee for Medical and Health Research Ethics, REC central Norway, and all participants gave written informed consent.

## Measures

### Interview with adolescents

The Child and Adolescent Psychiatric Assessment (CAPA) [58] is an in-depth semi-structured psychiatric interview which determines psychiatric disorders in children and adolescents, as defined by DSM-IV. The CAPA collects information about symptom onset, duration, frequency and intensity and includes both required and optional follow-up questions. Interviewers probe until they clarify the presence of predefined symptom criteria. The following psychiatric disorder categories and psychosocial problems were assessed using CAPA: depression, anxiety, CD/ODD, suicidal thoughts, suicidal plan, suicidal attempt, suicidal behavior without suicidal intent, self-injurious behavior without suicidal intent (self-harm), exposure to bullying, contact with police, sex for gain, substance use (daily use of alcohol or ever having used cannabis or hard drugs) and substance use for mood improvement. A three-month primary period was applied to all the CAPA variables, except for the following, where a lifetime period was applied: suicidal attempt, been bullied often, contact with police, sex for gain and substance use.

### Interview with the adolescents' primary contacts

Adolescents are considered to be less reliable informants regarding symptoms of ADHD than adults who know them well [59]. Further, because self-acknowledging signs of RAD and DSED would require mentalization abilities beyond what could be expected of adolescents with RAD and DSED, due to the lack of supportive caregiving relationships necessary to promote mentalization [60], adolescents were expected to be sub-optimal informants of RAD and DSED symptoms. Therefore, ADHD, RAD and DSED were assessed using the adolescents' primary contacts as informers. ADHD was assessed using the caregiver version of CAPA and RAD/DSED using the RAD module in the Preschool Age Psychiatric Assessment (PAPA) [61]. The DSM-5 criteria [4] were applied in diagnosing RAD and DSED; however, we lacked the RAD item 'response to comfort'.

To prevent interviewer drift and ensure adherence to the interview protocol, the interviews underwent regular and random controls. To provide inter-rater reliability estimates, blinded raters re-coded a randomly drawn sample ( $n = 42$ ; 10.5%) of interview audio recordings. Inter-rater reliability

for the DSM-IV by Gwet's  $AC_1$  was in the range of 0.74–1.0, and the absolute agreement was in the range of 83–100% [51].

### Child Behavior Checklist (CBCL)

To obtain information about sub-threshold emotional and behavioral problems, the adolescents' primary contacts completed the CBCL for ages 6–18 [62], a well-validated caregiver questionnaire with 118 items, yielding the following syndrome scales: anxiety/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior and aggressive behavior. The CBCL items classified as 'other problems' were also included.

### Statistical analysis

Among the 381 subjects, 59 cases had information about RAD, DSED, ADHD, and CBCL syndrome scales, but had missing information about other CAPA-informed comorbid disorders and psychosocial problems because their primary contacts had completed the diagnostic interview, but the adolescents themselves had not. Missing data were handled by multiple imputation. In the imputation model, we used all variables to be included in the analysis. Imputation for girls and boys was done separately. We created 100 imputed data sets, generally regarded as sufficient [63]. We chose not to restrict the imputed values to the possible range, as recommended by Rodwell et al. [64]. Differences in means were analyzed using the Student's  $t$  test. Associations between RAD or DSED and the continuous variables were investigated using linear regression and the dichotomous variables using logistic regression. All regression analyses were adjusted for age and gender. Neither age at first placement nor the number of out-of-home placements were in complete case analyses associated with RAD or DSED diagnosis or symptom loads, and were not included in the imputation model. Two-sided  $p$  values  $< .05$  were taken to indicate statistical significance, and 95% confidence intervals (CI) are reported where relevant. Due to multiple hypotheses,  $p$  values between .01 and .05 should be interpreted with caution. We used SPSS 25 for all analyses.

## Results

### RAD

Among adolescents with a RAD diagnosis, all disorders (Table 1, Fig. 1) were prevalent, and 65% fulfilled the criteria for at least one additional psychiatric disorder, with 53% fulfilling the criteria for at least two and 20% at least three.

**Table 1** RAD and DSED diagnosis and symptom load in adolescence: (a) prevalence and Odds Ratio (OR) for co-occurring psychiatric disorders and psychosocial problems; (b) association with Child Behavior Checklist (CBCL) syndrome scales

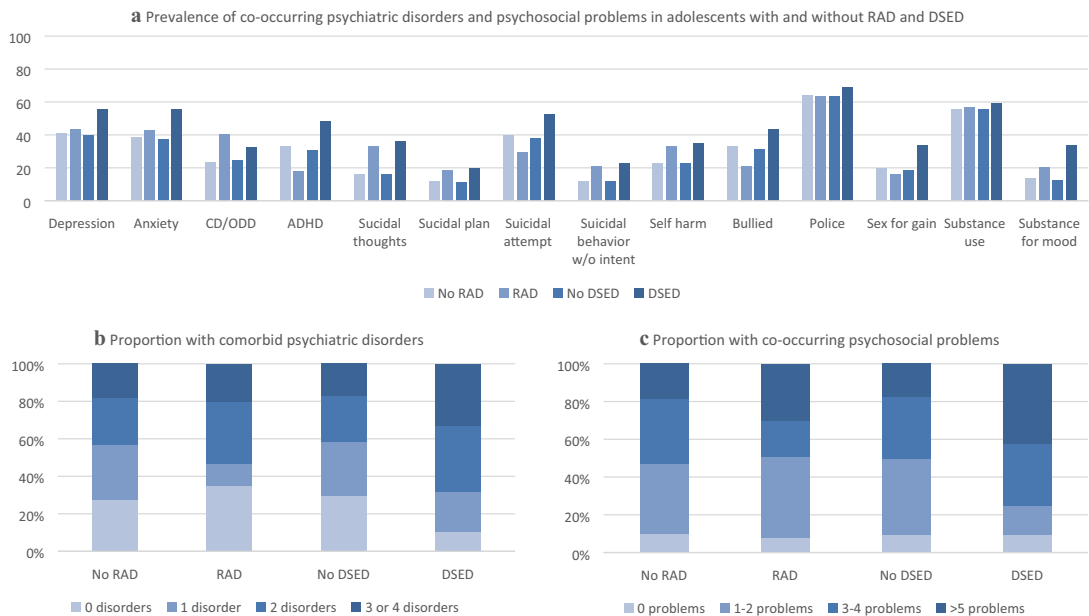
	(a) Disor-der/Psy-chosocial problem			RAD diagnosis n = 33			RAD symptom load Range 0-11			DSED diagnosis n = 31			DSED symptom load Range 0-4			
	n	%	p	OR	CI	p	OR	CI	p	%	OR	CI	p	OR	CI	p
Depression	156.8	43.3	.85	1.08	0.47 to 2.47	.85	<b>1.13</b>	<b>1.00 to 1.28</b>	<b>.043</b>	17.3	55.8	1.47	0.66 to 3.26	1.18	0.85 to 1.65	.32
Anxiety	148.8	42.7	.70	1.18	0.52 to 2.69	.70	<b>1.17</b>	<b>1.04 to 1.31</b>	<b>.009</b>	17.2	55.5	1.93	0.87 to 4.26	1.33	0.96 to 1.86	.088
CD/ODD	95.1	40.3	.066	2.22	0.95 to 5.19	.066	1.03	0.90 to 1.17	.72	10.0	32.3	1.89	0.75 to 4.75	1.40	0.95 to 2.07	.091
ADHD	122	18.2	.084	0.45	0.18 to 1.12	.084	1.02	0.91 to 1.14	.79	15	48.4	<b>2.50</b>	<b>1.17 to 5.36</b>	<b>0.18</b>	<b>1.02 to 1.93</b>	<b>.035</b>
Any disorder	274.0	64.8	.33	0.68	0.31 to 1.48	.33	1.13	0.99 to 1.29	.064	27.9	90.0	<b>3.48</b>	<b>1.02 to 11.86</b>	<b>0.46</b>	<b>1.17 to 3.05</b>	<b>.010</b>
Suicidal thoughts	68.3	33.3	<b>.049</b>	<b>2.51</b>	<b>1.00 to 6.29</b>	<b>.049</b>	1.09	0.94 to 1.27	.27	11.2	36.1	<b>2.49</b>	<b>1.01 to 6.13</b>	<b>0.47</b>	<b>1.03 to 2.27</b>	<b>.037</b>
Suicidal plan	46.5	18.8	.40	1.69	0.50 to 5.69	.40	1.11	0.92 to 1.35	.27	6.1	19.7	1.61	0.44 to 5.83	1.35	0.78 to 2.33	.28
Suicidal attempt	148.2	29.7	.34	0.65	0.27 to 1.57	.34	1.02	0.90 to 1.15	.80	16.3	52.6	1.68	0.74 to 3.80	1.19	0.85 to 1.67	.31
Suic.beh w/o intent	47.6	20.9	.32	1.90	0.54 to 6.67	.32	1.07	0.88 to 1.30	.48	7.0	22.6	2.26	0.67 to 7.68	1.22	0.70 to 2.13	.48
Self-harm	91.0	33.0	.31	1.60	0.65 to 3.96	.31	<b>1.16</b>	<b>1.00 to 1.33</b>	<b>.047</b>	10.8	34.8	1.27	0.52 to 3.10	1.17	0.80 to 1.69	.42
Been bullied often	123.1	21.2	.14	0.51	0.21 to 1.23	.14	1.04	0.93 to 1.17	.51	13.4	43.2	1.33	0.61 to 2.88	1.20	0.88 to 1.65	.25
Contact with police	243.6	63.6	.94	1.04	0.44 to 2.47	.94	0.99	0.88 to 1.12	.85	21.4	69.0	1.49	0.62 to 3.62	1.20	0.83 to 1.74	.33
Sex for gain	74.7	16.4	.63	0.69	0.15 to 3.22	.63	1.06	0.89 to 1.26	.54	10.4	33.5	2.14	0.76 to 6.01	1.36	0.83 to 2.21	.22
Substance use	212.1	57.0	.74	1.15	0.51 to 2.61	.74	0.97	0.87 to 1.09	.64	18.4	59.4	1.35	0.59 to 3.07	1.21	0.85 to 1.72	.28
Substance for mood	54.3	20.6	.42	1.61	0.50 to 5.14	.42	1.03	0.85 to 1.25	.74	10.4	33.5	<b>3.80</b>	<b>1.23 to 11.70</b>	<b>0.20</b>	<b>0.99 to 2.70</b>	<b>.055</b>

**Table 1** (continued)

(b) CBCL scale	RAD diagnosis			RAD symptom load (0–11)			DSED diagnosis			DSED symptom load (0–4)				
	<i>M</i> (S.E.)	$\beta$	<i>p</i>	CI	<i>p</i>	CI	<i>M</i> (S.E.)	$\beta$	CI	<i>p</i>	CI	<i>p</i>		
Anxiety/depressed	6.91 (1.05)	0.41	–1.35 to 2.16	.65	<b>0.65</b>	<b>0.40 to 0.90</b>	<.001	8.96 (1.08)	<b>2.25</b>	<b>0.41 to 4.09</b>	<b>.016</b>	<b>1.20</b>	<b>0.45 to 1.95</b>	<b>.002</b>
Withdrawn/depressed	6.73 (0.63)	<b>2.37</b>	<b>1.25 to 3.49</b>	<.001	<b>0.73</b>	<b>0.58 to 0.89</b>	<.001	4.75 (0.61)	0.11	–1.12 to 1.34	.86	0.21	–0.29 to 0.71	.42
Somatic complaints	4.00 (0.72)	0.00	–1.36 to 1.36	1.0	<b>0.22</b>	<b>0.02 to 0.42</b>	.031	4.72 (0.80)	0.30	–1.12 to 1.72	.68	0.18	–0.41 to 0.77	.54
Social problems	4.55 (0.55)	–0.21	–1.52 to 1.11	.76	<b>0.37</b>	<b>0.18 to 0.57</b>	<.001	7.32 (0.86)	<b>2.71</b>	<b>1.33 to 4.09</b>	<.001	<b>1.56</b>	<b>1.01 to 2.12</b>	<.001
Thought problems	4.09 (0.62)	–0.31	–1.63 to 1.01	.64	<b>0.43</b>	<b>0.24 to 0.62</b>	<.001	6.33 (0.78)	<b>2.34</b>	<b>0.95 to 3.72</b>	.001	<b>1.23</b>	<b>0.68 to 1.79</b>	<.001
Attention problems	6.79 (0.70)	–0.64	–2.08 to 0.78	.37	<b>0.40</b>	<b>0.20 to 0.61</b>	<.001	10.35 (0.72)	<b>3.40</b>	<b>1.94 to 4.87</b>	<.001	<b>1.81</b>	<b>1.22 to 2.39</b>	<.001
Rule-breaking behavior	9.67 (1.00)	0.36	–1.76 to 2.47	.74	0.11	–0.20 to 0.43	.48	13.17 (1.22)	<b>4.17</b>	<b>1.95 to 6.39</b>	<.001	<b>2.47</b>	<b>1.57 to 3.36</b>	<.001
Aggressive behavior	10.67 (1.25)	0.18	–2.49 to 2.86	.89	<b>0.57</b>	<b>0.18 to 0.97</b>	.004	16.14 (1.54)	<b>5.88</b>	<b>3.08 to 8.68</b>	<.001	<b>3.06</b>	<b>1.92 to 4.20</b>	<.001
Other problems	3.88 (0.51)	–0.62	–1.77 to 0.53	.29	<b>0.26</b>	<b>0.09 to 0.43</b>	.003	6.12 (0.73)	<b>1.94</b>	<b>0.73 to 3.16</b>	.002	<b>1.12</b>	<b>0.62 to 1.61</b>	<.001

Reference group: adolescents without RAD or DSED, respectively. All analyses are adjusted for age and gender. 1a) Logistic regression analyses with the comorbid disorder or psychosocial problem as dependent variable, RAD/DSED diagnosis or symptom load as covariate. Analyses and estimated '*n*' with decimals are based on multiple imputation. 1b) Linear regression with RAD/DSED diagnosis or symptoms as covariates

$\beta$  unstandardized regression coefficient, *M* estimated mean, *S.E.* standard error, *ADHD* attention deficit hyperactive disorder, *CD* conduct disorder, *DSED* disinhibited social engagement disorder, *ODD* oppositional defiant disorder, *RAD* reactive attachment disorder, *Substance use* daily alcohol use or ever having used cannabis or hard drugs, *Suic.beh w/o intent* suicidal behavior without suicidal intention



**Fig. 1** Prevalence (%) of co-occurring psychiatric disorders and psychosocial problems in adolescents with and without RAD and DSED diagnosis (a). Proportion (%) of adolescents with and without a RAD

and DSED diagnosis who have co-occurring psychiatric disorders (b) and psychosocial problems (c)

Further, all categorical psychosocial problems (Table 1, Fig. 1) were prevalent among adolescents with a RAD diagnosis, and 92% reported at least one co-occurring psychosocial problem, with 49% reporting at least three and 30% at least five. Nevertheless, this high-risk sample presented no differences in the rates of categorical psychiatric disorders or psychosocial problems for adolescents with a RAD diagnosis, compared to those without, except for suicidal thoughts, for which adolescents with a RAD diagnosis had 2.5 times increased odds (Table 1). Adolescents with a RAD diagnosis had means of 1.44 comorbid psychiatric disorders (range 0–4, mean difference 0.08 (CI – 0.35 to 0.51,  $p = .72$ ) higher than adolescents without RAD) and 3.15 co-occurring psychosocial problems (range 0–10, mean difference 0.26 (CI – 0.50 to 1.02,  $p = .51$ ) higher than adolescents without RAD). The odds of depression and anxiety increased with an increasing number of RAD symptoms, as did the odds of self-harm (Table 1). The remaining psychiatric disorders and categorical psychosocial problems were not associated with RAD symptom load in this high-risk sample. Through dimensional measures of other psychopathology, the sole clinically significant regression coefficient and statistically significant association for a RAD diagnosis was with the CBCL withdrawn/depressed syndrome scale (Table 1). However, the RAD symptom load had clinically

significant regression coefficients and statistically significant associations with all the CBCL syndrome scales, except rule-breaking behavior (Table 1).

## DSED

All disorders (Table 1, Fig. 1) were prevalent among adolescents with a DSED diagnosis, and 90% fulfilled the criteria for at least one additional psychiatric disorder, with 68% fulfilling the criteria for at least two and 33% at least three. The odds of ADHD were 2.5 times higher, and the odds of any other psychiatric disorder 3.5 times higher for adolescents with a DSED diagnosis than those without. Adolescents with a DSED diagnosis had a mean of 1.92 comorbid disorders (range 0–4, mean difference 0.60 (CI 0.17 to 1.03,  $p = .006$ ) higher than adolescents without DSED). All categorical psychosocial problems were also prevalent among adolescents with a DSED diagnosis (Table 1, Fig. 1), and 91% reported at least one co-occurring psychosocial problem, with 76% reporting at least three and 42% at least five. Adolescents with a DSED diagnosis had a mean of 4.04 co-occurring psychosocial problems (range 0–10, mean difference 1.23 (CI 0.34 to 2.11,  $p = .006$ ) higher than adolescents without DSED). The odds of suicidal thoughts and substance use for mood improvement were higher among adolescents with a

DSED diagnosis compared to those without. Further, the odds of having ADHD, any comorbid disorder or suicidal thoughts increased with increasing DSED symptom load (Table 1). For the remaining categorical psychiatric disorders and psychosocial problems, we found no associations with DSED symptom load in this high-risk sample. However, by dimensional measures of other psychopathology, we found DSED diagnosis and symptom load to be associated with the following CBCL syndrome scales: anxiety/depressed, social problems, thought problems, attention problems, rule-breaking behavior, aggressive behavior and other problems (Table 1). Scores on the CBCL syndrome scales withdrawn/depressed and somatic complaints were neither associated with DSED diagnosis nor symptom load.

## Discussion

RAD and DSED are often misdiagnosed in children and adolescents with histories of neglect, either by overidentifying or overlooking the attachment-related nature of their problems or—when rightly recognized—not acknowledging comorbid conditions. To counteract this tendency toward misdiagnosis and elaborate on the complex clinical picture often presented in individuals exposed to early adversity, we investigated the co-occurrence of other psychopathology and psychosocial problems among adolescents with and without RAD and DSED in a national study of high-risk adolescents living in RYC. This is the first in-depth study of RAD and DSED comorbidity in adolescence to report prevalence rates of co-occurring psychiatric disorders and psychosocial problems, and to explore associations using both categorical and dimensional approaches to psychopathology. We found that most adolescents with RAD or DSED diagnoses had additional psychiatric disorders and psychosocial problems and that all investigated disorders and psychosocial problems of both emotional and behavioral types frequently co-occurred with both RAD and DSED. In general, analyses based on categorical variables have lower statistical power than those based on the corresponding scale variables. Indeed, in analyses of associations between RAD and DSED and other psychopathology in this high-risk sample, the choice of categorical measures versus dimensional measures was decisive for the results. The categorical measures in the analytical approaches to co-occurring psychopathology and psychosocial problems revealed few and not highly statistically significant differences between adolescents with and without RAD and DSED, whereas the dimensional measures clearly showed that RAD and DSED symptom loads and a DSED diagnosis were all associated with both emotional and behavioral problems.

Consonant with the lasting negative effects of childhood neglect and maltreatment [1, 65], the prevalence rates of

both emotional and behavioral disorders [14, 66, 67] and frequencies of psychosocial problems [68–70] were markedly higher among adolescents with RAD or DSED than in the general population and were comparable to findings in other adolescents subjected to child abuse and neglect [71]. The prevalence rates were as high or higher than in early institutionalized preschool and 12-year-old children assigned to ‘care as usual’ in the Bucharest Early Intervention Project (BEIP) [72, 73]. Possibly, individuals with RAD/DSED and co-occurring psychopathology or psychosocial problems have increased risk of repeated placement breakdown with subsequent placement in RYC, introducing elevated comorbidity rates in this study. On the other hand, longitudinal findings in the BEIP revealed that placement disruptions predicted psychopathology, rather than vice versa [72], which may also apply to adolescents in RYC. Indeed, the participants in our study had multiple placement disruptions and high ages at first placement, both key risk factors of emotional and behavioral problems in looked-after children [74]. Further, developmental changes from childhood to adolescence, i.e., higher prevalence rates of emotional, behavioral and substance use disorders in adolescence [14, 67], may contribute to the higher psychiatric morbidity in this study compared to studies of younger children. In any case, the findings demonstrate high levels of comorbidity and additional psychosocial burdens for adolescents with RAD and DSED in RYC settings. Of note, even though most adolescents with RAD or DSED qualified for at least one additional psychiatric disorder, no single diagnostic category was present in more than half of those with RAD or DSED, and only a minority of adolescents with the other disorders had comorbid RAD or DSED, supporting previous findings of the discriminant validity of RAD and DSED in adolescence [21].

## RAD

Finding that both emotional and behavioral problems may co-occur with RAD and be associated with RAD symptom load in adolescence is concordant with previous findings among school-aged children and early adolescents [26, 41–43]. However, this result contradicts that of studies among pre-schoolers, which report that RAD is associated with more emotional problems and not with more behavioral problems [39, 40, 75]. Although there is a possibility of type-II errors where observed differences are not statistically significant due to small sample sizes, the above studies of pre-schoolers used dimensional measures of psychopathology, thereby eliminating potential type-II errors due to reduced power by categorical measures. Therefore, rather than having predominantly methodological explanations, the differences in the findings between the associations of RAD in pre-schoolers and adolescents may be due to real



developmental changes from childhood to adolescence, and the added risk from many placement disruptions and high age at the first placement.

Although depression and anxiety were the most common comorbid disorders among adolescents with RAD, CD/ODD was nearly as common and present in 40% of those with a RAD diagnosis. This high comorbidity rate may shed light on the conceptual confusion pertaining to older children and adolescents, whose conduct problems may be misinterpreted as RAD [9, 76]. Importantly, our findings clearly demonstrate that while many with RAD had co-occurring CD/ODD, most adolescents with RAD did not. Moreover, despite the high-risk nature of the sample, only a small minority (14%) of all adolescents with CD/ODD had a co-occurring RAD diagnosis. Further, although RAD symptom load was associated with the dimensional measure of aggressive behavior, illustrating that adolescents with RAD may have additional behavioral problems, neither the categorical measures of CD/ODD or contact with the police, nor the dimensional measure of rule-breaking behavior was associated with RAD. Therefore, although both conduct problems and RAD are associated with maltreatment and neglect and are malleable by caregiver behavior [39, 72], conduct problems in individuals with histories of maltreatment and neglect are not equivalent to RAD and should not be interpreted as such.

The lack of increased odds of most other forms of psychopathology with a RAD diagnosis, as opposed to not having RAD, must be understood in light of the high-risk nature of the sample, with a very high psychiatric morbidity also among the adolescents without RAD. Further, the reduced statistical power caused by dichotomizing RAD symptoms into a RAD diagnosis (present/absent) may partially explain a loss of statistical significance from the dimensional measure of RAD symptom load to the categorical RAD diagnosis. However, such a trend was not obvious where a categorical approach to co-occurring psychopathology and psychosocial problems was used. Indeed, we see the opposite tendency for the odds of co-occurring CD/ODD and ADHD, with lower *p*-values for a RAD diagnosis than for RAD symptom load. Furthermore, although in the dimensional approach to other forms of psychopathology we see the expected loss of statistical significance by categorizing RAD symptoms into a RAD diagnosis, we note a lack of clinically significant regression coefficients for a RAD diagnosis (except for the association with CBCL ‘withdrawn/depressed’), contrary to the RAD symptom load, illustrating that different approaches to RAD may reveal different results regardless of statistical power. One reason for this may be that the RAD diagnosis reflects more than a numerical cut-off level of RAD symptoms, as the diagnostic criteria require the presence of certain symptom clusters classified under A criteria (minimal comfort seeking/response) and B criteria

(emotional dysregulation and limited emotional responsiveness) [4]. In a study of foster youth, self-reported potentially traumatic events were associated with B criteria, not with A criteria of DSM-5 RAD [77]. Possibly, the A and B criteria also differ in their associations with other psychopathology, potentially impacting our results.

Interestingly, in this high-risk sample, the sole association between a RAD diagnosis and dimensional measures of psychopathology was with the CBCL withdrawn/depressed scale, mirroring findings among institutionalized pre-schoolers, where an observational measure of RAD was strongly related to the CBCL scales withdrawn/depressed and somatic complaints—though only weakly to a total score of emotional problems (internalizing score)—and were not associated with behavioral problems [75]. Due to multiple hypotheses and *p*-values being between .01 and .05, the positive associations between RAD symptom load and the categorical measures of depression and self-harm, and between a RAD diagnosis and suicidal thoughts, must be interpreted with caution. However, the statistically convincing associations between a RAD diagnosis and the CBCL withdrawn/depressed scale, and between RAD symptom load and most CBCL syndrome scales, demonstrate the importance of assessing emotional problems in adolescents with RAD.

## DSED

The prevalence rates of ADHD and CD/ODD in adolescents with DSED resemble findings in preschool and school-aged children with signs of DSED, including home-reared [11] and post-institutionally adopted [44] children. Concordant with findings in preschool, school age and young adulthood [11, 19, 45, 47], we found DSED in adolescence to be associated with ADHD. Although we failed to reveal associations between DSED and categorical emotional disorders, the most frequently co-occurring disorders among adolescents with DSED were depression and anxiety, each present in over half of those with a DSED diagnosis. Emotional problems were more prevalent among adolescents with DSED in this sample than reports of post-institutionalized adopted school children [44], possibly reflecting developmental differences such as increasing emotional problems in adolescence [2] or factors related to the care context [74], as discussed above in relation to RAD. Further, three of the findings—that suicidal thoughts occurred more frequently in adolescents with DSED than in those without, that half of the adolescents with a DSED diagnosis reported previous suicidal attempts, and that adolescents with a DSED diagnosis were more prone to intentionally using substances for mood improvement—underscore the importance of assessing emotional problems, including suicidality and emotion regulation from substance use, in adolescents with DSED.

Due to multiple hypotheses and *p*-values being between .01 and .05, the associations between DSED in adolescence and the categorical measures of ADHD, any comorbid disorder, suicidal thoughts and substance use for mood improvement must be interpreted with caution. Nevertheless, as for RAD, the few and weak associations between a DSED diagnosis and the categorical measures of co-occurring psychopathology may be masked by the high-risk nature of the comparison group with a very high psychiatric morbidity in adolescents without DSED. Even so, all the investigated disorders and psychosocial problems were numerically more prevalent among adolescents with DSED diagnosis than those without. Further, as the dimensional approach to co-occurring psychopathology revealed strong associations between a DSED diagnosis and both emotional and behavioral problems, while the categorical approach did not, it seems plausible that results regarding the latter are subject to type-II error due to the reduced power of the categorical dependent variables.

The positive associations between DSED symptom load and all but two CBCL syndrome scales (withdrawn/depressed and somatic complaints) cohere with findings in other non-institutionalized adolescents exposed to in-family maltreatment, where DSED symptoms were strongly associated with all CBCL syndrome scales except the withdrawn/depressed and somatic complaint scales [46]. The overall finding that DSED in adolescence is associated with both emotional and behavioral problems is also in line with some results from studies of younger children [36, 39].

### Strengths and limitations

The use of in-depth semi-structured psychiatric interviews in a national and comparatively large sample of high-risk adolescents constitutes a clear strength. Further, the combined use of self- and caregiver reports for other psychopathology and psychosocial problems reduced the risk of common rater bias. However, we acknowledge some limitations. Our assessment of RAD and DSED was limited to caregiver (primary contact) information. Although a caregiver-informed approach to RAD and DSED is common in research [2, 23, 24], clinical recommendations entail a multi-method approach, including observational assessments [13, 65]. Both a risk of over-identification [78] and under-identification [12] have been demonstrated in caregiver reports of RAD and DSED. However, caregiver assessments of RAD and DSED have also been found to converge with observational measures [13, 19, 22, 43], lending support to our findings. A related limitation for RAD, but not for DSED, is uncertainty as to whether aberrant attachment behavior registered by the primary contacts in the RYC was representative of the adolescents' attachment behavior toward previous caregivers. Previous findings of the trans-relational nature

of RAD [43] support the suitability of our approach. Further, for the DSM-5 RAD A criterion, we only had available information on the adolescents' comfort-seeking behavior and no information on their response to comfort. This may have influenced our results by deflating the number of RAD symptoms in the measure of symptom load and inflating the number of participants with a RAD diagnosis. Additionally, we were only able to substantiate, not document with certainty, the DSM-5 criteria of early exposure to extremely insufficient care and the presence of RAD symptoms prior to age 5, possibly inflating our diagnostics of RAD and DSED. However, careful measures were taken to minimize the risk of over-diagnosing RAD and DSED, and the prevalence rates of RAD and DSED herein are concordant with the findings in foster children in Norway [33]. Thus, we consider the risk of overdiagnosis to be limited.

Due to developmental changes and heterotypic continuity of disorders and symptoms, the rates of co-occurrence and the degree of associations reported herein cannot necessarily be ascribed to other age groups. Further, the prevalence rates of comorbid disorders and psychosocial problems are likely to be context dependent, and may therefore differ for adolescents in non-RYC settings—such as adolescents with early placement in well-functioning and lasting foster/adoptive homes or adolescents placed in larger-sized or less developmentally supportive RYCs—and those in other countries. Because adolescent behavioral problems and drug use are more frequently cited reasons for placement in RYC than in foster care [54], we would expect foster-placed adolescents with RAD and DSED to have somewhat lower co-occurrence of behavioral problems and drug use than adolescents with RAD and DSED in RYC.

### Clinical implications

As this is the first in-depth and multi-approach investigation of co-occurring psychopathology and psychosocial problems among adolescents with RAD and DSED, the clinical value is presumably high. Because other psychiatric disorders and psychosocial problems frequently co-occur with RAD and DSED in adolescence, all adolescents with RAD or DSED symptoms or diagnoses should receive comprehensive psychiatric assessment in accordance with the practice parameter [65]. Clinicians should, in their assessments of adolescents with RAD or DSED, systematically consider possible comorbid emotional and behavioral disorders as well as related psychosocial problems, including suicidality, bullying experience, juridical offenses, sexual activity and substance use. Because disclosing such problems may provoke feelings of shame and taboo, adolescents may not spontaneously present them in conversation or general assessment. However, becoming aware of these additional psychosocial problems might impact the overall understanding of the adolescent's daily

challenges and might be crucial in terms of offering adequate treatment and support. Our findings underline the importance of permitting diagnostic comorbidity so that all aspects of an individual's mental health problems may be incorporated into a comprehensive understanding of what support and treatment are needed. This is contrary to the general medical principle of combining symptoms to a minimum number of diagnoses. We maintain, however, that the discriminant validity demonstrated for RAD and DSED in previous studies, combined with this and other studies demonstrating the clinically important ramifications of early maltreatment and neglect, imply that clinicians should seek to grasp the full complexity rather than simplify their understanding in the assessment and treatment of these high-risk individuals.

## Conclusion

Most adolescents with RAD or DSED disorders or symptoms have additional psychiatric disorders and psychosocial problems of an emotional and/or behavioral nature, warranting easy access to high-quality psychiatric health care, including a comprehensive psychiatric assessment where comorbidity is acknowledged, and treatment plans are adjusted accordingly.

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**Availability of data and material** Access to data by project manager Nanna S. Kayed.

## Compliance with ethical standards

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

**Ethics** The Norwegian Regional Committee for Medical and Health Research Ethics (REK) approved the study (reference number: 2015/1474/REC central Norway). Written informed consent was obtained from all participants, and the study was congruent with current ethical standards.

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## References

1. Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, Jones L, Dunne MP (2017) The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Health* 2(8):e356–e366. [https://doi.org/10.1016/S2468-2667\(17\)30118-4](https://doi.org/10.1016/S2468-2667(17)30118-4)
2. Sonuga-Barke EJS, Kennedy M, Kumsta R, Knights N, Golm D, Rutter M, Maughan B, Schlotz W, Kreppner J (2017) Child-to-adult neurodevelopmental and mental health trajectories after early life deprivation: the young adult follow-up of the longitudinal English and Romanian Adoptees study. *Lancet* 389(10078):1539–1548. [https://doi.org/10.1016/S0140-6736\(17\)30045-4](https://doi.org/10.1016/S0140-6736(17)30045-4)
3. Norman RE, Byambaa M, De R, Butchart A, Scott J, Vos T, Tomlinson M (2012) The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis (consequences of child nonsexual maltreatment). *PloS Med* 9(11):e1001349. <https://doi.org/10.1371/journal.pmed.1001349>
4. American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders : DSM-5, 5th edn. American Psychiatric Association, Washington, D.C.
5. John SG, Brandt TW, Secrist ME, Mesman GR, Sigel BA, Kramer TL (2019) Empirically-guided assessment of complex trauma for children in foster care: a focus on appropriate diagnosis of attachment concerns. *Psychol Serv* 16(1):120–133. <https://doi.org/10.1037/ser0000263>
6. Chaffin M, Saunders RHBE, Nichols T, Barnett D, Zeanah C, Berliner L, Egeland B, Newman E, Lyon T, Letourneau E, Miller-Perrin C (2006) Report of the APSAC task force on attachment therapy, reactive attachment disorder, and attachment problems. *Child Maltreatment* 11(1):76–89. <https://doi.org/10.1177/1077559505283699>
7. Woolgar M, Baldock E (2015) Attachment disorders versus more common problems in looked after and adopted children: comparing community and expert assessments. *Child Adolesc Mental Health* 20(1):34–40. <https://doi.org/10.1111/camh.12052>
8. Woolgar M, Scott S (2014) The negative consequences of over-diagnosing attachment disorders in adopted children: the importance of comprehensive formulations. *Clin Child Psychol Psychiatry* 19(3):355–366. <https://doi.org/10.1177/1359104513478545>
9. Allen B, Schuengel C (2020) Attachment disorders diagnosed by community practitioners: a replication and extension. *Child Adolesc Mental Health* 25(1):4–10. <https://doi.org/10.1111/camh.12338>
10. Zimmermann P, Soares I (2019) Recent contributions for understanding inhibited reactive attachment disorder. *Attach Hum Dev* 21(2):87–94. <https://doi.org/10.1080/14616734.2018.1499207>
11. Scheper FY, Groot CRM, de Vries ALC, Doreleijers TAH, Jansen LMC, Schuengel C (2018) Course of disinhibited social engagement behavior in clinically referred home-reared preschool children. *J Child Psychol Psychiatry* 60(5):555–565. <https://doi.org/10.1111/jcpp.12994>

12. Bruce M, Young D, Turnbull S, Rooksby M, Chadwick G, Oates C, Nelson R, Young-Southward G, Haig C, Minnis H (2019) Reactive attachment disorder in maltreated young children in foster care. *Attach Hum Dev* 21(2):152–169. <https://doi.org/10.1080/14616734.2018.1499211>
13. Atkinson L (2019) Reactive attachment disorder and attachment theory from infancy to adolescence: review, integration, and expansion. *Attach Hum Dev* 21(2):205–217. <https://doi.org/10.1080/14616734.2018.1499214>
14. Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A (2003) Prevalence and development of psychiatric disorders in childhood and adolescence. *Arch Gen Psychiatry* 60(8):837–844. <https://doi.org/10.1001/archpsyc.60.8.837>
15. de Girolamo G, Dagani J, Purcell R, Cocchi A, McGorry PD (2012) Age of onset of mental disorders and use of mental health services: needs, opportunities and obstacles. *Epidemiol Psychiatr Sci* 21(1):47–57. <https://doi.org/10.1017/s2045796011000746>
16. Lehmann S, Breivik K, Heiervang ER, Havik T, Havik OE (2016) Reactive attachment disorder and disinhibited social engagement disorder in school-aged foster children: a confirmatory approach to dimensional measures. *J Abnorm Child Psychol* 44(3):445–457. <https://doi.org/10.1007/s10802-015-0045-4>
17. Davidson C, Ohare A, Mactaggart F, Green J, Young D, Gillberg C, Minnis H (2015) Social relationship difficulties in autism and reactive attachment disorder: improving diagnostic validity through structured assessment. *Res Dev Disabil* 40:63–72. <https://doi.org/10.1016/j.ridd.2015.01.007>
18. Follan M, Anderson S, Huline-Dickens S, Lidstone E, Young D, Brown G, Minnis H (2011) Discrimination between attention deficit hyperactivity disorder and reactive attachment disorder in school aged children. *Res Dev Disabil Multidiscip J* 32(2):520–526. <https://doi.org/10.1016/j.ridd.2010.12.031>
19. Gleason MM, Fox NA, Drury S, Smyke A, Egger HL, Nelson CA, Gregas MC, Zeanah CH (2011) Validity of evidence-derived criteria for reactive attachment disorder: indiscriminately social/disinhibited and emotionally withdrawn/inhibited types. *J Am Acad Child Adolesc Psychiatry* 50(3):216–231. <https://doi.org/10.1016/j.jaac.2010.12.012>
20. Giltaj HP, Sterkenburg PS, Schuengel C (2015) Psychiatric diagnostic screening of social maladaptive behaviour in children with mild intellectual disability: differentiating disordered attachment and pervasive developmental disorder behaviour. *J Intellect Disabil Res* 59(2):138–149. <https://doi.org/10.1111/jir.12079>
21. Seim AR, Jozefiak T, Wichstrøm L, Kaye NS (2019) Validity of reactive attachment disorder and disinhibited social engagement disorder in adolescence. *Eur Child Adolesc Psychiatry*. <https://doi.org/10.1007/s00787-019-01456-9>
22. Zeanah CH, Gleason MM (2015) Annual research review: attachment disorders in early childhood—clinical presentation, causes, correlates, and treatment. *J Child Psychol Psychiatry* 56(3):207–222. <https://doi.org/10.1111/jcpp.12347>
23. Humphreys KL, Nelson CA, Fox NA, Zeanah CH (2017) Signs of reactive attachment disorder and disinhibited social engagement disorder at age 12 years: effects of institutional care history and high-quality foster care. *Dev Psychopathol* 29(2):675–684. <https://doi.org/10.1017/S0954579417000256>
24. Lehmann S, Monette S, Egger H, Breivik K, Young D, Davidson C, Minnis H (2018) Development and examination of the reactive attachment disorder and disinhibited social engagement disorder assessment interview. *Assessment*. <https://doi.org/10.1177/1073191118797422>
25. Guyon-Harris KL, Humphreys KL, Fox NA, Nelson CA, Zeanah CH (2018) Course of disinhibited social engagement disorder from early childhood to early adolescence. *J Am Acad Child Adolesc Psychiatry* 57(5):329–335. <https://doi.org/10.1016/j.jaac.2018.02.009>
26. Guyon-Harris KL, Humphreys KL, Degnan K, Fox NA, Nelson CA, Zeanah CH (2019) A prospective longitudinal study of Reactive Attachment Disorder following early institutional care: considering variable- and person-centered approaches. *Attach Hum Dev* 21(2):95–110. <https://doi.org/10.1080/14616734.2018.1499208>
27. American Psychiatric Association Task Force on DSM-IV (2000) Diagnostic and statistical manual of mental disorders: DSM-IV-TR, 4th edn. American Psychiatric Association, Washington, DC
28. Kocovska E, Puckering C, Follan M, Smillie M, Gorski C, Barnes J, Wilson P, Young D, Lidstone E, Pritchett R, Hockaday H, Minnis H (2012) Neurodevelopmental problems in maltreated children referred with indiscriminate friendliness. *Res Dev Disabil* 33(5):1560–1565. <https://doi.org/10.1016/j.ridd.2012.02.016>
29. Minnis H, Macmillan S, Pritchett R, Young D, Wallace B, Butcher J, Sim F, Baynham K, Davidson C, Gillberg C, Minnis H (2013) Prevalence of reactive attachment disorder in a deprived population. *Br J Psychiatry* 202:342–346. <https://doi.org/10.1192/bjp.bp.112.114074>
30. Pritchett R, Pritchett J, Marshall E, Davidson C, Minnis H (2013) Reactive attachment disorder in the general population: a hidden ESSENCE disorder. *Sci World J*. <https://doi.org/10.1155/2013/818157>
31. Mayes SD, Calhoun SL, Waschbusch DA, Breaux RP, Baweja R (2017) Reactive attachment/disinhibited social engagement disorders: callous-unemotional traits and comorbid disorders. *Res Dev Disabil* 63:28–37. <https://doi.org/10.1016/j.ridd.2017.02.012>
32. Minnis H, Green J, O'Connor TG, Liew A, Glaser D, Taylor E, Follan M, Young D, Barnes J, Gillberg C, Pelosi A, Arthur J, Burston A, Connolly B, Sadiq FA (2009) An exploratory study of the association between reactive attachment disorder and attachment narratives in early school-age children. *J Child Psychol Psychiatry* 50(8):931–942. <https://doi.org/10.1111/j.1469-7610.2009.02075.x>
33. Lehmann S, Havik OE, Havik T, Heiervang ER (2013) Mental disorders in foster children: a study of prevalence, comorbidity and risk factors. *Child Adolesc Psychiatry Ment Health* 7(1):39. <https://doi.org/10.1186/1753-2000-7-39>
34. Millward R, Kennedy E, Towlson K, Minnis H (2006) Reactive attachment disorder in looked-after children. *Emot Behav Difficult* 11(4):273–279. <https://doi.org/10.1080/13632750601022212>
35. Moran K, McDonald J, Jackson A, Turnbull S, Minnis H (2017) A study of Attachment Disorders in young offenders attending specialist services. *Child Abuse Negl* 65:77–87. <https://doi.org/10.1016/j.chiabu.2017.01.009>
36. Jonkman CS, Oosterman M, Schuengel C, Bolle EA, Boer F, Lindauer RJJ (2014) Disturbances in attachment: inhibited and disinhibited symptoms in foster children. *Child Adolesc Psychiatry Ment Health*. <https://doi.org/10.1186/1753-2000-8-21>
37. Schroder M, Ludtke J, Fux E, Izat Y, Bolten M, Gloger-Tippelt G, Suess GJ, Schmid M (2019) Attachment disorder and attachment theory—two sides of one medal or two different coins? *Compr Psychiatry*. <https://doi.org/10.1016/j.comppsy.2019.152139>
38. Gleason MM, Zamfirescu A, Egger HL, Nelson CA, Fox NA, Zeanah CHJEC. *Psychiatry A* (2011) Epidemiology of psychiatric disorders in very young children in a Romanian pediatric setting. *Eur Child Adolesc Psychiatry* 20(10):527. <https://doi.org/10.1007/s00787-011-0214-0>
39. McGoron L, Gleason MM, Smyke AT, Drury SS, Nelson CA 3rd, Gregas MC, Fox NA, Zeanah CH (2012) Recovering from early deprivation: attachment mediates effects of caregiving on psychopathology. *J Am Acad Child Adolesc Psychiatry* 51(7):683–693. <https://doi.org/10.1016/j.jaac.2012.05.004>
40. Spangler G, Bovenschen I, Jorjadze N, Zimmermann J, Werner A, Riedel N, Gabler S, Kliwew-Neumann JD, Nowacki K (2019) Inhibited symptoms of attachment disorder in children from

- institutional and foster care samples. *Attach Hum Dev* 21(2):132–151. <https://doi.org/10.1080/14616734.2018.1499210>
41. Vervooft E, De Schipper J, Bosmans G, Verschueren K (2013) Screening symptoms of reactive attachment disorder: evidence for measurement invariance and convergent validity. *Int J Methods Psychiatr Res* 22(3):256–265. <https://doi.org/10.1002/mpr.1395>
  42. Giltaij HP, Sterkenburg PS, Schuengel C (2016) Adaptive behaviour, comorbid psychiatric symptoms, and attachment disorders. *Adv Ment Health Intellect Disabil* 10(1):82–91. <https://doi.org/10.1108/AMHID-07-2015-0035>
  43. Zimmermann P, Iwanski A (2019) Attachment Disorder behavior in early and middle childhood: associations with children's self-concept and observed signs of negative internal working models. *Attach Hum Dev* 21(2):170–189. <https://doi.org/10.1080/14616734.2018.1499212>
  44. Rutter M, Colvert E, Kreppner J, Beckett C, Castle J, Groothues C, Hawkins A, O'Connor TG, Stevens SE, Sonuga-Barke EJS (2007) Early adolescent outcomes for institutionally-deprived and non-deprived adoptees. I: Disinhibited attachment. *J Child Psychol Psychiatry* 48(1):17–30. <https://doi.org/10.1111/j.1469-7610.2006.01688.x>
  45. Kay C, Green J, Sharma K (2016) Disinhibited attachment disorder in UK adopted children during middle childhood: prevalence, validity and possible developmental origin. *J Abnorm Child Psychol* 44(7):1375–1386. <https://doi.org/10.1007/s10802-016-0131-2>
  46. Kay C, Green J (2013) Reactive attachment disorder following early maltreatment: systematic evidence beyond the institution. *J Abnorm Child Psychol* 41(4):571–581. <https://doi.org/10.1007/s10802-012-9705-9>
  47. Kennedy M, Kreppner J, Knights N, Kumsta R, Maughan B, Golm D, Hill J, Rutter M, Schlotz W, Sonuga-Barke E (2017) Adult disinhibited social engagement in adoptees exposed to extreme institutional deprivation: examination of its clinical status and functional impact. *Br J Psychiatry* 211(5):289. <https://doi.org/10.1192/bjp.bp.117.200618>
  48. Kreppner J, Kumsta R, Rutter M, Beckett C, Castle J, Stevens S, Sonuga-Barke EJ (2010) Developmental course of deprivation-specific psychological patterns: early manifestations, persistence to age 15, and clinical features. *Monogr Soc Res Child Dev* 75(1):79–101. <https://doi.org/10.1111/j.1540-5834.2010.00551.x>
  49. Stoltenborgh M, Bakermans-Kranenburg MJ, Alink LRA, Ijzendoorn MH (2015) The prevalence of child maltreatment across the globe: review of a series of meta-analyses. *Child Abuse Rev* 24(1):37–50. <https://doi.org/10.1002/car.2353>
  50. Stafford B, Zeanah CH, Scheeringa M, Guedeney A, Maestro S (2003) Exploring psychopathology in early childhood: PTSD and attachment disorders in DC: 0–3 and DSM-IV. *Infant Mental Health J* 24(4):398–409. <https://doi.org/10.1002/imhj.10064>
  51. Jozefiak T, Kaye N, Rimehaug T, Wormdal A, Brubakk A, Wichstrøm L (2016) Prevalence and comorbidity of mental disorders among adolescents living in residential youth care. *Eur Child Adolesc Psychiatry* 25(1):33–47. <https://doi.org/10.1007/s00787-015-0700-x>
  52. Greger HK, Myhre AK, Lydersen S, Jozefiak T (2015) Previous maltreatment and present mental health in a high-risk adolescent population. *Child Abuse Negl* 45:122–134. <https://doi.org/10.1016/j.chiabu.2015.05.003>
  53. Bufdir.no (2018) Barnevernsstatistikk (Statistics of the Child Protection Service) (2018). Barne- ungdoms- og familiedirektoratet (The Norwegian Directorate for Children, Youth and Family Affairs). [https://www.bufdir.no/Statistikk\\_og\\_analyse/Barnevern/](https://www.bufdir.no/Statistikk_og_analyse/Barnevern/). Accessed 11 Mar 2020
  54. Backe-Hansen E, Bakketeig E, Gautun H, Grønningseter AB (2011) Institusjonsplassering—siste utvei. Betydningen av barnevernsreformen fra 2004 for institusjonstilbudet (Placement in institutions—the last opportunity. The importance of the child welfare reform in 2004 for placement policy in institutions). NOVA, vol 21/2011. Norsk institutt for forskning om oppvekst, velferd og aldring, Oslo
  55. Lovdata.no (2018) Lov om barneverntjenester (Act relating to child protection services). Barne- og familiedepartementet (The Norwegian Ministry of Children and Families). [https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL\\_4#KAPITTEL\\_4](https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL_4#KAPITTEL_4). Accessed 11 Mar 2020
  56. Lovdata.no (2008) Forskrift om krav til kvalitet og internkontroll i barneverninstitusjoner (Regulation concerning requirements to quality and internal control in child welfare institutions). Barne- og familiedepartementet (The Norwegian Ministry of Children and Families). <https://lovdata.no/dokument/SF/forskrift/2008-06-10-580>. Accessed 11 Mar 2020
  57. Kaye NS, Jozefiak T, Rimehaug T, Tjelflaot T, Brubakk A-M, Wichstrøm L (2015) Resultater fra forskningsprosjektet Psykisk helse hos barn og unge i barneverninstitusjoner. NTNU Regionalt kunnskapssenter for barn og unge—Psykisk helse og barnevern, [https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport\\_RKBU.pdf](https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport_RKBU.pdf). Accessed 11 Mar 2020
  58. Angold A, Costello EJ (2000) The child and adolescent psychiatric assessment (CAPA). *J Am Acad Child Adolesc Psychiatry* 39(1):39–48. <https://doi.org/10.1097/00004583-200001000-00015>
  59. Owens J, Goldfine M, Evangelista N, Hoza B, Kaiser N (2007) A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clin Child Fam Psychol Rev* 10(4):335–351. <https://doi.org/10.1007/s10567-007-0027-3>
  60. Fonagy P (2002) Affect regulation, mentalization, and the development of the self. Other Press, New York
  61. Egger HL, Erkanli A, Keeler G, Potts E, Walter BK, Angold A (2006) Test-retest reliability of the preschool age psychiatric assessment (PAPA). *J Am Acad Child Adolesc Psychiatry* 45(5):538–549. <https://doi.org/10.1097/01.chi.0000205705.71194.b8>
  62. Achenbach TM, Rescorla L (2001) Manual for the ASEBA school-age forms & profiles: an integrated system of multi-informant assessment. ASEBA, Burlington
  63. van Buuren S (2018) Flexible imputation of missing data. CRC interdisciplinary statistic series, 2nd edn. CRC Press, Boca Raton
  64. Rodwell L, Lee KJ, Romaniuk H, Carlin JB (2014) Comparison of methods for imputing limited-range variables: a simulation study. *BMC Med Res Methodol* 14(1):57. <https://doi.org/10.1186/1471-2288-14-57>
  65. Zeanah CH, Chesser T, Boris NW (2016) Practice parameter for the assessment and treatment of children and adolescents with reactive attachment disorder and disinhibited social engagement disorder. *J Am Acad Child Adolesc Psychiatry* 55(11):990. <https://doi.org/10.1016/j.jaac.2016.08.004>
  66. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA (2015) Annual research review: a meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J Child Psychol Psychiatry* 56(3):345–365. <https://doi.org/10.1111/jcpp.12381>
  67. Reneflot A, Aarø LE, Aase H, Reichborn-Kjennerud T, Tams K, Øverland S (2018) Psykisk helse i Norge (Mental health in Norway). Norwegian Institute of Public Health, [https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/psykisk\\_helse\\_i\\_norge2018.pdf](https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2018/psykisk_helse_i_norge2018.pdf). Accessed 11 Mar 2020
  68. Rescorla L, Ivanova MY, Achenbach TM, Begovac I, Chahed M, Drugli MB, Emerich DR, Fung DSS, Haider M, Hansson K, Hewitt N, Jaimes S, Larsson B, Maggolini A, Marković J, Mitrović D, Moreira P, Oliveira JT, Olsson M, Ooi YP, Petot D, Pisa C, Pomalima R, da Rocha MM, Rudan V, Sekulić S, Shahini M, de Mattos Silveira EF, Szivovicza L, Valverde J, Vera LA,

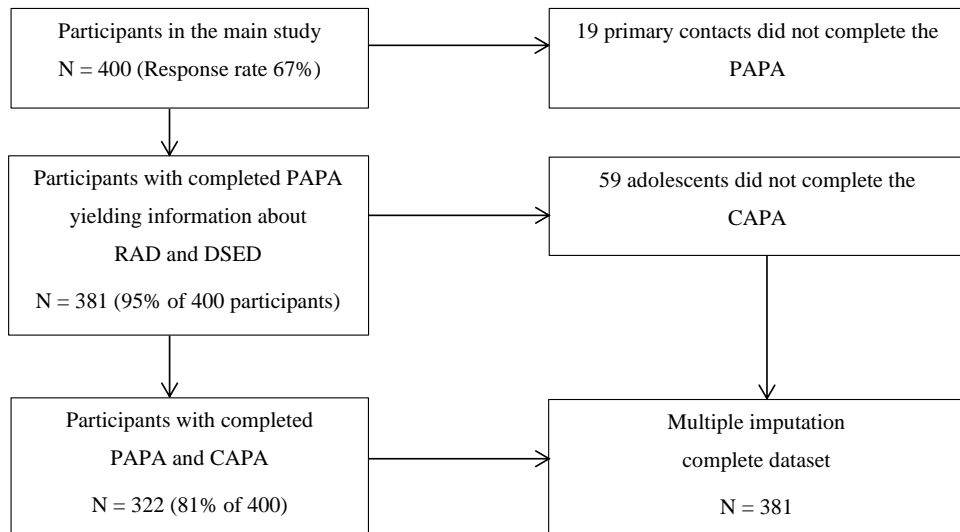
- Villa MC, Viola L, Woo BSC, Zhang EY (2012) International epidemiology of child and adolescent psychopathology II: integration and applications of dimensional findings from 44 societies. *J Am Acad Child Adolesc Psychiatry* 51(12):1273–1283. <https://doi.org/10.1016/j.jaac.2012.09.012>
69. Nøvik TS (1999) Validity and use of the child behavior checklist in Norwegian children and adolescents : an epidemiological and clinical study. Department of Psychiatry, University of Oslo, Centre for Child and Adolescent Psychiatry, Oslo
70. NOVA (2015) Ungdata. Nasjonale resultater 2014. Nova Rapport 7/15. (Youth Data. National Results 2014). Oslo: Norsk institutt for forskning om oppvekst, velferd og aldring (NOVA) (Norwegian Social Research)
71. Cohen P, Brown J, Smailes E (2001) Child abuse and neglect and the development of mental disorders in the general population. *Dev Psychopathol* 13(4):981–999
72. Humphreys KL, Gleason MM, Drury SS, Miron D, Nelson CA, Fox NA, Zeanah CH (2015) Effects of institutional rearing and foster care on psychopathology at age 12 years in Romania: follow-up of an open, randomised controlled trial. *Lancet Psychiatry* 2(7):625–634. [https://doi.org/10.1016/S2215-0366\(15\)00095-4](https://doi.org/10.1016/S2215-0366(15)00095-4)
73. Zeanah CH, Egger HL, Smyke AT, Nelson CA, Fox NA, Marshall PJ, Guthrie D (2009) Institutional rearing and psychiatric disorders in Romanian preschool children. *Am J Psychiatry* 166(7):777–785. <https://doi.org/10.1176/appi.ajp.2009.08091438>
74. Jones R, Everson-Hock E, Papaioannou D, Guillaume L, Goyder E, Chilcott J, Cooke J, Payne N, Duenas A, Sheppard L, Swann C (2011) Factors associated with outcomes for looked-after children and young people: a correlates review of the literature. *Child Care Health Dev* 37(5):613–622. <https://doi.org/10.1111/j.1365-2214.2011.01226.x>
75. Corval R, Belsky J, Baptista J, Mesquita A, Soares I (2019) Development and validation of an observational measure of symptoms of reactive attachment disorder. *Attach Hum Dev* 21(2):111–131. <https://doi.org/10.1080/14616734.2018.1499209>
76. Allen B (2018) Misperceptions of reactive attachment disorder persist: poor methods and unsupported conclusions. *Res Dev Disabil* 77:24–29. <https://doi.org/10.1016/j.ridd.2018.03.012>
77. Lehmann S, Breivik K, Monette S, Minnis H (2020) Potentially traumatic events in foster youth, and association with DSM-5 trauma- and stressor related symptoms. *Child Abuse Negl*. <https://doi.org/10.1016/j.chiabu.2020.104374>
78. Giltaij HP, Sterkenburg PS, Schuengel C (2017) Convergence between observations and interviews in clinical diagnosis of reactive attachment disorder and disinhibited social engagement disorder. *Clin Child Psychol Psychiatry* 22(4):603–619. <https://doi.org/10.1177/1359104517709049>

### Online Resource 1

**Article:** RAD and DSED in adolescence: co-occurring disorders and psychosocial problems

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Figure S1. Participant flowchart



Note. *CAPA* child and adolescent psychiatric assessment; *DSED* disinhibited social engagement disorder; *PAPA* preschool age psychiatric assessment; *RAD* reactive attachment disorder.





# Paper III





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## Child Abuse &amp; Neglect

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# Self-esteem in adolescents with reactive attachment disorder or disinhibited social engagement disorder

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## ABSTRACT

**Background:** Low self-esteem predicts negative outcomes and mediates the association between childhood adversity and mental health problems in adolescence. Reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) are presumably caused by early insufficient care, but their association with self-esteem is unknown.

**Objective:** Investigate global and domain-specific self-esteem in adolescents with RAD or DSED. **Participants and setting:** All adolescents living in Norwegian residential youth care (RYC) ( $N = 306$ ; age 12–20) were compared with a sample from the general Norwegian adolescent population ( $N = 10,480$ ; age 12–20).

**Methods:** Self-esteem for scholastic competence (SC), social acceptance (SA), athletic competence (AC), physical appearance (PA), romantic appeal (RA), close friendship (CF), and self-worth (SW) was investigated using the revised version of the Self-Perception Profile for Adolescents.

**Results:** Compared to the general population, adolescents with RAD diagnosis had lower SC (mean difference, MD =  $-0.30$ ,  $p = .020$ ) and higher CF (MD =  $0.25$ ,  $p = .021$ ), whereas adolescents with DSED diagnosis had lower SC (MD =  $-0.42$ ,  $p = .005$ ), SA (MD =  $-0.40$ ,  $p = .015$ ), AC (MD =  $-0.22$ ,  $p = .038$ ), PA (MD =  $-0.33$ ,  $p = .048$ ), and SW (MD =  $-0.37$ ,  $p = .013$ ). Compared to adolescents in RYC without RAD/DSED diagnoses, adolescents with DSED diagnoses had lower SA (MD =  $-0.42$ ,  $p = .012$ ) and SW (MD =  $-0.32$ ,  $p = .037$ ). More RAD symptoms were associated with lower SA ( $B = -0.051$ ,  $p = .013$ ), AC ( $B = -0.048$ ,  $p = .028$ ), RA ( $B = -0.053$ ,  $p = .007$ ), and CF ( $B = -0.052$ ,  $p = .005$ ). More DSED symptoms were associated with lower SC ( $B = -0.125$ ,  $p = .038$ ).

**Conclusion:** Both global and domain-specific self-esteem in adolescents with RAD or DSED should be assessed; developmental support and treatment plans should be adjusted accordingly.

## 1. Introduction

High self-esteem predicts beneficial outcomes in important life domains such as health, work, and interpersonal relationships (Orth & Robins, 2014), whereas low self-esteem in adolescence predicts poor physical and mental health, worse economic prospects, and

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criminal behavior in adulthood (Trzesniewski et al., 2006). Self-esteem denotes the self-evaluation of one's worth and ability and evolves as a function of a person's developmental history, experiences, and cognitive ability (Harter, 2012). Children with emotionally unavailable, rejective, and unsupportive caregivers are prone to develop a self-perception as incompetent, unlovable, and unworthy, reflected by low global self-esteem (Harter, 2012). Moreover, severely insufficient care in early childhood is a diagnostic criterion and the presumed cause of reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) (American Psychiatric Association, 2013). In adolescence, RAD and DSED frequently co-occur with emotional and behavioral problems and disorders (Seim et al., 2020a), but associations with self-esteem are unknown. Intervention studies indicate that poor self-esteem in children and adolescents can be enhanced and that targeting children and adolescents with identified disorders or problems is more effective than preventive interventions in the general population (Haney & Durlak, 1998; O'Mara et al., 2006). Because self-esteem has been found to mediate the association between child maltreatment and emotional and behavioral problems (Flynn et al., 2014; Ju & Lee, 2018; Turner et al., 2015), it may be an important target for intervention in the prevention and treatment of mental health problems in high-risk adolescents, including those with RAD or DSED. Further, low self-esteem may, independently of psychopathology, contribute to low quality of life in high-risk adolescents (Jozefiak et al., 2017), and self-esteem enhancement may therefore be important to improve life quality in adolescents with RAD or DSED.

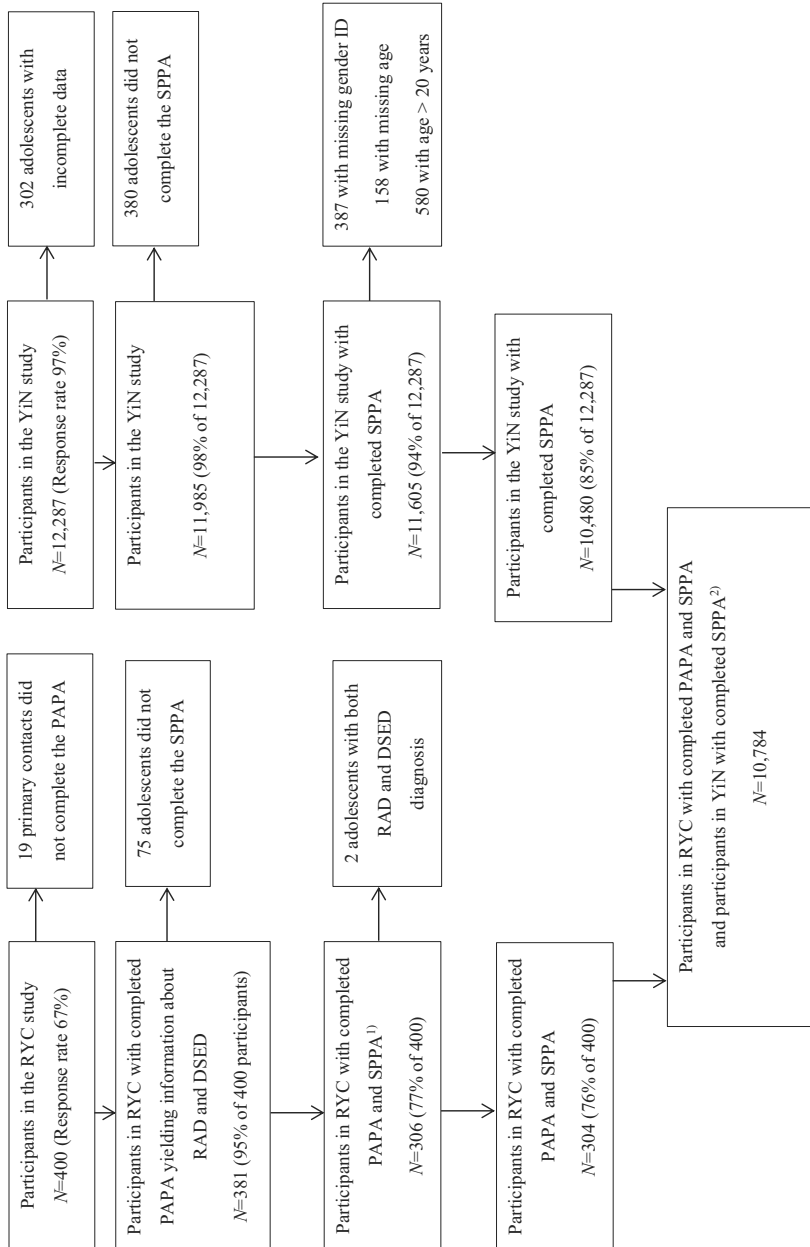
Self-esteem is typically conceptualized as a multidimensional construct, having several domain-specific components, such as academic, physical, and social self-esteem (Harter, 2012; Rosenberg et al., 1995), in addition to an evaluation of global self-esteem. Because a person may have, for example, a high academic self-esteem and a low physical self-esteem, and the person's global self-esteem then depends on how important the person considers academic and physical success to be (intrapersonal perspective) and how important these domains are for the individual's perception of their own social status (interpersonal perspective), a person's self-esteem cannot be adequately understood without considering both global and domain-specific components (Harter, 2012; Marsh et al., 2004; Rosenberg et al., 1995; Von Soest et al., 2016). Moreover, self-esteem interventions that directly target specific self-domains, such as academic self-esteem, rather than aiming to enhance self-esteem in general, have been shown to more effectively improve self-esteem in the targeted domain (O'Mara et al., 2006). Therefore, to optimize treatment and care for individuals with RAD or DSED, services and caregivers need specified knowledge about self-esteem in adolescent RAD and DSED, which has not been previously studied. Accordingly, having access to a national sample of adolescents living in residential youth care (RYC) and a national sample of adolescents in the general population, we investigate global and domain-specific self-esteem in adolescent RAD and DSED.

RAD is characterized by social withdrawal, limited emotional responsiveness, and failure to seek and respond to comfort (American Psychiatric Association, 2013). DSED, on the other hand, is characterized by indiscriminate behavior and a lack of reticence in interactions with strangers or in other unfamiliar settings (American Psychiatric Association, 2013). Longitudinal studies have demonstrated that symptoms of RAD and DSED may persist from early childhood to adolescence and early adulthood (Guyon-Harris et al., 2018; Guyon-Harris et al., 2019; Humphreys et al., 2017; Sonuga-Barke et al., 2017). However most available studies of RAD and DSED are of younger children, and more knowledge about RAD and DSED in adolescence is called for (Zeanah et al., 2016). Because RAD and DSED are rare psychiatric disorders distinct from insecure and disorganized attachment patterns (Schroder et al., 2019) that characterize nearly half of the general adolescent population (Ballús et al., 2019), findings from studies of associations between disorganized or insecure attachment and self-esteem cannot be directly mapped onto RAD and DSED. The only available studies of self-esteem in individuals with RAD or DSED are of school-aged children. However, because global and domain-specific self-esteem tend to drop from childhood to adolescence (Robins et al., 2002) with a subsequent increase through adolescence to adulthood (Robins et al., 2002; Von Soest et al., 2016), and because the presentation and impact of RAD and DSED in adolescence may differ from that in childhood (Zeanah et al., 2016), findings in school-aged children are not necessarily transferable to adolescence. Therefore, a specific investigation of self-esteem in adolescents with RAD or DSED is needed.

At school age, a study of institutionalized children found that disturbed attachment behavior, including symptoms of either RAD or DSED, was associated with poor self-reported scholastic competence and global self-esteem but was not associated with social acceptance or athletic competence self-esteem (Vacaru et al., 2018). Regarding RAD, a study in special schools for children with emotional and behavioral disorders found no associations between RAD and self-reported global self-esteem (Bosmans et al., 2019). Another study comparing school-aged high-risk children with controls from the general population reported that having more RAD symptoms was associated with lower self-esteem, measured as the mean of cognitive competence, peer acceptance, and behavioral conduct self-esteem (Zimmermann & Iwanski, 2019). Beyond age 12 years, the self-esteem in individuals with RAD has not been studied. For DSED, an investigation of school-age children in special education schools found, contrary to expectations, that children with signs of DSED had more positive appraisals of both self and others and reported higher global self-esteem than the control group (Vervoort et al., 2014). Beyond middle childhood, the self-esteem of individuals with DSED has not been investigated. Altogether, research on self-esteem in RAD and DSED is scarce, findings are equivocal, and there is a total lack of knowledge for adolescence.

The causal relationship between self-esteem and other psychopathology (such as emotional and behavioral disorders) is not entirely clear, and two opposing explanations dominate the literature: The vulnerability model proposes that low self-esteem is a risk factor for psychopathology, whereas the scar model proposes that low self-esteem is a consequence of psychopathology (Orth et al., 2012; Reed-Fitzke, 2020; Zeigler-Hill, 2011). A variant of the vulnerability model, the stress process model, proposes that negative stress interacts with self-esteem in predicting psychopathology, with self-esteem acting as a mediator (Pearlin, 1989; Reed-Fitzke, 2020). Although there is a risk that RAD or DSED may cause other psychopathology later in life, the early debut and etiology implicit in the RAD and DSED diagnoses make it less likely that other psychopathology causes RAD or DSED. Hence, in the investigation of associations between RAD or DSED and self-esteem, other psychopathology may act as a collider (in the case of the vulnerability model) or a mediator (in the case of the scar model) but less likely a confounder, and it should therefore not be adjusted for.

Categorical and dimensional approaches to RAD and DSED each have their strengths and weaknesses (Stafford et al., 2003), where



**Fig. 1.** Participant flowchart. Note. DSED disinhibited social engagement disorder; PAPA preschool age psychiatric assessment; RAD reactive attachment disorder; RYC residential youth care; SPPA Self-Perception Profile for Adolescents; YiN Young in Norway study. <sup>1)</sup>Participants included in analysis of association between self-esteem domains and RAD and DSED symptom loads. <sup>2)</sup>Participants included in group comparisons of self-esteem (adolescents with: RAD diagnosis, DSED diagnosis, adolescents in RYC with neither RAD nor DSED diagnoses, and adolescents in the general population).

categorical diagnoses are clinical tools that consider, for example, onset, impairment, and exclusion criteria and reflect more than simple cut-off values of symptom loads. Dimensional measures of symptom loads, on the other hand, give higher statistical power and allow the inclusion of sub-threshold cases, which may have high levels of impairment and psychiatric burden, although some diagnostic criteria are unfulfilled (Stafford et al., 2003). To encompass the advantages of both categorical and dimensional approaches, we investigate self-esteem by using both diagnostic and symptom load approaches to RAD and DSED.

Due to the high-risk nature of adolescents living in residential youth care (RYC) (Greger et al., 2015; Jozefiak et al., 2016) and indications that school-age children not reared with their parents have lower self-esteem in many domains compared with children in the general population (Wang et al., 2015), we hypothesize that adolescents with RAD or DSED living in RYC have lower self-esteem compared with adolescents in the general population. However, this may not be the case in all self-esteem domains. Further, it is unknown whether self-esteem in adolescent RAD and DSED differs from self-esteem in other high-risk adolescents living in RYC without RAD or DSED. Moreover, children with RAD seem to be more responsive to enhanced caregiving than children with DSED (Smyke et al., 2012; Zeanah & Gleason, 2015), but it is unknown whether there is a difference in self-esteem between adolescents with a RAD diagnosis and those who have a DSED diagnosis. Because of the general knowledge drought concerning self-esteem in individuals with RAD or DSED and the complete lack of knowledge in adolescence, our study is mainly exploratory, aiming to investigate whether adolescents with RAD or DSED diagnoses or symptoms have lower global or domain-specific self-esteem than adolescents without RAD or DSED.

More specifically, we aim to investigate whether mean values of global and domain-specific self-esteem among adolescents living in RYC (i) differ between those with a RAD diagnosis, a DSED diagnosis, neither RAD nor DSED diagnoses, and adolescents in the general population, and (ii) are associated with RAD or DSED symptom loads.

## 2. Methods

### 2.1. Participants

#### 2.1.1. Adolescents in RYC

All residents aged 12–23 years living in Norwegian RYC between 2011 and 2014 were invited to participate in the research project *Mental Health in Adolescent Residents in the Child Welfare System* (Jozefiak et al., 2016). Of 601 eligible adolescents, a total of 400 participated, of which 381 yielded information about RAD and DSED, and  $N = 306$  also yielded information about self-esteem and participated in the study. The participants were between 12.2 and 20.2 years old ( $M = 16.8$ ,  $SD = 1.4$ ), 56.9% were female ( $n = 174$ ), and 78.5% were ethnic Norwegian. The mean age at first out-of-home placement was 12.4 years ( $SD = 4.1$ ), and the mean number of out-of-home placements was 3.4 ( $SD = 2.5$ ). In total,  $n = 5$  participants had been diagnosed with mild intellectual disability, whereof none had RAD, and  $n = 1$  qualified for a DSED diagnosis. In a previous study, the participants demonstrated high levels of parental risk factors, such as drug use, mental illness, or other chronic illnesses, and very high rates of psychiatric morbidity (Jozefiak et al., 2016). Exposure to maltreatment was self-reported by 71%, and virtually all had likely been exposed to social neglect prior to placement (Greger et al., 2015). The prevalence of RAD diagnosis was 9.2% ( $n = 28$ ), and 8.5% qualified for a DSED diagnosis ( $n = 26$ ), congruent with our previous findings in the total sample of  $N = 381$  with available information about RAD and DSED (Seim et al., 2020b).

#### 2.1.2. Adolescents in the general population

The Young in Norway Study (Wichstrøm, 1999) sampled 67 schools with a total of 12,287 students from a national register of all junior and senior high schools in Norway, by stratifying the sample according to geographic region and school size. A total of 10,480 students had completed the self-esteem questionnaire, were in a comparable age range as the RYC sample, had available gender identification allowing adjustment for gender, and participated in the study. The students were in Grades 7 through 12 and were 12 to 20 years old ( $M = 15.8$ ,  $SD = 1.9$ ), 50.5% female ( $n = 5295$ ). The recruitment flowchart is shown in Fig. 1.

### 2.2. Setting in RYC

The primary focus of the Norwegian child protection services (CPS) is to support families and children in need within their homes, and out-of-home placements are limited to situations when considered paramount to fulfil a child's basic needs (Bufdir.no, 2020). In such cases, placement in foster homes is preferred, with RYC being a last resort (Backe-Hansen et al., 2011). The Norwegian CPS placement criteria (Lovdata.no, 2020) imply that social neglect, maltreatment, or severely inadequate care are likely exposures of children and adolescents prior to out-of-home placements.

Law and quality requirements regulate Norwegian RYC institutions, aiming to ensure that residents are provided with a developmentally supportive and secure environment, covering all basic needs (Lovdata.no, 2020). Typical Norwegian RYC institutions have three to eight residents, resemble family homes, and strive to retain relational continuity. All residents have a primary contact among the staff, who particularly focus on their designated resident, aiming to build a trustful relationship and fulfil the various roles of a primary caregiver. Because 90% of the RYC participants had lived in RYC for three months or more (Kayed et al., 2015), the primary contacts were considered to know their designated resident well and to be reliable informants.

### 2.3. Procedure

In the RYC institutions, data was collected from June 2011 until July 2014 by four trained research assistants, all with relevant

**Table 1**  
Self-esteem subdomains for adolescents with and without RAD and DSED diagnoses. Between-group comparisons of global and domain-specific self-esteem, as measured by one-way ANCOVA with SPFA-domains as dependent variables, grouping factor as fixed factor, and gender and age as covariates.

	Group	n	Descriptive statistics				YIN				RYC				RAD			
			M	SD	MD	CI	p	MD	CI	p	MD	CI	p	MD	CI	p		
Scholastic competence	YIN	10,421	2.83	0.52	-0.17	-0.25	-0.07	.001	-0.13	-0.39	0.16	.344	-0.12	-0.52	0.26	.550		
	RYC	237	2.64	0.67	-0.30	-0.54	-0.04	.020	-0.25	-0.56	0.03	.103						
	RAD	25	2.52	0.65	-0.42	-0.72	-0.14	.005										
Social acceptance	DSED	23	2.37	0.69	0.01	0.10	0.10	.755	0.10	-0.17	0.32	.444						
	YIN	10,473	3.08	0.49	0.11	-0.16	0.33	.338	0.10	-0.42	-0.77	.012	-0.51	-0.92	-0.12	.008		
	RYC	253	3.11	0.68	-0.40	-0.74	-0.08	.015										
Athletic competence	RAD	26	3.20	0.59	-0.05	-0.15	0.04	.233	0.09	-0.21	0.40	.539	-0.26	-0.59	0.08	.124		
	DSED	24	2.68	0.78	0.04	-0.25	0.31	.790	0.17	-0.38	0.06	.163						
	YIN	10,462	2.45	0.63	-0.22	-0.42	-0.004	.038	-0.17	-0.38	0.01	.073						
Physical appearance	RYC	249	2.36	0.76	-0.01	-0.11	0.09	.893	0.19	-0.16	0.54	.280	-0.52	-0.97	-0.08	.023		
	RAD	26	2.48	0.79	0.19	-0.16	0.51	.270	-0.32	-0.68	0.01	.073						
	DSED	24	2.11	0.59	-0.33	-0.67	-0.03	.048										
Romantic appeal	YIN	10,315	2.61	0.58	0.04	-0.03	0.12	.301	0.04	-0.28	0.32	.735	-0.01	-0.32	0.35	.961		
	RYC	242	2.67	0.66	0.09	0.09	0.12	.301	0.04	-0.28	0.32	.735						
	RAD	26	2.72	0.77	0.09	-0.23	0.35	.518	0.04	-0.28	0.32	.735						
Close friends	DSED	24	2.65	0.54	0.08	-0.15	0.29	.426	0.04	-0.20	0.26	.738	-0.01	-0.32	0.35	.961		
	YIN	10,430	3.16	0.59	0.08	0.00	0.16	.054	0.17	-0.06	0.38	.130	-0.22	-0.52	0.09	.128		
	RYC	252	3.28	0.62	0.25	0.03	0.45	.021	-0.05	-0.24	0.15	.654						
Self-worth	RAD	26	3.43	0.52	0.03	0.03	0.15	.726	0.05	-0.15	0.05	.344						
	DSED	24	3.30	0.41	0.03	-0.15	0.21	.726	0.05	-0.26	0.38	.716	-0.38	-0.77	-0.002	.064		
	YIN	10,403	2.87	0.55	-0.05	-0.15	0.05	.344	0.05	-0.26	0.38	.716						
Self-worth	RYC	252	2.81	0.82	-0.37	-0.64	-0.07	.013	-0.32	-0.63	-0.02	.037	-0.38	-0.77	-0.002	.064		
	RAD	26	2.88	0.77	0.01	-0.29	0.32	.956	0.05	-0.26	0.38	.716						
	DSED	24	2.42	0.78	-0.37	-0.64	-0.07	.013	-0.32	-0.63	-0.02	.037	-0.38	-0.77	-0.002	.064		

Note: Groups: adolescents in the general population (YIN), adolescents in RYC with neither RAD nor DSED diagnoses (RYC), adolescents in RYC with RAD diagnosis (RAD), adolescents in RYC with DSED diagnosis (DSED). CI 95% confidence interval, M mean; MD mean difference; SD standard deviation. Bold text signifies p<.05

professional backgrounds. The research assistants completed semi-structured psychiatric interviews with the adolescents and their primary contacts in RYC, in addition to questionnaires completed by the adolescents. In the general population, data was collected in 1992 by student completion of questionnaires in school. All participants gave written, informed consent. The Norwegian Data Protection Authority approved the research in the general population, and the Norwegian Regional Committee for Medical and Health Research Ethics in central Norway approved the research in RYC, as well as the current study.

## 2.4. Instruments

### 2.4.1. RAD and DSED

Because at the time of data collection, there were no validated assessment tools for RAD and DSED in adolescence, and there are no available interviews tailored for adolescent self-report, the Preschool Age Psychiatric Assessment (PAPA) (Egger et al., 2006), a semi-structured psychiatric interview including a module for caregiver-informed symptoms of RAD and DSED was conducted with the primary contacts of adolescents living in RYC. RAD symptoms were assessed by 11 items and DSED symptoms by 4 items. In the diagnostics of RAD and DSED, we applied the DSM-5 criteria (American Psychiatric Association, 2013) but lacked the RAD-item 'response to comfort.' To avoid over-diagnostics, strict criteria of high symptom severity and functional impairment were set (Seim et al., 2020b). Random and regular controls of the interviews were conducted to ensure adherence to the interview protocol and prevent interviewer drift. Blinded re-coding of a randomly drawn sample ( $n = 42$ ; 10.5%) of interview audio recordings yielded satisfactory inter-rater reliability for the assessed diagnoses (Gwet's AC<sub>1</sub> ranged from 0.74 to 1.0, and absolute agreement ranged from 83% to 100%) (Jozefiak et al., 2016).

### 2.4.2. Self-esteem

The revised version (Wichstrøm, 1995) of the Self-Perception Profile for Adolescents (SPPA) was completed by the adolescents in RYC and in the general population. Seven of the original nine SPPA scales were used to assess self-esteem. The global self-worth subscale was used to assess global self-esteem, and the following domain-specific self-esteem scales were also included: scholastic competence, social acceptance, athletic competence, physical appearance, romantic appeal, and close friends. Because having a part-time job was rare (10%) among the adolescents in RYC (Jozefiak et al., 2017), the subscale 'job competence' was omitted. Further, the 'behavior conduct' subscale was excluded because it has shown low reliability in several studies (Jozefiak et al., 2017). The revised SPPA has shown similar or better psychometric properties than the original nine-scale SPPA (Wichstrøm, 1995), and satisfactory internal consistency for each subscale (Von Soest et al., 2016). In the revised SPPA, each domain consists of five items, with four response options ranging from 1 (*describes me poorly*) to 4 (*describes me very well*). To avoid acquiescence, about half of the SPPA items are negatively worded, and the other half are positively worded. Hence, the scores of negatively worded items were reversed such that high scores indicate high self-esteem for all items.

## 2.5. Statistical analysis

For each participant, we calculated mean values of the five items composing the seven respective SPPA domains. The domain mean was coded as missing if information was missing for more than one of the five domain-specific items. We created a grouping variable with four groups (group name in parentheses): adolescents in the general population (YiN), adolescents living in RYC with neither RAD nor DSED diagnoses (RYC), adolescents living in RYC with a RAD diagnosis (RAD), and adolescents living in RYC with a DSED diagnosis (DSED). To allow for comparison of mutually exclusive groups, we excluded  $n = 2$  who satisfied both the RAD and DSED diagnoses. Furthermore, participants who had not completed the SPPA were excluded (Fig. 1). Thus, the comparison of groups was based on information from  $n = 304$  adolescents in RYC and  $n = 10,480$  adolescents in the general population, giving a total  $N = 10,784$  participants. Differences in group means were investigated using analysis of covariance (ANCOVA) with the self-esteem domains as dependent variables. Due to slight differences in the standard deviations between the groups and large differences in the group sizes, we used bootstrapping with the bias-corrected and accelerated (BC<sub>a</sub>) method and  $B = 1000$  bootstrap samples. Associations between RAD or DSED symptoms and self-esteem were investigated among the adolescents in RYC ( $N = 306$ ) using linear regression with each SPPA domain, one at a time, as the dependent variable. All analyses were adjusted for age and gender. Two-sided  $p$ -values  $< .05$  were considered to betoken statistical significance, and where relevant we report 95% confidence intervals (CI). Due to multiple hypotheses,  $p$ -values between .01 and .05 should be interpreted with caution. We used SPSS version 26.0 for all analyses.

## 3. Results

### 3.1. RAD and DSED diagnoses

Adolescents with a RAD diagnosis (Table 1) had lower self-esteem for scholastic competence and higher for close friendship compared to adolescents in the general population. We found no self-esteem differences between adolescents with a RAD diagnosis and those in RYC with neither RAD nor DSED.

Adolescents with a DSED diagnosis (Table 1) had lower self-esteem for scholastic competence, social acceptance, athletic competence, physical appearance, and self-worth than adolescents in the general population. Furthermore, compared to adolescents in RYC with neither RAD nor DSED, adolescents with a DSED diagnosis had lower self-esteem for social acceptance and self-worth. Compared to adolescents with a RAD diagnosis, adolescents with a DSED diagnosis evinced lower self-esteem for social acceptance



and physical appearance. No between-group differences were found for self-esteem in romantic appeal (Table 1).

### 3.2. RAD and DSED symptoms

More RAD symptoms were associated with lower self-esteem in the social acceptance, athletic competence, romantic appeal, and close friendship domains, whereas more DSED symptoms were associated with lower scholastic competence self-esteem (Table 2). The distributions of RAD and DSED symptoms in adolescents living in RYC are presented in online supplements (Tables S1 and S2).

## 4. Discussion

The purpose of this study was to examine whether adolescents with RAD or DSED have lower global and domain-specific self-esteem than adolescents without RAD or DSED. We found that compared to the general population, adolescents in RYC had lower scholastic competence self-esteem regardless of whether they had a RAD or DSED diagnosis. For the remaining domains, adolescents with a RAD diagnosis evidenced no lower self-esteem than any compared groups and had slightly *higher* close friendship self-esteem than the general population. However, using a dimensional approach to RAD, having more RAD *symptoms* was associated with lower self-esteem for several domains. For DSED, adolescents with a DSED diagnosis evidenced lower self-esteem in many domains compared to both the general population and other high-risk adolescents in RYC, and having more DSED symptoms was associated with lower scholastic competence self-esteem. Because the categorical and dimensional approaches to RAD and DSED gave somewhat different results, we discuss the results from each approach separately, starting with the categorical diagnoses.

### 4.1. RAD diagnosis

The mean self-esteem value for scholastic competence in adolescents with a RAD diagnosis was comparable to that in maltreated pre-adolescents using the same self-esteem measure as in the current study (Cederbaum et al., 2020; Mennen et al., 2010). Further, the lower scholastic competence self-esteem in adolescents with RAD compared to the general population agrees with previous findings in institutionalized school-aged children with symptoms of either RAD or DSED (Vacaru et al., 2018). However, because all groups in RYC had lower scholastic competence self-esteem than adolescents in the general population, and there were no between-RYC-group differences or any association between scholastic competence self-esteem and RAD symptom load, the reduced scholastic competence self-esteem in adolescents with RAD may be related to factors common to all adolescents in RYC, such as adversity exposure and relational disruptions, rather than being RAD specific. Nonetheless, awareness of the low scholastic competence self-esteem may better prepare caregivers, clinicians, social workers, and teachers to provide adolescents in RYC, including those who have RAD, with adequate scholastic developmental support and arrange for experiences of mastery in scholastic domains.

Although the *p*-value of between .01 and .05 requires cautious interpretation, our results indicate that adolescents with a RAD diagnosis had a slightly *higher* close friendship self-esteem than peers in the general population. Previous studies, although not specific to RAD, report that maltreated home-reared pre-adolescents have *lower* close friendship self-esteem than non-maltreated peers (Cederbaum et al., 2020; Mennen et al., 2010). By further comparing our results to previous research that applied the same self-esteem measure as the current study, we found higher means for close friendship self-esteem in all adolescent RYC-groups compared to reported means in maltreated home-reared and foster placed pre-adolescents (Cederbaum et al., 2020; Mennen et al., 2010). However, in the general population, the mean levels we found in adolescents are comparable to reported levels in pre-adolescents (Cederbaum et al., 2020; Mennen et al., 2010). Therefore, rather than representing a normative developmental increase in self-esteem through adolescence, the higher close friendship self-esteem in adolescents living in RYC may be due to RYC-specific factors. Notably, the high levels could either represent a false or genuine high self-esteem (Burack et al., 2006; Salmivalli, 2001). Indeed, following severe childhood neglect and abuse, self-aggrandizement may serve as a psychological defense mechanism in order to protect a frail self-esteem (Harter, 2012). Accordingly, given the social vulnerability and relational disruptions following placement, it may be that some adolescents in RYC—as a self-protective mechanism in order to reduce a feeling of aloneness—count others, for example, co-

**Table 2**

RYC-population of *N* = 306. Linear regression analyses with Self-Perception Profile for Adolescents (SPPA) subscale scores as dependent variables and RAD and DSED symptom loads as covariates. All analyses are adjusted for age and gender.

Self-esteem domain (scale 1–4)	RAD symptoms (0–11)				DSED symptoms (0–4)					
	B	CI	<i>p</i>	$\beta$	B	CI	<i>p</i>	$\beta$		
Scholastic competence	–0.013	–0.055	0.029	.537	–0.036	–0.125	–0.243	–0.007	.038	–0.125
Social acceptance	–0.051	–0.091	–0.011	.013	–0.137	–0.113	–0.226	0.001	.053	–0.110
Athletic competence	–0.048	–0.091	–0.005	.028	–0.118	0.014	–0.107	0.135	.819	0.013
Physical appearance	–0.013	–0.067	0.040	.619	–0.026	–0.023	–0.175	0.129	.766	–0.016
Romantic appeal	–0.053	–0.092	–0.014	.007	–0.151	0.031	–0.079	0.141	.578	0.032
Close friends	–0.052	–0.089	–0.016	.005	–0.162	0.033	–0.070	0.137	.528	0.032
Self-worth	–0.018	–0.064	0.029	.462	–0.040	–0.041	–0.174	0.092	.544	–0.034

Note. *B* unstandardized regression coefficient;  $\beta$  standardized regression coefficient; *CI* 95% confidence interval; *DSED* disinhibited social engagement disorder; *RAD* reactive attachment disorder; *p* two-tailed *p*-value.

Bold text signifies *p* < .05

inhabitants in their RYC unit, as close friends regardless of the quality of the relationship. However, we must also acknowledge the possibility that our findings reflect a *genuine* high close friendship self-esteem among some of the adolescents in RYC, possibly due to resilience factors related to the RYC setting. For instance, it may be that living in RYC with peers who have similar life experiences favors the development of truly close friendships.

For the remaining self-esteem domains, we found that adolescents with a RAD diagnosis and adolescents in RYC with neither RAD nor DSED diagnoses did *not* have lower self-esteem than adolescents in the general population. Possibly, this lack of expected discrepancy between high-risk adolescents and the general population echoes the findings from a two-year follow-up of U.S. adolescents, where self-esteem decreased in those who experienced consistently high or increasing levels of poly-victimization, whereas the self-esteem in adolescents who experienced a decrease in poly-victimization was comparable to that in adolescents with stable low levels of victimization (Turner et al., 2015). Because in our study, the adolescents living in RYC on average had their first out-of-home placement four years prior to the data collection, and 90% had lived in RYC for more than three months, it may be that a decrease or halt in adverse experiences following removal from an adverse home environment cultivated an increase in self-esteem to levels comparable with those in the general population. However, there was limited information about the length of stay in RYC (a dichotomous measure: >3 months, yes/no), and lacking information about whether and when reestablishment of parental care had been attempted between previous alternative placements. Hence, we could not study the effect of time on self-esteem following removal from neglectful or abusive caregiving environments. Further, because self-esteem is dependent on social referencing, where an individual will make comparisons to people or groups with which the individual considers comparison to be relevant (Harter, 2012), it may be that adolescents who have lived a while in RYC tend to compare themselves to other adolescents living in RYC rather than to peers in their school or neighborhood. If so, such a contextual comparison factor could contribute to the lack of expected discrepancy between self-esteem in the high-risk adolescents living in RYC and those in the general population. Longitudinal studies are needed to investigate the trajectories of global and domain-specific self-esteem in children and adolescents throughout their placements in alternative care.

#### 4.2. DSED diagnosis

Although, as discussed for RAD, the lower scholastic competence self-esteem in adolescents with DSED may largely be due to factors common to all adolescents in RYC, our results indicate that, contrary to other adolescents in RYC, those with a DSED diagnosis tend to have lower self-esteem than peers in the population for several domains. Finding a lower social acceptance self-esteem in adolescents with a DSED diagnosis than in the general population agrees with previous reports of lower social acceptance self-esteem in maltreated children (Cederbaum et al., 2020; Mennen et al., 2010); however, no previous research has specified the social acceptance self-esteem in DSED or compared it to that in other maltreated groups. Although the indiscriminate behavior intrinsic to DSED may give an impression of a high social self-esteem, our results indicate the contrary, namely that adolescents with a DSED disorder have lower social acceptance self-esteem even compared to other high-risk adolescents in RYC, including those with a RAD diagnosis. Possibly, adolescents with a DSED diagnosis—through their indiscriminate behavior—are more exposed to adverse experiences after placement than other adolescents in RYC and, therefore, to a lesser degree experience an improvement in their self-esteem following removal from neglectful home environments. Additionally, at least in a Norwegian cultural setting where modesty is appreciated and respecting others' privacy is important, it may be that others are more prone to feel invaded by adolescent disinhibited behavior than to feel rejected by adolescent inhibited behavior. Consequently, it may be that adolescents with inhibited behavior evoke more sensitive and supportive responses from their social environment, whereas adolescents with disinhibited behavior evoke more responses of dislike or avoidance from their surroundings, affecting self-esteem trajectories both prior to and after placement in RYC.

Such possible liabilities regarding social feedback and lasting adversity exposure may also depress other self-esteem domains in adolescents with a DSED disorder. For self-esteem in athletic competence, we found lower levels in adolescents with a DSED disorder than in the general population. Previous findings in maltreated children, although non-significant, support the direction of this association (Mennen et al., 2010; Vacaru et al., 2018); however, the current study is the first to specify athletic competence self-esteem in individuals with DSED. Due to multiple hypotheses and a *p*-value close to .05, the lower athletic competence self-esteem in adolescents with DSED must be interpreted cautiously. However, athletic competence self-esteem in adolescence is associated with physical appearance self-esteem (Haugen et al., 2013), which in turn is the self-esteem domain most highly correlated with global self-esteem (Harter, 2012; Von Soest et al., 2016; Wichstrøm & von Soest, 2015). Hence, the general trend that adolescents with a DSED disorder had lower self-esteem for athletic competence, physical appearance, and self-worth compared with all other groups, although not always statistically significant, illustrates internal consistency and supports the validity of our results.

Physical appearance self-esteem has not previously been specified in individuals with DSED. However, previous research reports lower physical appearance self-esteem in individuals exposed to childhood maltreatment (Brayden et al., 1995; Grilo & Masheb, 2001), which adds to the above-discussed internal consistency in supporting our findings. Although the results must be cautiously interpreted due to *p*-values between .01 and .05, the finding that adolescents with a DSED diagnosis have lower physical appearance self-esteem not only compared to the general population but also compared to adolescents with a RAD diagnosis may at least in part be due to possible liabilities for adolescents with a DSED diagnosis, as discussed above.

For global self-esteem, the finding that adolescents with a DSED diagnosis had lower global self-esteem than their peers counters the finding of a higher global self-esteem in special education school children with signs of DSED (Vervoort et al., 2014) but coincides with the lower global self-esteem in institutionalized school-age children having either RAD or DSED symptoms (Vacaru et al., 2018). In total, it appears that adolescents with a DSED disorder are prone to have lower self-esteem in several domains compared with both

the general population and other high-risk adolescents in RYC, even those with a severe RAD diagnosis.

#### 4.3. RAD and DSED symptoms

The finding that having more RAD *symptoms* was associated with lower self-esteem for social acceptance, athletic competence, romantic appeal, and close friendship, whereas adolescents with a RAD *diagnosis* did not have lower self-esteem than their peers in any of these domains, may be because the dimensional measure of RAD symptom load does not consider diagnostic criteria, such as certain obligate symptom combinations or exclusion of individuals with autism spectrum disorder (ASD). Therefore, individuals who primarily have other psychiatric disorders associated with low self-esteem—for example, depression, anxiety, or ASD—may have overlapping symptoms with RAD without fulfilling the RAD diagnosis and thereby contribute to a negative association between certain self-esteem domains and RAD symptom load. Indeed, in a previous study of the same sample, symptoms of RAD correlated modestly with symptoms of depression or anxiety and highly with symptoms of ASD (Seim et al., 2020b). Nonetheless, RAD symptoms were found to be distinct from symptoms of other psychiatric disorders, including depression, anxiety, and ASD (Seim et al., 2020b), lending support to the validity of our findings. Overall, we consider that caregivers, social workers, and clinicians aiming to provide adequate developmental support or treatment to adolescents with RAD will be better positioned to do so by considering possible low self-esteem levels in the mentioned domains than by wrongly overlooking it.

Finding that scholastic competence self-esteem decreased with an increasing number of DSED symptoms agrees with reports in institutionalized children (Vacaru et al., 2018). Although, as discussed for RAD, the negative association may primarily be explained by factors common to all adolescents in RYC, our results indicate that there may be DSED-specific factors that further deteriorate scholastic competence self-esteem. Evidence is limited regarding physiological or neurobiological mechanisms underlying the development of RAD and DSED in response to childhood adversity (Zeanah et al., 2016); however, there are indications that DSED symptoms may primarily reflect impaired inhibitory control due to developmental deviations of regions in the prefrontal cortex (Pears et al., 2010). The prefrontal cortex is responsible for executive functioning and situates abilities not only of inhibitory control but also of working memory, attention capacity, mental shifts, and other aspects of cognitive control (Koechlin & Summerfield, 2007), thereby being essential to scholastic functioning. Hence, the reduced scholastic competence self-esteem in adolescents with a DSED disorder may reflect a lower scholastic functioning—indeed lower cognitive abilities have been demonstrated in school-age children with DSED (Pritchett et al., 2013), possibly both due to missed educational opportunities (Pritchett et al., 2013) and developmental neurobiological deviations (Pears et al., 2010).

#### 4.4. Strengths and limitations

The comparatively large and representative national samples both in RYC and in the general population are clear strengths of this research. Further strengths are the use of in-depth semi-structured psychiatric interviews to assess RAD and DSED and the broad assessment of multiple self-esteem domains in the high-risk and general population.

However, several limitations should be acknowledged. First, although sole use of caregiver information in the assessment of RAD and DSED is common in research (Humphreys et al., 2017; Lehmann et al., 2018; Sonuga-Barke et al., 2017), clinical parameters recommend the use of multiple methods, including observation (Atkinson, 2019; Zeanah et al., 2016). Caregiver reports may generate both over-identification (Giltaj et al., 2017) and under-identification (Bruce et al., 2019) of RAD and DSED. However, caregiver-informed assessments have also been found to converge with observation assessments of RAD and DSED (Atkinson, 2019; Gleason et al., 2011; Zeanah & Gleason, 2015; Zimmermann & Iwanski, 2019), giving confidence to our findings. Further, although RAD has been demonstrated to be trans-relational in nature (Zimmermann & Iwanski, 2019), we cannot be certain that the aberrant attachment behaviors reported by the primary contacts in RYC delineate the adolescents' behaviors toward previous primary caregivers, nor that RAD symptoms in accordance with the DSM-5 criteria were present prior to the age of five years. Moreover, in the diagnostics of RAD and DSED, we could substantiate, but not prove, fulfilment of the DSM-5 exposure criteria requiring extremely insufficient early care. In addition, for the RAD A criterion in DSM-5, we had information about comfort seeking behavior but lacked information about the adolescents' response to comfort when distressed. Although this deflated the number of RAD symptoms in our dimensional measure of symptom load, it may have inflated the prevalence of RAD diagnosis. Consequently, we took careful measures to minimize the risk of overdiagnosis (Seim et al., 2020b). In effect, and because we found prevalence rates of RAD and DSED no higher than those in Norwegian foster children (Lehmann et al., 2013), we regard the risk of overdiagnosis to be minimal.

In comparison groups representing the general population, taking measures to compensate for possible high-risk participants may introduce bias and inflate the real differences between the population of interest and the general population. Therefore, in the general population sample, the inclusion of all students in the sampled schools and non-adjustment for possible high-risk individuals may be regarded as a strength in our study. Still, there can be some presence of RAD, DSED, or RYC placement in the general population sample. Our lack of information and adjustment thereof, may have resulted in underestimation of real differences in self-esteem between the RYC and the non-RYC general population groups. However, because RAD, DSED, and RYC placements are considered very rare in the general population, we expect such bias to be negligible.

Due to possible developmental changes in both self-esteem and RAD/DSED, our findings are not necessarily transferable to other age groups. Further, the cross-sectional study design precludes investigation of self-esteem trajectories in individuals with RAD or DSED, both prior to and after placement. Moreover, self-esteem in adolescent RAD or DSED may differ for adolescents in other settings, such as those in well-functioning foster/adoptive homes or those in less developmentally supportive or larger sized RYCs. Cultural factors may also influence self-esteem (Harter, 2012), and our findings can therefore not necessarily be transcribed to adolescents with

RAD or DSED in non-Western cultures.

Furthermore, although self-esteem by definition implies a self-evaluation of one's ability and worth, various types of response biases are likely to occur by self-report measures of self-esteem (Salmivalli, 2001) and may impact our findings. Because severe and chronic child abuse and neglect increase the risk of developing false-self behavior (Harter, 2012), we expect false and unhealthy high self-esteem to be more prevalent in high-risk groups, such as adolescents living in RYC. If so, it may be that our results give a distorted impression in the direction of falsely high self-esteem levels in adolescents living in RYC, including those with RAD or DSED. Future research on self-esteem in RAD and DSED may benefit from including measures of awareness and acceptance of one's own shortcomings or negative characteristics (Salmivalli, 2001), as an effort to differentiate healthy and less healthy high self-esteem.

#### 4.5. Clinical implications

The most essential intervention for individuals with RAD or DSED is the provision of a lasting relationship with an emotionally available and sensitive caregiver (Zeanah et al., 2016). However, specified interventions targeting global or domain-specific self-esteem may be important mental health preventive measures in high-risk adolescents (Valdez et al., 2015), including those with RAD or DSED, and have been shown to be more effective than general or indirect interventions in improving the desired self-esteem domains (Haney & Durlak, 1998; O'Mara et al., 2006). Although further research is warranted to confirm our results, this first investigation of global and domain-specific self-esteem in adolescent RAD and DSED may be of clinical value for health workers, social workers, caretakers, and teachers of adolescents with RAD or DSED, by giving a direction for self-esteem interventions and suggesting the following focus areas:

Scholastic self-esteem predicts important life outcomes such as educational attainment, income, and employment (Von Soest et al., 2016) and may be an important target for adolescents in RYC, including those with RAD or DSED diagnoses. Because scholastic self-esteem is primarily promoted by positive school results (Marsh et al., 2018), the low scholastic self-esteem in adolescents with RAD and DSED probably reflects lower scholastic functioning. Ensuring that teachers have adequate information about the adolescents' background histories, symptoms, and functioning may be crucial to facilitate school staff interacting with the adolescents in developmentally supportive manners. Further, in accordance with clinical guidelines, all maltreated children, and thereby all children and adolescents with RAD or DSED, should receive comprehensive psychiatric assessments, including assessments for neurodevelopmental delays or disorders (Zeanah et al., 2016). Customizing learning plans in accordance with the individual's functioning may facilitate a sense of scholastic mastery, and school interventions that combine contingent praise of effort or ability with specific skills training in the desired fields of competence are recommended (O'Mara et al., 2006).

Further, because social acceptance self-esteem is rather highly correlated with global self-esteem (Vacaru et al., 2018; Von Soest et al., 2016) and predicts important life outcomes, including unemployment, income, and mental health indicators (Von Soest et al., 2016), interventions to enhance social acceptance self-esteem by, for example, combining contingent feedback or praise with specific social competence skills training (O'Mara et al., 2006) may prove beneficial for adolescents with RAD or DSED, and may be useful in, for example, milieu therapy plans for those living in RYC. Moreover, social acceptance self-esteem has been found to be associated with quality of life in high-risk adolescents (Jozefiak et al., 2017). Hence, targeting social acceptance self-esteem in adolescents with RAD or DSED may contribute to enhanced quality of life in a severely deprived group.

Finding ways to specifically target physical appearance self-esteem in adolescents with DSED may be important because physical appearance self-esteem predicts essential life outcomes such as income, unemployment, and mental health indicators (Von Soest et al., 2016). Further, physical appearance self-esteem is associated with quality of life in high-risk adolescents (Jozefiak et al., 2017) and is the self-esteem domain most highly correlated with global self-esteem in adolescence (Harter, 2012; Von Soest et al., 2016; Wichstrøm & von Soest, 2015). Because the correlation between physical appearance evaluated by self and others is only moderate (Ehlinger & Blashill, 2016), interventions to enhance self-acceptance and reduce self-criticism of physical appearance may be valuable, in addition to psychoeducation on the impact of societal body ideals and the importance of self-evaluated appearance for the feeling of self-worth. Further, due to the close and reciprocal relationship between global and physical appearance self-esteem (Von Soest et al., 2016; Wichstrøm & von Soest, 2015), another approach may be to target low global self-esteem in adolescents having DSED, with a potential indirect simultaneous enhancement of physical appearance self-esteem. Additionally, because physical activity may enhance physical appearance self-esteem, athletic competence self-esteem, and global self-esteem (Haugen et al., 2013; Legrand, 2014), interventions to stimulate participation and a sense of mastery in physical activities, for example, through specific athletic skills training combined with contingent praise and feedback, may be beneficial for adolescents with RAD or DSED.

#### 4.6. Conclusion

This cross-sectional study explored global and domain-specific self-esteem in adolescents living in RYC with RAD or DSED diagnoses or symptoms. Although unable to inform on the trajectories of self-esteem throughout placements in alternative care, the study supports the relevance of assessing global and domain-specific self-esteem in high-risk adolescents. Results indicated that self-esteem in several domains decreased with an increasing number of RAD symptoms. Further, compared to peers in the general population and in RYC, adolescents with a DSED diagnosis had lower self-esteem in multiple domains. Because low self-esteem in adolescence predicts poor life outcomes in adulthood and is associated with worse quality of life in high-risk adolescents, and because interventions targeting specific self-esteem domains may be more effective than unspecific interventions, all adolescents with RAD or DSED should be offered assessment of global and domain-specific self-esteem. School interventions, milieu therapeutic focus in, for example, RYCs, and individual treatment plans should be adjusted accordingly.

## Declaration of competing interest

None.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2021.105141>.

## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.).
- Atkinson, L. (2019). Reactive attachment disorder and attachment theory from infancy to adolescence: Review, integration, and expansion. *Attachment & Human Development, 21*(2), 205–217. <https://doi.org/10.1080/14616734.2018.1499214>
- Backe-Hansen, E., Bakkeiteig, E., Gautun, H., & Grønningseter, A. B. (2011). Institusjonsplassering - siste utvei. Betydningen av barnevernsreformen fra 2004 for institusjonstilbudet (placement in institutions - the last opportunity. The importance of the child welfare reform in 2004 for placement policy in institutions) (NOVA, Issue. v. o. a. NOVA - Norsk institutt for forskning om oppvekst). [http://www.nova.no/asset/5057/1/5057\\_1.pdf](http://www.nova.no/asset/5057/1/5057_1.pdf).
- Ballús, E., Urrutia, E., Casas, M., & Loizaga, F. (2019). Attachment Picture Story (APS): Adaptation and validation of the projective Patte Noire Test to evaluate attachment in adolescence. *Rorschachiana, 40*(2), 73–94. <https://doi.org/10.1027/1192-5604/a000113>
- Bosmans, G., Spilt, J., Vervoort, E., & Verschuere, K. (2019). Inhibited symptoms of reactive attachment disorder: Links with working models of significant others and the self. *Attachment & Human Development, 21*(2), 190–204. <https://doi.org/10.1080/14616734.2018.1499213>
- Brayden, R. M., Deitrich-MacLean, G., Dietrich, M. S., Sherrod, K. B., & Altemeier, W. A. (1995). Evidence for specific effects of childhood sexual abuse on mental well-being and physical self-esteem. *Child Abuse and Neglect, 19*(10), 1255–1262. [https://doi.org/10.1016/0145-2134\(95\)00078-M](https://doi.org/10.1016/0145-2134(95)00078-M)
- Bruce, M., Young, D., Turnbull, S., Rooksby, M., Chadwick, G., Oates, C., ... Minnis, H. (2019). Reactive attachment disorder in maltreated young children in foster care. *Attachment & Human Development, 21*(2), 152–169. <https://doi.org/10.1080/14616734.2018.1499211>
- Bufdir.no. (2020). *Barnevernsstatistikk (statistics of the child protection service)*. Barne- ungdoms- og familiedirektoratet (The Norwegian Directorate for Children, Youth and Family Affairs). [https://www.bufdir.no/Statistikk\\_og\\_analyse/Barnevern/](https://www.bufdir.no/Statistikk_og_analyse/Barnevern/).
- Burack, J. A., Flanagan, T., Peled, T., Sutton, H. M., Zygmuntowicz, C., & Manly, J. T. (2006). Social perspective-taking skills in maltreated children and adolescents. *Developmental Psychology, 42*(2), 207–217. <https://doi.org/10.1037/0012-1649.42.2.207>
- Cederbaum, J. A., Negriff, S., & Palmer Molina, A. (2020). Child maltreatment and romantic relationships in adolescence and young adulthood: The mediating role of self-perception. *Child Abuse and Neglect, 109*, 104718. <https://doi.org/10.1016/j.chiabu.2020.104718>
- Egger, H. L., Erkanli, A., Keeler, G., Potts, E., Walter, B. K., & Angold, A. (2006). Test-retest reliability of the Preschool Age Psychiatric Assessment (PAPA). *Journal of the American Academy of Child and Adolescent Psychiatry, 45*(5), 538–549. <https://doi.org/10.1097/01.chi.0000205705.71194.b8>
- Ehlinger, P. P., & Blashill, A. J. (2016). Self-perceived vs. actual physical attractiveness: Associations with depression as a function of sexual orientation. *Journal of Affective Disorders, 189*, 70–76. <https://doi.org/10.1016/j.jad.2015.08.071>
- Flynn, M., Cicchetti, D., & Rogosch, F. (2014). The prospective contribution of childhood maltreatment to low self-worth, low relationship quality, and symptomatology across adolescence: A developmental-organizational perspective. *Developmental Psychology, 50*(9), 2165–2175. <https://doi.org/10.1037/a0037162>
- Giltåj, H. P., Sterkenburg, P. S., & Schuengel, C. (2017). Convergence between observations and interviews in clinical diagnosis of reactive attachment disorder and disinhibited social engagement disorder. *Clinical Child Psychology and Psychiatry, 22*(4), 603–619. <https://doi.org/10.1177/1359104517709049>
- Gleason, M. M., Fox, N. A., Drury, S., Smyke, A., Egger, H. L., Nelson, C. A., ... Zeanah, C. H. (2011). Validity of evidence-derived criteria for reactive attachment disorder: Indiscriminately social/disinhibited and emotionally withdrawn/inhibited types. *Journal of the American Academy of Child and Adolescent Psychiatry, 50* (3), 216–231. e213 <https://doi.org/10.1016/j.jaac.2010.12.012>.
- Greger, H. K., Myhre, A. K., Lydersen, S., & Jozefiak, T. (2015). Previous maltreatment and present mental health in a high-risk adolescent population. *Child Abuse and Neglect, 45*, 122–134. <https://doi.org/10.1016/j.chiabu.2015.05.003>
- Grilo, C. M., & Masheb, R. M. (2001). Childhood psychological, physical, and sexual maltreatment in outpatients with binge eating disorder: Frequency and associations with gender, obesity, and eating-related psychopathology. *Obesity Research, 9*(5), 320–325. <https://doi.org/10.1038/oby.2001.40>
- Guyon-Harris, K. L., Humphreys, K. L., Degnan, K., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2019). A prospective longitudinal study of reactive attachment disorder following early institutional care: Considering variable- and person-centered approaches. *Attachment & Human Development, 21*(2), 95–110. <https://doi.org/10.1080/14616734.2018.1499208>
- Guyon-Harris, K. L., Humphreys, K. L., Fox, N. A., Nelson, C. A., & Zeanah, C. H. (2018). Course of disinhibited social engagement disorder from early childhood to early adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 57*(5), 329–335. e322 <https://doi.org/10.1016/j.jaac.2018.02.009>.

- Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and adolescents: A meta-analytical review. *Journal of Clinical Child Psychology*, 27(4), 423–433. [https://doi.org/10.1207/s15374424jccp2704\\_6](https://doi.org/10.1207/s15374424jccp2704_6)
- Harter, S. (2012). *The construction of the self: developmental and sociocultural foundations* (2nd ed.). The Guilford Press.
- Haugen, T., Ommundsen, Y., & Seiler, S. (2013). The relationship between physical activity and physical self-esteem in adolescents: The role of physical fitness indices. *Pediatric Exercise Science*, 25(1), 138–153. <https://doi.org/10.1123/pes.25.1.138>
- Humphreys, K. L., Nelson, C. A., Fox, N. A., & Zeanah, C. H. (2017). Signs of reactive attachment disorder and disinhibited social engagement disorder at age 12 years: Effects of institutional care history and high-quality foster care. *Development and Psychopathology*, 29(2), 675–684. <https://doi.org/10.1017/S0954579417000256>
- Jozefiak, T., Kayed, N., Rimehaug, T., Wormdal, A., Brubakk, A., & Wichstrøm, L. (2016). Prevalence and comorbidity of mental disorders among adolescents living in residential youth care. *European Child and Adolescent Psychiatry*, 25(1), 33–47. <https://doi.org/10.1007/s00787-015-0700-x>
- Jozefiak, T., Kayed, N. S., Ranøyen, I., Greger, H. K., Wallander, J. L., & Wichstrøm, L. (2017). Quality of life among adolescents living in residential youth care: Do domain-specific self-esteem and psychopathology contribute? *Quality of Life Research*, 26(10), 2619–2631. <https://doi.org/10.1007/s11136-017-1603-8>
- Ju, S., & Lee, Y. (2018). Developmental trajectories and longitudinal mediation effects of self-esteem, peer attachment, child maltreatment and depression on early adolescents. *Child Abuse and Neglect*, 76, 353–363. <https://doi.org/10.1016/j.chiabu.2017.11.015>
- Kayed, N. S., Jozefiak, T., Rimehaug, T., Tjellflaat, T., Brubakk, A. M., & Wichstrøm, L. (2015). Resultater fra forskningsprosjektet *Psykisk helse hos barn og unge i barneverninstusjoner* (Results from the research project *Mental Health in Adolescent Residents in the Child Welfare System*). Trondheim: NTNU Regionalt kunnskapssenter for barn og unge - Psykisk helse og barnevern. [https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport\\_RKBU.pdf](https://www.ntnu.no/documents/10293/1263899358/Barnevernrapport_RKBU.pdf).
- Koechlin, E., & Summerfield, C. (2007). An information theoretical approach to prefrontal executive function. *Trends in Cognitive Sciences*, 11(6), 229–235. <https://doi.org/10.1016/j.tics.2007.04.005>
- Legrand, F. D. (2014). Effects of exercise on physical self-concept, global self-esteem, and depression in women of low socioeconomic status with elevated depressive symptoms. *Journal of Sport & Exercise Psychology*, 36(4), 357–365. <https://doi.org/10.1123/jsep.2013-0253>
- 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(1), 39. <https://doi.org/10.1186/1753-2000-7-39>
- Lehmann, S., Monette, S., Egger, H., Breivik, K., Young, D., Davidson, C., & Minnis, H. (2018). Development and examination of the reactive attachment disorder and disinhibited social engagement disorder assessment interview. *Assessment*. <https://doi.org/10.1177/1073191118797422>
- Lovdata.no. (2020). *Lov om barneverntjenester (act relating to child protection services)*. Barne- og familiedepartementet (The Norwegian Ministry of Children and Families). [https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL\\_4#KAPITTEL\\_4](https://lovdata.no/dokument/NL/lov/1992-07-17-100/KAPITTEL_4#KAPITTEL_4).
- Marsh, H. W., Parada, R. H., & Ayotte, V. (2004). A multidimensional perspective of relations between self-concept (self description questionnaire II) and adolescent mental health (youth self-report). *Psychological Assessment*, 16(1), 27–41. <https://doi.org/10.1037/1040-3590.16.1.27>
- Marsh, H. W., Pekrun, R., Murayama, K., Arens, A. K., Parker, P. D., Guo, J., & Dicke, T. (2018). An integrated model of academic self-concept development: Academic self-concept, grades, test scores, and tracking over 6 years. *Developmental Psychology*, 54(2), 263–280. <https://doi.org/10.1037/dev0000393>
- Mennen, F. E., Brensilver, M., & Trickett, P. K. (2010). Do maltreated children who remain at home function better than those who are placed? *Children and Youth Services Review*, 32(12), 1675–1682. <https://doi.org/10.1016/j.childyouth.2010.07.010>
- O'Mara, A. J., Marsh, H. W., Craven, R. G., & Debus, R. L. (2006). Do self-concept interventions make a difference? A synergistic blend of construct validation and meta-analysis. *Educational Psychologist*, 41(3), 181–206. [https://doi.org/10.1207/s15326985Sep4103\\_4](https://doi.org/10.1207/s15326985Sep4103_4)
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current Directions in Psychological Science*, 23(5), 381–387. <https://doi.org/10.1177/0963721414547414>
- Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, 102(6), 1271–1288. <https://doi.org/10.1037/a0025558>
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior*, 30(3), 241–256. <https://doi.org/10.2307/2136956>
- Pears, K., Bruce, J., Fisher, P. A., & Kim, H. (2010). Indiscriminate friendliness in maltreated foster children. *Child Maltreatment*, 15(1), 64–75. <https://doi.org/10.1177/1077559509337891>
- Pritchett, R., Pritchett, J., Marshall, E., Davidson, C., & Minnis, H. (2013). Reactive attachment disorder in the general population: A hidden ESSENCE disorder. *The Scientific World Journal*, 2013. <https://doi.org/10.1155/2013/818157>
- Reed-Fitzke, K. (2020). The role of self-concepts in emerging adult depression: A systematic research synthesis. *Journal of Adult Development*, 27(1), 36–48. <https://doi.org/10.1007/s10804-018-09324-7>
- Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging*, 17(3), 423–434. <https://doi.org/10.1037/0882-7974.17.3.423>
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American Sociological Review*, 60(1), 141–156. <https://doi.org/10.2307/2096350>
- Salmivalli, C. (2001). Feeling good about oneself, being bad to others? Remarks on self-esteem, hostility, and aggressive behavior. *Aggression and Violent Behavior*, 6(4), 375–393. [https://doi.org/10.1016/S1359-1789\(00\)0012-4](https://doi.org/10.1016/S1359-1789(00)0012-4)
- Schroder, M., Ludtke, J., Fux, E., Izat, Y., Bolten, M., Gloger-Tippelt, G., ... Schmid, M. (2019). Attachment disorder and attachment theory - Two sides of one medal or two different coins? *Comprehensive Psychiatry*, 95(152139). <https://doi.org/10.1016/j.comppsy.2019.152139>
- Seim, A. R., Jozefiak, T., Wichstrøm, L., Lydersen, S., & Kayed, N. S. (2020a). Reactive attachment disorder and disinhibited social engagement disorder in adolescence: Co-occurring psychopathology and psychosocial problems. *European Child and Adolescent Psychiatry*. <https://doi.org/10.1007/s00787-020-01673-7>
- Seim, A. R., Jozefiak, T., Wichstrøm, L., & Kayed, N. S. (2020b). Validity of reactive attachment disorder and disinhibited social engagement disorder in adolescence. *European Child and Adolescent Psychiatry*, 29, 1465–1476. <https://doi.org/10.1007/s00787-019-01456-9>
- Smyke, A. T., Zeanah, C. H., Gleason, M. M., Drury, S. S., Fox, N. A., Nelson, C. A., & Guthrie, D. (2012). A randomized controlled trial comparing foster care and institutional care for children with signs of reactive attachment disorder. *American Journal of Psychiatry*, 169(5), 508–514. <https://doi.org/10.1176/appi.ajp.2011.11050748>
- Sonuga-Barke, E. J. S., Kennedy, M., Kumsta, R., Knights, N., Golm, D., Rutter, M., ... Kreppner, J. (2017). Child-to-adult neurodevelopmental and mental health trajectories after early life deprivation: The young adult follow-up of the longitudinal English and Romanian adoptees study. *The Lancet*, 389(10078), 1539–1548. [https://doi.org/10.1016/S0140-6736\(17\)30045-4](https://doi.org/10.1016/S0140-6736(17)30045-4)
- Stafford, B., Zeanah, C. H., Scheeringa, M., Guedeney, A., & Maestros, S. (2003). Exploring psychopathology in early childhood: PTSD and attachment disorders in DC: 0–3 and DSM-IV. *Infant Mental Health Journal*, 24(4), 398–409. <https://doi.org/10.1002/imhj.10064>
- Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., Caspi, A., & Garcia Coll, C. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*, 42(2), 381–390. <https://doi.org/10.1037/0012-1649.42.2.381>
- Turner, H. A., Shattuck, A., Finkelhor, D., & Hamby, S. (2015). Effects of poly-victimization on adolescent social support, self-concept, and psychological distress. *Journal of Interpersonal Violence*, 32(5), 755–780. <https://doi.org/10.1177/0886260515586376>
- Vacaru, V. S., Sterkenburg, P. S., & Schuengel, C. (2018). Self-concept in institutionalized children with disturbed attachment: The mediating role of exploratory behaviours. *Child: Care, Health and Development*, 44(3), 476–484. <https://doi.org/10.1111/cch.12521>
- Valdez, C. E., Lim, B. H., & Parker, C. P. (2015). Positive change following adversity and psychological adjustment over time in abused foster youth. *Child Abuse and Neglect*, 48, 80–91. <https://doi.org/10.1016/j.chiabu.2015.07.007>
- Vervoort, E., Bosmans, G., Doumen, S., Minnis, H., & Verschuren, K. (2014). Perceptions of self, significant others, and teacher-child relationships in indiscriminately friendly children. *Research in Developmental Disabilities*, 35(11), 2802–2811. <https://doi.org/10.1016/j.ridd.2014.07.004>
- Von Soest, T., Wichstrøm, L., & Kvalem, I. L. (2016). The development of global and domain-specific self-esteem from age 13 to 31. *Journal of Personality and Social Psychology*, 110(4), 592–608. <https://doi.org/10.1037/pspp0000060>

- Wang, X., Ling, L., Su, H., Cheng, J., Jin, L., & Sun, Y. H. (2015). Self-concept of left-behind children in China: A systematic review of the literature. *Child: Care, Health and Development*, 41(3), 346–355. <https://doi.org/10.1111/cch.12172>
- Wichström, L. (1995). Harter's self-perception profile for adolescents: Reliability, validity, and evaluation of the question format. *Journal of Personality Assessment*, 65(1), 100–116. [https://doi.org/10.1207/s15327752jpa6501\\_8](https://doi.org/10.1207/s15327752jpa6501_8)
- Wichström, L. (1999). The emergence of gender difference in depressed mood during adolescence: The role of intensified gender socialization. *Developmental Psychology*, 35(1), 232–245. <https://doi.org/10.1037/0012-1649.35.1.232>
- Wichström, L., & von Soest, T. (2015). Reciprocal relations between body satisfaction and self-esteem: A large 13-year prospective study of adolescents. *Journal of Adolescence*, 47, 16–27. <https://doi.org/10.1016/j.adolescence.2015.12.003>
- Zeanah, C. H., Chesher, T., & Boris, N. W. (2016). Practice parameter for the assessment and treatment of children and adolescents with reactive attachment disorder and disinhibited social engagement disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 55(11), 990. <https://doi.org/10.1016/j.jaac.2016.08.004>
- Zeanah, C. H., & Gleason, M. M. (2015). Annual research review: Attachment disorders in early childhood - Clinical presentation, causes, correlates, and treatment. *Journal of Child Psychology and Psychiatry*, 56(3), 207–222. <https://doi.org/10.1111/jcpp.12347>
- Zeigler-Hill, V. (2011). The connections between self-esteem and psychopathology. *Journal of Contemporary Psychotherapy*, 41(3), 157–164. <https://doi.org/10.1007/s10879-010-9167-8>
- Zimmermann, P., & Iwanski, A. (2019). Attachment disorder behavior in early and middle childhood: Associations with children's self-concept and observed signs of negative internal working models. *Attachment & Human Development*, 21(2), 170–189. <https://doi.org/10.1080/14616734.2018.1499212>





**Online supplement**

**Article:** Self-esteem in adolescents with RAD or DSED

**Journal:** Child Abuse and Neglect

Distribution of RAD and DSED symptoms in the RYC population, N=306:

Table S1. Distribution of RAD symptoms in adolescents living in RYC

Symptom load	<i>n</i>	%
0	105	34.3
1	66	21.6
2	49	16.0
3	32	10.5
4	27	8.8
5	12	3.9
6	7	2.3
7	6	2.0
8	2	0.7
8—11	0	0.0

Note. Mean = 1.73, SD = 1.85

Table S2. Distribution of DSED symptoms in adolescents living in RYC

Symptom load	<i>n</i>	%
0	240	78.4
1	40	13.1
2	21	6.9
3	5	1.6
4	0	0.0

Note. Mean = 0.32, SD = 0.67

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