Early predictors of the childhood dysregulation profile from ages 5 to 8

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Abstract

Background: Childhood dysregulation profile (DP) is characterised by difficulties in regulating emotions, behaviour and cognitions, and is associated with adverse long-term outcomes. However, its early-life predictors remain less well understood.

Aim: This thesis aimed to investigate child- and family-related predictors of childhood DP symptoms.

Methods: Participants were N=3,467 children from the UK Household Longitudinal Study. Parents reported on child-related factors during the first year (i.e., regulatory problems) and age 3 (i.e., negative affect, impatience, impulsivity, regularity, screen media exposure). Family-related factors included prenatal variables (i.e., smoking, alcohol use during pregnancy) and postnatal family characteristics (i.e., maternal and paternal psychological distress, stimulating home environment). Parents also reported on childhood DP symptoms at ages 5 and 8. Hierarchical logistic regression analyses were conducted to estimate the contribution of child- and family-related predictors to borderline and clinical DP symptoms at ages 5 and 8, as well as the persistence of these symptoms over time.

Results: Negative affect at age 3 was consistently associated with an increased likelihood of borderline and persistent dysregulation profile symptoms at ages 5 and 8, as well as with symptom persistence across time. Additional child-related predictors included impulsivity, impatience and irregularity. In contrast, family-related factors were not consistent predictors of dysregulation profile symptoms.

Conclusion: These findings highlight the important role of early child temperament, particularly negative affect, in the development and persistence of dysregulation symptoms across early childhood. Identifying temperament-based risk factors early in life may help

guide targeted prevention efforts that strengthen children's self-regulation skills before difficulties with dysregulation become more persistent and harder to change.

Chapter 1: Introduction

Mental Health Services for Children within the UK

Prevalence and Demand for Services

Mental health difficulties among children and young people in the UK have risen significantly in recent years, placing increasing pressure on existing services. Evidence indicates that approximately one in five individuals aged between 8-25 years meet criteria for a probable mental disorder (Newlove-Delgado et al., 2023). In response to this growing need, referrals to Child and Adolescent Mental Health Services (CAMHS) have reached unprecedented levels. Between 2022 and 2023, around one million children and young people were referred to CAMHS, with common presenting issues including anxiety, depression, attention deficit hyperactivity disorder (ADHD), conduct disorder, and concerns requiring crisis support (Children's Commissioner, 2024; National Health Service, 2025a).

A notable challenge within CAMHS is the high rate of comorbidity. Many children present with overlapping emotional and behavioural difficulties, complicating assessment and intervention planning (Wang et al., 2022). This is particularly problematic given many empirical-based treatments are traditionally designed to target single disorders rather than complex, co-occurring presentations (Bearman & Weisz, 2015).

Policy Framework and Service Development in the UK

UK mental health services are guided by evidence-based practices, primarily informed by NICE guidelines. Policy initiatives have increasingly prioritised early intervention and accessibility. The 10 Year Health Plan for England (Department of Health and Social Care, 2025) outlined a need for better access to mental health support for children and young people via community hubs and digital services. The National Health Service (NHS) Long Term Plan (2019) identified children and young people as a key priority group,

promoting the integration of mental health support within educational settings. The introduction of school-based mental health teams aims to improve early identification, increase accessibility, and foster resilience, ultimately reducing the likelihood of mental health difficulties (National Health Service, 2015, 2019).

In addition, the Children Act (2004) emphasises a multi-disciplinary approach, highlighting the importance of collaboration between health, education, and social care services to ensure holistic support for the child. This systems-based thinking is reflected in the transition from the traditional stepped-care model to the i-THRIVE framework (Wolpert et al., 2019), which focuses on meeting the needs of children through coordinated, needs-led care across services.

System Pressures and Emerging Challenges

Despite policy advancements, CAMHS continues to face substantial pressures. Waiting times for services remain high, and inpatient admissions for psychiatric care are increasing (National Health Service, 2019; 2025a). Several factors may explain this trend. Increased awareness and early intervention efforts may be leading to higher referral rates, capturing cases that might previously have gone unnoticed. Additionally, broader societal factors, such as economic pressures within the families, may contribute to rising mental health difficulties in children (Golberstein et al., 2019; Robinson et al., 2025).

The COVID-19 pandemic has also had a profound and lasting impact. Experiences such as bereavement, social isolation and disruption to routines have significantly affected children's mental wellbeing. Although the acute phase of the pandemic has passed, its psychological consequences continue to be evident in the current service demand (Fellin et al., 2024; Rider et al., 2021).

Importantly these increasing demands and complexities highlight limitations within existing diagnostic and treatment models of childhood mental health problems. In particular, the high prevalence of comorbid disorders challenges the usefulness of approaches that conceptualise and treat disorders as discrete categories. This has led to growing interest in more integrative frameworks for understanding childhood mental health.

Conceptualising Childhood Mental Health Difficulties

Internalising and Externalising Difficulties

Childhood mental health is frequently characterized by two broad factors: internalising and externalising difficulties (Jaekel et al., 2021; Winsper et al., 2020). Internalising difficulties refer to inward-directed symptoms such as withdrawing, fearful and somatic symptoms (Liu et al., 2011). In contrast, externalising difficulties refer to outward-directed symptoms that are observable by others, such as challenging behaviour, impulsivity and inattention (Samek & Hicks, 2014).

Existing research suggests that externalising symptoms are easier to detect compared to internalising symptoms, possibly because they are more observable or because internalising difficulties may emerge later in development (Arslan et al., 2021; Gooren et al., 2011; Willner et al., 2016). Consequently, children presenting with externalising symptoms are often more likely to receive early behavioural support from CAMHS. This may contribute to a gap in service provision, whereby children with less visible internalising needs are not sufficiently identified or supported (Baer et al., 2025; Department for Education, 2025; Department of Health and Social Care, 2026).

The Childhood Dysregulation Profile (DP)

While the distinction between internalising and externalising symptoms is useful, it does not fully capture the complexity of many children's emotional and behavioural

difficulties. A significant proportion of children experience both internalising and externalising symptoms concurrently, often as a result of genetic and environmental vulnerabilities (Nikstat & Riemann, 2020; Willner et al., 2016). This comorbidity has been associated with more severe outcomes, including increased aggressive behaviour in a longitudinal study spanning over 16 years (Arslan et al., 2021).

The co-occurrence of internalising and externalising symptoms has led to the development of the childhood dysregulation profile (DP; Althoff et al., 2010). The DP reflects broader difficulties in emotional, behavioural, and attentional regulation, providing a more integrative framework for understanding complex and overlapping symptom presentations.

In the context of increasing demand, comorbidity, and limitations within current service models, the DP offers a valuable conceptual lens. It enables clinicians and researchers to move beyond categorical diagnoses towards a more holistic understanding of dysregulation, supporting the development of interventions that better reflect the complexity of children's mental health needs.

Childhood Dysregulation Profile (DP): Conceptual Development, Definition, Assessment and Developmental Outcomes

Conceptual Development of The Childhood Dysregulation Profile (DP)

Childhood DP was initially conceptualised as a marker of juvenile bipolar disorder (Biederman et al., 1995; Harris 2005; Mick et al., 2003), following observations that children with severe emotional dysregulation and aggression were frequently diagnosed with bipolar disorder (Carlson et al., 2000; Wozniak et al., 1995). Early research also identified overlap with ADHD symptoms and potential genetic vulnerability (Biederman et al., 1998; Faraone et al., 2005).

However, subsequent research demonstrated that DP is not specific to bipolar disorder but instead reflects a broader vulnerability to multiple forms of psychopathology (Ayer et al., 2009; Lewinsohn et al., 2000). As a result, the term evolved into "Childhood Dysregulation Profile" to better capture its transdiagnostic nature.

As interest in dysregulation-related disorders has grown among researchers and clinicians, these disorders (though not childhood DP specifically) have been recognized in the most recent versions of major diagnostic systems. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) includes childhood DP as Disruptive Mood Dysregulation Disorder (F34.8) within the depressive disorders category, describing children with severe irritability and anger. Similarly, the International Classification of Diseases (ICD-11; World Health Organization, 2018) includes childhood DP as Oppositional Defiant Disorder (ODD) with chronic irritability-anger (6C90.0) under disruptive behaviour or dissocial disorders as a subtype of ODD characterised by prevailing, persistent angry or irritable mood. These varying classifications highlight the complex, multi-faceted, and often comorbid nature of dysregulation in childhood.

Definition and Early Presentation

The Childhood DP is not a clinical diagnosis but a profile characterised by comorbid impairments in the child's ability to regulate emotions, behaviours and cognitions (Althoff et al., 2010). This differs from emotion dysregulation, which refers more narrowly to difficulties in managing, modulating, and responding to emotional experiences (Thompson, 2019). Emotion dysregulation could occur on its own, whereas DP reflects a broader and more severe pattern that includes emotional symptoms alongside hyperactivity/inattention and conduct problems. Its global prevalence ranges from 2-18% (Rescorla et al., 2021). Emerging

evidence suggests that these dysregulation difficulties can emerge as early as the preschool years (Asmussen et al., 2022; Brown et al., 2025), a critical developmental period in which foundational self-regulatory skills are rapidly developing (Feldman, 2009). During this stage, children are expected to increasingly manage emotional responses, inhibit appropriate behaviours and direct attention in goal-directed ways. However, children exhibiting symptoms of DP might struggle with these developmental tasks, often presenting with intense emotional responses, difficulty calming down, behavioural outbursts, and attentional inconsistencies.

Identifying these patterns early is particularly important, as persistent dysregulation across multiple domains may signal elevated risk for late psychopathology. As such, the DP provides a useful framework for understanding early emerging, transdiagnostic vulnerabilities that cut across conventional mental health classifications.

Assessment of the Childhood Dysregulation Profile (DP)

Childhood DP is most commonly assessed using the Child Behaviour Checklist (CBCL), specifically the following three subscales: anxious/depressed, aggressive behaviour and attention problems. Research indicates that the CBCL-DP presents a distinct syndrome rather than simply reflecting comorbidity across these domains (Deutz et al., 2016; Geeraerts et al., 2015).

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) has also been identified as a valid tool for assessing childhood DP (Deutz, Shi, et al., 2018; Holtmann et al., 2010). There are two versions of the SDQ available to measure for the DP (Please see Table 1 for details):

- A 5-item version, combining selected items across emotional, conduct, and hyperactivity subscales (Holtmann et al., 2011).

- A 15-item version, summing all items across these domains, which demonstrates stronger reliability and validity (Deutz, Shi, et al., 2018; Levantini et al., 2024).

Table 1.

Description of 5-item and 15-item version of the assessment of the Childhood Dysregulation Profile using the Strengths and Difficulties Questionnaire (SDQ)

SDQ subscale	**5-item version**	**15-item version**
Emotional problems	• Often unhappy, down-hearted or tearful • Nervous or clingy in new situations, easily loses confidence	• Often unhappy, down-hearted or tearful • Nervous or clingy in new situations, easily loses confidence • Has many worries, often seems worried • Many fears, easily scared • Often complains of headaches, stomach aches or sickness
Conduct problems	• Often has temper tantrums or hot tempers	• Often has temper tantrums or hot tempers • Generally obedient, usually does what adults request • Often fights with other children or bullies them • Often lies or cheats • Steals from home, school, or elsewhere

SDQ subscale	5-item version	15-item version
Hyperactivity/inattention	• Restless, overactive, cannot sit still for long • Constantly fidgeting or squirming	• Restless, overactive, cannot sit still for long • Constantly fidgeting or squirming • Easily distracted, concentration wonders • Can stop and think things over before acting • Sees tasks through to the end

Although the CBCL is more comprehensive, including 118 items (Achenbach, 1991), the SDQ provides a shorter and more practical alternative with comparable clinical correlates to the CBCL DP (Carballo et al., 2014).

Informant differences are also important. Parents typically report higher levels of DP symptoms than teachers across both clinical and non-clinical samples. (Aitken et al., 2019; Deutz, Vossen, et al., 2018). This may reflect contextual differences, as teachers observe children in structured environments, whereas parents observe them across a broader range of emotional contexts. Overall, parent reports may provide a more comprehensive view of dysregulation, though multi-informant assessment remains essential.

Long-term outcomes of childhood dysregulation profile (DP)

A growing body of longitudinal research highlights the persistence and impact of childhood DP across development. Evidence from twin studies suggests that childhood DP is

highly heritable (Althoff et al., 2006). Studies have identified distinct developmental trajectories, with groups showing high, moderate and low levels of DP over time from 5 years to 21 years (Aebi et al., 2020; Blok, de Mol, et al., 2022). One study conducted in Switzerland identified that while the majority of children showed low levels of DP across time, others demonstrated stable or persistent high levels of dysregulation (9%; Aebi et al., 2020). Further evidence from population representative longitudinal cohort studies showed 6.3% of children in the high symptoms class from 3 years to 9 years in Ireland (Bilgin et al., 2025), and 8.9% of children in the high symptoms class from 3 years to 11 years in the UK (Bilgin, Morales-Muñoz, et al., 2024). Similar results were found in a non-clinical population consisting in The Netherlands which followed up the children from 5 to 16 years (Blok, de Mol, et al., 2022). It was found that only 23% of children who met clinical DP symptoms at age 5 had resolving symptoms between early and late childhood (6-9 years) and 9% had resolving symptoms between late childhood and early adolescence (9-13 years). Thus, supporting he persistence of childhood DP symptoms.

Moreover, childhood DP is also associated with poor sleep and more emotional reactivity (Blok, de Mol, et al., 2022; Geeraerts et al., 2015). A large longitudinal study within the UK, found children who are better able to regulate their emotions, behaviours and cognitions between the ages of 5-16, tend to have better life satisfaction in adulthood, up to 42 years of age (Flèche et al., 2021).

Childhood DP has been associated with a wide range of adverse outcomes across both non-clinical and clinical populations, including, symptoms of ADHD, depression and anxiety (in Germany; Wang et al., 2018), personality pathology consisting of negative affectivity, disinhibition, detachment and psychoticism (in Belgium; Deutz, Vossen, et al., 2018), disruptive behaviour, and drug use (in Holland; Althoff et al., 2010) when compared to peers

with low level childhood DP. These outcomes can persist up to 14 years later, suggesting that DP may function as an early developmental risk marker for long-term psychopathology (Althoff et al., 2010).

Importantly, childhood DP is highly relevant within clinical contexts. Evidence suggests that within clinical populations, children with ADHD are more likely to present with comorbid DP (in Germany; Wang et al., 2022). Beyond this, childhood DP has been consistently associated with a range of adverse psychosocial outcomes in later life. For instance, childhood DP has been linked to increased risk of suicidal ideation and attempts, as well as self-harm (in Spain; Caro-Cañizares et al., 2019), cannabis use (in United States of America; De Genna et al., 2013), bipolar disorder (in USA; Biederman et al., 2009), and both ADHD and mood disorders (in USA and Italy; Dougherty et al., 2014; Masi et al., 2015).

In addition, children with DP tend to exhibit higher levels of hostility, risk taking, callousness, and impulsivity during adolescence (in Belgium; De Caluwé et al., 2013). Academic functioning may also be affected, as higher DP scores at age 6 have been associated with poorer reading and mathematics performance at school in later schooling in nineth grade (in USA; Shi et al., 2023). Taken together, this body of evidence suggests that childhood DP may act as an early developmental risk marker of persistent self-regulation difficulties and more severe forms of psychopathology across the lifespan (Bellani et al., 2012; Holtmann et al., 2011).

Furthermore, within clinical samples, a significant proportion of children presenting to CAMHS, demonstrate comorbid emotional and behavioural dysregulation (Wang et al., 2022). This presents a challenge for service provision, as many evidenced-based interventions are designed to target single disorders rather than complex, co-occurring

difficulties (Bearman & Weisz, 2015). Consequently, a substantial number of children and adolescents may not have their needs fully met within current mental health services.

Together, these findings suggest that childhood DP could be an early developmental risk marker for persisting self-regulation difficulties and severe psychopathology across the lifespan (Holtmann et al., 2011). Given this, there is increasing value in examining childhood DP within non-clinical populations. Childhood DP symptoms in the general population may present more subtly at borderline level, meaning that early identification can help prevent progression to clinically significant levels.

Explanations for Long-Term Outcomes of Childhood DP

The long-term impact of childhood DP is largely consistent across different ages and cultures. This may be explained by several factors, including difficulties developing and maintaining self-regulation skills, neurobiological differences, challenges with pro-social skills, genetic influences, and bidirectional influences between parents and children.

Self-regulation skills

Self-regulation refers to the ability to manage physiological arousal, inhibit frustration, focus attention and organise behaviours (McQuillan et al., 2018). Theoretically, it is understood as a multidimensional construct involving emotional, cognitive, and behavioural processes, underpinned by the development of executive functions such as inhibitory control, working memory, and cognitive flexibility. It begins developing in utero and continues throughout childhood, supported by caregivers who help co-regulate the child's emotional and behavioural responses (Eisenberg et al., 2010; Knowles et al., 2021; Meredith Weiss et al., 2024; Montroy et al., 2016). Over time, these repeated interactions are internalised, enabling the child to develop independent self-regulation. There is evidence that as children get older, they typically become more independent in regulating themselves

(Pauen, 2016). However, longitudinal evidence suggests that parenting alone might not fully explain self-regulation development, with factors such as temperament, peer relationships and neurobiological susceptibility to environmental input also playing significant roles (Tammilehto et al., 2021). Additional influences, including trauma, neurodiversity, and neglect can further impact regulatory abilities (Knowles et al., 2021).

There is substantial evidence that early behaviours reflecting self-regulation are predictive of later internalising and externalising symptoms, as well as their comorbidity. Infants who show persistent regulatory difficulties, such as problems with crying, sleeping, and feeding, are more likely to develop behavioural difficulties and mood disorders later in life (Bäuml et al., 2019; Jaekel et al., 2023). Greater levels of early dysregulation are associated with ongoing difficulties in behaviour, attention, and cognition, which often co-occur and remain stable across development (Winsper & Wolke, 2014). Similarly, early childhood self-regulation skills, such as delay of gratification and emotion regulation, are linked to later socio-emotional and behavioural outcomes, with poorer regulation associated with increased risk of both internalising and externalising problems (Wilson et al., 2009).

Overall, these findings suggest that disruptions in early self-regulation may represent a key underlying mechanism through which childhood DP develops and persists across the lifespan.

Neurobiological differences

Research suggests that childhood DP is associated with neurobiological differences compared to children without DP. Neuroimaging studies indicate alterations in global brain development and subcortical grey matter volume (Blok, Geenjaar, et al., 2022). Additionally, persistent DP symptoms into adulthood could lead to intrinsic functional connectivity

changes within the Default Mode Network area of the infant's brain, which is the area that becomes activated when the person is not engaged in a specific task and the brain is actively resting (Althoff et al., 2010; Bäuml et al., 2019).

Physiological mechanisms, particularly involving the hypothalamic-pituitary-adrenal (HPA) axis, also appear relevant (Knezevic et al., 2023). Some evidence shows that adolescents with persistent DP exhibit lower cortisol levels and reduced HPA axis activity at 11 and 14 years, suggesting difficulties in stress regulation (Ayer et al., 2013). Similarly, weaker serotonin functioning in children with DP symptoms has been associated with increased stress sensitivity, although the finding is limited by small sample size (Zepf et al., 2008).

Taken together, this evidence indicates that alterations in brain development and stress-response systems may provide a key biological pathway underlying the development and maintenance of childhood DP.

Genetic influences

Evidence from a twin study consisting of 6,246 sets of Dutch twins suggested that childhood DP is highly heritable (Althoff et al., 2006). Specifically, the authors found monozygotic twins, especially males, to have a higher likelihood of developing childhood DP compared to dizygotic twins. Heritability of childhood DP has estimated to range between 53-87%, which may be due to a genetic disposition (Boomsma et al., 2006; Doyle et al., 2010).

Taken together, these findings suggest that genetic factors also play a significant role in the development of childhood DP, potentially contributing to its early onset and persistence over time.

Difficulties With Pro-Social Skills

Childhood DP has consistently been associated with poorer pro-social skills across childhood. For example, in a laboratory assessment, pre-school children with childhood DP demonstrated weaker social skills during interactions with both the experimenter and parental reports compared to peers without childhood DP (Kim et al., 2012). These children were also more likely to experience difficulties with depression and effortful control, which are known to impede social development skills (Kupferberg & Hasler, 2023).

Additionally, in children aged between 9-15 years with a diagnosis of Oppositional Defiant Disorder and/or Conduct Disorder, those with childhood DP symptoms were more likely to have difficulties with rule breaking, find social situations more challenging and withdraw from social situations (Masi et al., 2015).

These findings suggest that deficits in pro-social skills may represent a key pathway through which childhood DP contributes to emotional and behavioural difficulties and its persistence over time.

Trauma and adversity

The first three years of an infant's life have been widely recognised as being a critical period for shaping a child's health, wellbeing and development (Culshaw & Yearsley, 2025; HM Government, 2021; McLean et al., 2024). A child who experiences a nurturing environment, is less likely to experience psychosocial difficulties in later life when compared to peers who have experienced adverse childhood experiences (i.e., abuse, neglect, poverty, trauma; Blaustein & Kinniburgh, 2019; Milojevich et al., 2020). During this time period, neural connections in the brain are impacted by what a child is exposed to. Trauma and adversity alters brain areas such as the amygdala, hippocampus and prefrontal cortex; areas associated with emotional processing, memory and executive functioning (Alpugan, 2024;

Cross et al., 2017). Children who experience trauma or adversity learn to stay hypervigilant to threats or can become hypo-aroused as a learned, protective response even in everyday non-threatening situations, which can look like emotional outbursts, shutting down, difficulties with attention, and difficulties soothing (Blaustein & Kinniburgh, 2019). Young children in particular are dependent on primary caregivers to co-regulate and support them with soothing strategies, when these are absent, cortisol levels remain high (Alpugan, 2024; Cross et al., 2017), leading a child to present as dysregulated.

Parent and Child Bidirectional Influences

Research suggests that childhood DP develops within a bidirectional, transactional relationship between children and their caregivers. A systematic review proposed a circulatory feedback process in which children with self-regulation difficulties negatively impact parenting behaviours and parental mental health, which in turn increases of more severe psychopathology (Caro-Cañizares et al., 2015).

Less emotional expression from mothers as a result of depression can lead to children expressing emotions at a higher intensity and frequency to gain their mother's attention and seek connection or to self-regulate, which in turn can lead to the child developing depression in later life (Aktar & Bögels, 2017; Bernard-Bonnin et al., 2004). Similar results have been found about the impact of father's mental health on children's regulation abilities (Vallotton et al., 2016). Whereas, Kahn et al. (2004) found that children most at risk of poor emotional and behavioural regulation are those whose both parents have poor mental health, whereas children whose father has better mental health, may buffer against the effects of a mother's poor mental health. Additionally, a review by Morris et al. (2007) postulated that children can learn through parents how to self-regulate in three ways: 1) children observe parent's regulating their own emotions (i.e., modelling, social referencing and social contagion), 2)

emotion-based parenting practices (i.e., how parents react to their child's emotions and emotional coaching) and 3) the emotional climate of the family (i.e., parenting style, attachment style, emotional expressivity and family relationships). The authors identified parental characteristics that could impact the three mechanisms (i.e., parental reactivity, regulation of own emotions and mental health), as well as child factors (i.e., temperament and gender). Therefore, it is not clear whether parental factors are a cause or effect of the childhood DP.

Theoretical frameworks support this bidirectional perspective.

Attachment Theory

Attachment theory emphasises the importance of co-regulation within early caregiver-child relationships (Ainsworth et al., 1978). Originally proposed by Bowlby (1969), attachment theory posits that children are biologically predisposed to seek proximity to caregivers in times of distress, as a means of ensuring survival. Through repeated interactions, children develop internal working models, mental representations of the self, others, and relationships, which guide expectations about emotional support and influence later regulatory processes. From a regulatory perspective, attachment relationships function as the primary context in which children learn to manage physiological arousal, emotions, and behaviour. Early co-regulation, where caregivers modulate the child's emotional states through soothing, mirroring, and contingent responding, gradually becomes internalised, allowing children to develop independent self-regulation over time. Importantly, attachment processes are inherently bidirectional. While caregiver sensitivity shapes attachment security, children's temperament and regulatory capacities also influence caregiver responses (Ainsworth et al., 1978; Crittenden, 2006). For example, infants with higher negative

emotionality may place greater demands on caregivers, increasing the likelihood of inconsistent or strained interactions, particularly in contexts of parental stress or limited resources (Fleck et al., 2024; Kiff et al., 2011; Morris et al., 2017; Wang et al., 2025; Yoo & Ahn, 2023).

Attachment theory also provides a useful framework for understanding how parental mental health impacts childhood DP. Caregivers experiencing depression or anxiety may struggle with emotional availability, responsiveness, and attunement, which can disrupt co-regulatory processes and increase the likelihood of insecure or disorganised attachment. In turn, children may adapt by developing maladaptive regulatory strategies, such as emotional suppression or hyperactivation, which can contribute to the persistence of dysregulation across development.

Transactional Model of Development

The transactional model of development conceptualises development as the result of continuous, reciprocal exchanges between the child and their environment. Rather than viewing dysregulation as residing solely within the child or the caregiver, the model emphasises how patterns of interaction evolve over time through repeated feedback loops (Sameroff, 2009).

Within this framework, a child's early regulatory difficulties (e.g., heightened emotional reactivity, poor attentional control) may elicit more controlling, critical, or inconsistent parenting responses (Fleck et al., 2024; Kiff et al., 2011). These parental behaviours, in turn, can further undermine the child's regulatory development, reinforcing maladaptive patterns (Morris et al., 2017; Yoo & Ahn, 2023). For example, in a study consisting of 9,024 children, it was found that parental behaviours showed the highest

association in predicting childhood DP, specifically, parental overprotectiveness, inadequate parental supervision and/or control, deprivation of experiences essential to child development and inappropriate parental pressures (Jucksch et al., 2011). Similar results were found within children with acquired brain injuries (Chavez-Arana et al., 2019) and pre-school children from the general population (Kim et al., 2012). However, both of these studies were not longitudinal designs and so their results must be interpreted with caution. Kim et al. (2012) found that children with DP were more likely to have mothers who displayed controlling and punitive parenting and fathers who displayed a lack of structure and control within their parenting. Importantly, the model highlights that these interactions are not static; they accumulate and intensify across development, making early experiences particularly influential. This perspective is especially useful in explaining why it is often difficult to disentangle cause and effect in childhood DP (Jucksch et al., 2011), as both parent and child continuously shape each other's behaviours.

Ecological Systems Theory

Bronfenbrenner's ecological systems theory (1977) extends the bidirectional perspective beyond the immediate parent–child dyad by situating development within multiple, interacting environmental systems. While the microsystem (e.g., parent–child interactions; school; nursery; extended family; health services) remains central, other systems, such as the mesosystem (connections between settings), exosystem (indirect environments like parental workplace stress), macrosystem (cultural values), and chronosystem (changes over time), also influence the development of childhood DP. Each of these systems can impact a child's ability to self-regulate. For example, children can learn from parents and teachers about expectations of what is 'acceptable' behaviour and can model to children how to show this. Children also learn from the interactions between the adults in their life, such as, how school

and parents communicate to each other when there is a disagreement for example. Additionally, the community, culture and religious group that a child grows up in can communicate social norms of what behaviours and emotions acceptable. These systems may all interact, in which, the child can also influence these systems too.

This theory expands our understanding of dysregulation by recognising that parental behaviours are themselves shaped by broader contextual factors. For example, parental stress, socioeconomic disadvantage, or limited social support may reduce caregivers' capacity for consistent co-regulation. In turn, children's dysregulation may place additional strain on these systems, reinforcing a cycle of difficulty.

Which Factors are Associated with Childhood Dysregulation Profile?

Although there is increasing evidence for the negative outcomes of childhood DP, less is known about the factors that contribute to the development of childhood DP. Existing research has examined various child-related and family-related factors as potential predictors of childhood DP.

Family related variables

Infants and children are especially dependent on their primary caregivers to help them regulate their emotions and behaviours, known as joint regulation, which encourages independent regulation (Atkinson et al., 2021; Grolnick et al., 1998). The few existing studies highlighted the importance of parental factors for the development of childhood DP.

Parenting behaviours. Findings from a cross-sectional, clinical sample found parents of children with DP, including older aged children (11 years and over) often exhibit more punitive, controlling, rejecting, inadequate parental supervision, and overprotective

behaviours compared to parents of children without DP (Aebi et al., 2020; Kim et al., 2012). Children who have experienced harsh parental behaviours during infancy are more likely to display difficulties regulating their attention, emotions and behaviour (Breeman et al., 2018; Diemer et al., 2021), symptoms of childhood DP. More specifically, parents who exhibit low parental care and/or high parental overprotection are more likely to have children who experience higher levels of anxiety, depression and challenging behaviours such as aggression and impulsivity (Smorti et al., 2024). The authors further found emotional dysregulation to mediate the relationship between parenting behaviours and internalising and externalising behaviours within their children. However, these findings are only for adolescents so it is not clear if the results can generalise to younger children. Nonetheless, positive parenting behaviours such as showing interest in their child, setting clear rules and rewarding behaviour was associated with fewer childhood DP symptoms in a cross-sectional study consisting of children aged between 9 to 11 years (Muratori et al., 2022). These results remained significant even after controlling for child gender, parents age, parental education and marital status. However, this study was only conducted at one time point, therefore, it is unclear about the longitudinal impacts of parental behaviours.

Parental mental health. A systematic review reported negative parenting behaviours are linked with poor parental mental health (Zitzmann et al., 2024); the length of exposure to and severity of parental mental health during childhood, positively correlates with greater distress in adulthood (Kamis, 2021). Parental mental health problems such as depression and bipolar disorder could contribute to dysregulation measured by temperament (Babineau et al., 2015) and increased symptoms of childhood DP in at-risk populations (Kil et al., 2024). Similar results have been found by Maoz et al. (2014), however, the sample size was too small and the relevant data was not available to be included in this review. Within the

community, pre-school aged children of parents with bipolar disorder are more likely to meet the criteria for DP even after controlling for children with attention deficient disorder (Maoz et al., 2014). Similarly, prenatal depression in mothers predicts emotional dysregulation in children from 3 months and is stable when children are 3 years (Babineau et al., 2015). Although, this study did not look at children's regulation beyond 3 years.

Substance use. Parental emotional availability reduces with parental substance use, especially in parents with a lower education background (Punamäki et al., 2021). In a study including over 1,500 mother-child dyads, found prenatal alcohol exposure including light to moderate amounts, negatively impacted children's ability to self-regulate emotions (Chen, 2012), which in turn is associated with difficulties in later behaviour regulation (Frick & Morris, 2004). Similarly, tobacco use during pregnancy is associated with greater childhood cognitive, behavioural and/or internalising difficulties due to epigenic changes (Cornelius & Day, 2000; Knopik et al., 2012; Moylan et al., 2015).

Additionally, mothers are less likely to reduce smoking during pregnancy and are more likely to also use other substances (Cornelius & Day, 2000). However, researchers have postulated whether the effects of smoking tobacco on children may be a result of the risk factors associated with smoking rather than smoking per se. For instance, family environment, maternal age, maternal education and/or genetic vulnerabilities (Kuja-Halkola et al., 2010). Direct and indirect tobacco consumption by mother prenatally is associated with multiple physical health difficulties in children postnatally including pre-term birth, low birthweight, obesity, hypertension, type 2 diabetes and respiratory impairments (Banderali et al., 2015). Childhood physical health is a common worry amongst parents (Fisak et al., 2012); health complications could strain parent-child dynamics due to the child having additional needs that may require more hospital appointments and may impede abilities to

engage in daily activities, causing heightened anxiety in parents. This can in result negatively impact children's ability to self-regulate emotions and behaviours because children typically learn through direct observation from parents modelling emotional expressivity or indirectly through choices parents make that may influence the home environment (Bridgett et al., 2015; Frankel et al., 2012; Morris et al., 2017). If a child notices their parents worrying about them, it can lead to the child worrying too, which can negatively impact their physical health condition, creating a vicious cycle (Fisak et al., 2012).

Cultural considerations. The significance of parents poses difficulties as many parenting books and interventions emphasise the important of the role of parents in modelling and co-regulating children's emotions (Children Act, 2004; Creswell & Willetts, 2019) and behaviours (Greene, 2021; Webster-Stratton, 2019). Whilst this approach may be helpful for some families, it may not be as helpful for parents who may not have the time or resources to support their child in such a way as described above. Cultural norms of parenting may also play a significant role in the involvement of parents/ carers in a child's emotional and cognitive development. The authors mentioned in this section are all written from a Western cultural perspective. Whereas, in non-Western cultures, older siblings have been identified to play a crucial role in raising their younger sibling(s), as do extended family members and the wider community (Kramer & Hamilton, 2019; Novianti et al., 2023), which may be overlooked by Western research and interventions. Whilst Western and non-Western cultures may have different values regarding parenting and may display differences in child rearing practices, there is a shared emphasis on the importance of parents developing a positive relationship with their child(ren) to achieve happiness and prosperity (Lansford, 2022; Novianti et al., 2023). Therefore, it is important to consider a parent's culture in their parenting practices. Nonetheless, there are interventions within the UK such as the Solihull

Approach, aimed to support both parent and infant wellbeing within the context of the parent-child dynamic and child development (Douglas, 2010).

Child related variables

Fewer studies have identified child factors that predict childhood DP.

Gender. Research appears consistent regarding no gender differences in non-clinically significant childhood DP; however, research is mixed regarding gender differences within clinically significant childhood DP symptoms. In a cross-sectional study consisting of over 6,000 Dutch twins aged between 3-12 years, male monozygotic and dizygotic sets of twins were more likely to meet threshold for childhood DP compared to female sets of twins (.87 vs .53; Althoff et al., 2006). The results suggest males are more genetically susceptible to developing childhood DP. Childhood DP scores are typically similar for male and female children aged between 7-13 years, however, one study found males scored higher than girls on externalising behaviours when DP was measured at one time point (Levantini et al., 2024). Whereas alternative studies found girls to be more negatively impacted by aggression and anxiety/depression symptoms, and in turn have higher levels of childhood DP (Kunze et al., 2018). Similarly, total childhood DP symptoms have been found to be higher in females but it is acknowledged that the age of screening could be contributing factor. For instance, in a large-scale study consisting of 2,856 German children and adolescents aged between 4-18 years, females were more likely to reach DP clinical significance with approximately 76% of females reaching threshold compared to 24% of boys (Holtmann et al., 2007). However, the females in the high DP category were typically older than the boys, suggesting developmental differences. Additionally, girls are more likely to score higher for anxiety/depression over time especially post-puberty, whereas boys scores remain generally stable and has shown to

reduce over time in cross-sectional studies (Aebi et al., 2020; Holtmann et al., 2007; Kunze et al., 2018; Wang et al., 2018).

However, within a study that only assessed DP during one time point in adulthood (18-25 years; Szkody et al., 2021) found males with a higher DP score, were more likely to experience mental health difficulties, parental mental health difficulties and poorer current parent-child relationships compared to females. The differences in results may be due to Szkody et al. (2021) recruiting from a university population in which students would receive recognition for participating in the study, therefore, there may be an element of self-selection bias as certain people may have chosen to participate. Additionally, university students are at similar academic levels and may belong to particular socioeconomic status (Lupton, 2019), meaning the results may not be generalisable.

In addition to time of measurement being important, the stringency of thresholds used to classify DP severity can contribute to gender differences in scores. Within the same group of children, when a strict threshold was used for the CBCL within a clinical population, more females met threshold for childhood DP, however, when a less strict threshold was used, more males met threshold (Aitken et al., 2019). An additional study found females were overall more likely to meet threshold for childhood DP, however, during early childhood, males were likely to meet threshold (Holtmann et al., 2007). Additionally, when a bifactor model of childhood DP was used using the CBCL, no gender differences were found (Deutz et al., 2016). However, it is important to note that within this study, participants completing the CBCL at one time point, which differs to all other papers mentioned in this paragraph who completing measuring questionnaires at multiple time points. No identified research focused on children who identify as transgender or non-binary.

Mental health and quality of life. Low self-esteem, high self-awareness, and higher number of stressful life events experienced at 11-14 years old has been associated with the DP in early adulthood (Aebi et al., 2020). In a study of children aged 7-11 years with Oppositional Defiant Disorder, those with higher sympathetic arousal for anger and sadness were more likely to show higher levels of DP (Tonacci et al., 2019). At a similar age of 9-13 years, children with high internalising and externalising difficulties showed higher levels of DP after two years (Kunze et al., 2018). Though, the authors found a better quality of life (physical and emotional wellbeing, self-esteem, family, friends and everyday functioning; Bullinger et al., 2008) to be a protective factor against high and moderate levels of childhood DP levels for both genders, and socioeconomic status was a protective factor against high childhood DP levels for girls only. However, (Kunze et al., 2018) did not further examine these results to provide a robust explanation, especially regarding the differences in the influence of socioeconomic status. An additional study who used a clinical population also found low socioeconomic status via household income to be a predictor of childhood DP (Miller et al., 2019). It would be beneficial to understand what specific factors within quality of life may have the biggest influence in being a protective factor. Results from previous research suggest that adults with a strong social network and feeling connected with others tend to have better levels of wellbeing (Heinsch et al., 2022). Similar results have been found with youth whereby positive childhood experiences, which mainly consists of greater social connectedness, to be a protective factor against depression in youth, including those who have experienced adverse childhood experiences (Samji et al., 2025). Additionally, the study by Kunze et al. (2018) was cross-sectional in design, therefore, it is not clear how predictors may have influenced individuals over time, which would provide a more coherent understanding of predictors of childhood DP.

Pre-term birth and low birth weight. Pre-term birth has also been suggested to predict childhood DP. The World Health Organization (WHO, 2023) defines pre-term birth as a child who is born alive prior to the 37 weeks of pregnancy being completed. WHO further subcategorise pre-term into extremely pre-term (a child born prior to 28 weeks of pregnancy being completed), very pre-term (a child born between 28-31 weeks) and moderate to late pre-term (a child born 32-37 weeks). In a review examining behavioural changes in very and moderately pre-term born children during infancy (0-2 years) and pre-school (3-5 years), found pre-term born children showed more difficulties regulating their behaviour, emotions and attention at both time points compared to children not born pre-term (Arpi & Ferrari, 2013). Difficulties in regulating attention and emotions continue into pre-adolescence; pre-term children are 3-4 times at higher risk compared to peers born when expected (Johnson & Marlow, 2011).

However, these results have not been replicated in all studies. For instance, in a study comparing children born moderate to late pre-term and children born when expected, found similar social-emotional competency and behavioural impairments between the two groups, and similar risk factors of non-White ethnicity, lower socio-economic status and not being breast fed upon hospital discharge (Johnson et al., 2018). However, a proportion of only pre-term born children did show cognitive and language impairments but no difficulties in regulating behaviour, suggesting etiological differences. The children in this group were typically male and underwent pre-eclampsia. Pre-term born males show more difficulties in regulating externalising behaviours from 4 years which continue into adulthood (Scott et al., 2017). However, not all pre-term born children develop symptoms of childhood DP, highlighting that pre-term birth may not be a predictive factor alone. Frazier et al. (2015) found within 826 very pre-term born children, only 9% developed childhood DP symptoms.

The authors found children most at risk were those whose parents were not from a White ethnic background, young, did not continue schooling past high school, unmarried and overweight. Additionally, practical factors such as time spent in neonatal intensive care units and prolonged use of artificial ventilation, and dysfunctional interactions between mother and child also increase susceptibility to childhood DP in pre-term born children (Arpi & Ferrari, 2013). Whereas lower levels of maternal distress and family dysfunction were identified as protective factors within pre-born children (Lean et al., 2020). Therefore, pre-term birth could create a neurological and environmental susceptibility to developing childhood DP.

Similar findings have been found in low birthweight children, which may be because pre-term born infants are typically also very low in weight when born (Cutland et al., 2017). Very low birthweight is defined as weight at birth being less than 2,500 grams, equating to 5.5 pounds (World Health Organization, 2024). Compared to children born when expected and normal birthweight, children born very pre-term and very low birthweight show significant difficulties regulating crying, sleep, feeding, attention, anxiety and social difficulties making them more susceptible to meet diagnosis criteria for Autism Spectrum Disorder, ADHD, Anxiety Disorder and Mood Disorders (Anderson et al., 2021; Bilgin & Wolke, 2016). These difficulties continue into early adulthood in children who were born at a low birthweight and interfered with daily life (Eriksen et al., 2023). The risk increases for children with depressed parents (Nomura et al., 2007). The authors also found low birthweight children were more likely to be diagnosed with psychiatric disorders during childhood and mothers smoked more during their pregnancy which may have increased the risk for low birthweight compared to peers born at a normal birthweight. Again, suggesting a biological and environmental susceptibility.

Screen media exposure. Screen media exposure consists of any screen-based media devices (i.e., television, mobile phone, electronic tablet). Screen media exposure to young children can be seen as a way to help children self-soothe, build a positive relationship with their child and educational (Mallawaarachchi et al., 2022; Orfanidou et al., 2025). A systematic review consisting of 45 studies, found that children who had greater screen time exposure during infancy were more likely to have difficulties regulating their thoughts, feelings and behaviour during early childhood (Uzundağ et al., 2022). The effects reduced during later childhood. Similar results have been repeated by several researchers (Bilgin et al., 2025; Choe et al., 2022; Jourdren et al., 2023; Muppalla et al., 2023). Indirect screen time has also been found to negatively impact a child's ability to self-regulate; the child does not watch a screen directly but instead are exposed to the sounds of someone else, like a parent, watching a screen (Kucker & Schneider, 2026). Reasons for this relationship may be due to screen time negatively impacting sleep, altering neural pathways in the brain associated with reward perception, emotional regulation and cognitive control (Lissak, 2018; Oswald et al., 2020).

Summary and Conclusions

In summary, childhood DP represents a multidimensional construct capturing co-occurring difficulties in emotional, behavioural, and attentional regulation. Although initially conceptualised in relation to paediatric bipolar disorder, subsequent research has demonstrated that childhood DP reflects a broader vulnerability to psychopathology. Childhood DP can be assessed using the SDQ, enabling the identification of children at elevated risk.

Evidence consistently indicates that childhood DP is associated with significant long-term psycho-social adverse outcomes, including increased risk of mental health disorders, maladaptive behaviours, and functional impairment across development. The stability and heritability of DP further highlight its importance as an early developmental marker of persistent self-regulation difficulties. Despite this, there remains limited understanding of the factors that contribute to the emergence and maintenance of childhood DP.

Therefore, identifying predictors of childhood DP is essential for advancing theoretical models of developmental psychopathology, as well as informing early intervention and prevention efforts. Studies that have examined predictors of DP, are largely cross-sectional, only focused on a few years and all identified have examined predictors from 3 years plus. However, research on general emotional regulation indicate that factors before a child is 3 years old could impact later emotion regulation and development. Therefore, it is of interest to identify early predictive factors of childhood DP to prevent later life consequences and promote early intervention to parents whose children may be at risk. The following section will review the existing literature on predictors of childhood DP within longitudinal studies.

Chapter 2: Systematic Literature Review

Please note this chapter has been published as follows:

Vitkauskaite, E., & Bilgin, A. (2026). Early Predictors of the Childhood Dysregulation Profile: A Systematic Review. *Clinical Child and Family Psychology Review,* 29, 152–166. https://doi.org/10.1007/s10567-026-00557-7

Existing research has identified various potential predictors of childhood DP, but a comprehensive systematic understanding is lacking. A previous systematic review (Caro-Cañizares et al., 2015) found that genetic heritability, differences in brain functioning, parental substance use, and parenting behaviours were associated with childhood DP. However, the review used broad and limited search terms, potentially missing relevant studies. It included both cross-sectional and longitudinal designs but focused only on three studies specifically examining childhood DP, limiting the generalisability of its findings. Since then, numerous relevant studies have emerged. Therefore, a new systematic review is needed to provide an updated and more thorough examination of early predictors of childhood DP. The current review aims to identify key child- and family-related predictors of childhood DP within non-clinical populations, to better understand early-emerging risk factors prior to the onset of clinical symptoms.

Methods

This systematic review was registered with the PROSPERO International Prospective Register of Systematic Reviews (registration no: CRD42024588573) and was conducted in line with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2010).

Study Selection Criteria

See Table 2 for summary. Prospective longitudinal studies were eligible for inclusion in this systematic review. Studies were included in the review based on four criteria. First, they had to report on the childhood dysregulation profile (DP) along with at least one predictor. Second, participants had to have a mean age of 18 years or younger at the time of the assessment of the dysregulation profile. Third, studies had to report on child or family-related predictors assessed during early childhood (0-8 years). Child-related predictors refer to individual characteristics of the child, whereas family-related predictors refer to aspects of the child's wider environment influenced by familial circumstances. Fourth, the articles had to be published in a peer-reviewed journal in English.

Studies were excluded if they included a clinical sample (e.g., participants with a primary diagnosis of anxiety, autism spectrum disorders) or at-risk sample (e.g., preterm born children). The review focused on non-clinical populations to identify predictors of childhood DP as they emerge in the general population, avoiding potential confounding influences of clinical diagnoses, treatment exposures, or disorder-specific symptom profiles (Barkus et al., 2022; He et al., 2020). This approach aimed to improve the specificity of findings for early identification and prevention, addressing a gap in the literature, which has largely focused on clinical populations. Studies were also excluded if they were not peer-reviewed (i.e., thesis), systematic reviews, not a longitudinal design and the sample size was less than 100 participants.

Table 2.

Summary of study selection criteria

	Inclusion criteria	Exclusion criteria
Participants/ population	• Children (18 years and younger) or parents. Parents can include prenatal period. • All genders and ethnicities	• Patients with a primary diagnosis of anxiety, autism, PTSD, personality disorder, cognitive disorder (dementia), other neurological disorders
Intervention/ exposure	• Predictive factors that are associated with later childhood dysregulation profile • No restrictions will be placed on predictive factors, they can include child, parental and environmental	• Not related to predictive factors • Focus of the study is on psychometric properties of the SDQ and/or CBCL, prevalence of dysregulation profile, gender differences
Condition	• Childhood dysregulation profile, identified using SDQ or CBCL	
Outcome	• Children (18 years and below) with identified dysregulation profile using SDQ or CBCL • Can include adults who were identified with childhood dysregulation profile in childhood	• Dysregulation is related to biological or physiological reasons or substance use

Search strategy

A literature search was conducted to identify longitudinal studies examining predictors of the childhood dysregulation profile published up to December 2024. The article search was finalised in January 2025. The following electronic databases were searched: PubMed, PsychINFO, MEDLINE, and Web of Science. In addition, the reference lists of included studies and the first 100 results from a grey literature search conducted via Google Scholar were screened for additional relevant studies. Grey literature refers to materials

published through non-traditional channels, often without peer-review, but which may still provide valuable evidence (Mahood et al., 2014).

The keywords used were as follows: ("childhood dysregulation" OR "CBCL dysregulation" OR "SDQ dysregulation" OR "dysregulation profile" OR “CBCL juvenile bipolar” OR “CBCL-juvenile bipolar” OR “Child Behavior Checklist–Juvenile Bipolar” OR “Child Behaviour Checklist–paediatric Bipolar” [Abstract and Title]) AND (predict* OR indicat* OR “risk factor*” [Full text]).

Quality Assessment

The Newcastle-Ottawa Scale (Wells et al., 1999) was used to assess the quality of studies referring to selection, comparability, and outcome or exposure for cohort studies (see Table 3 for description of the questionnaire and Table 4 for study quality ratings). Scores in this scale could range from 0 to 9, with higher scores indicating higher quality. Studies were rated by EV and AB. See Table 5 for a summary of studies.

Table 3.

Newcastle-Ottawa Scale – Questionnaire Description

Selection				**Comparability**	**Outcome**		
1) Representativeness of the exposed cohort	2) Selection of the non-exposed cohort	3) Ascertainment of exposure	4) Demonstration that outcome of interest was not present at start of study	1) Comparability of cohorts on the basis of the design or analysis controlled for confounders	1) Assessment of outcome	2) Was follow-up long enough for outcomes to occur	3) Adequacy of follow-up of cohorts
a) Truly representative (one star) b) Somewhat representative (one star) c) Selected group d) No description of the derivation of the cohort	a) Drawn from the same community as the exposed cohort (one star) b) Drawn from a different source c) No description of the derivation of the non exposed cohort	a) Secure record (e.g., surgical record) (one star) b) Structured interview (one star) c) Written self report d) No description e) Other	a) Yes (one star) b) No	a) The study controls for age, sex and marital status (one star) b) Study controls for other factors (list) (one star) c) Cohorts are not comparable on the basis of the design or analysis controlled for confounders	a) Independent blind assessment (one star) b) Record linkage (one star) c) Self report d) No description e) Other	a) Yes (one star) b) No	a) Complete follow up- all subject accounted for (one star) b) Subjects lost to follow up unlikely to introduce bias- number lost less than or equal to 20% or description of those lost suggested no different from those followed. (one star) c) Follow up rate less than 80% and no description of those lost d) No statement

Table 4.

Newcastle-Ottawa Scale – Study Quality Ratings

Author (year)	Selection 1	Selection 2	Selection 3	Selection 4	Comparability 1	Outcome 1	Outcome 2	Outcome 3	Total Score
Adynski et al. (2023)	1	1	1	1	0	1	1	0	6
Asmussen et al. (2022)	1	1	1	1	1	1	1	0	7
Ayer et al. (2013)	1	1	1	1	1	1	1	1	8
Basten et al. (2013)	1	1	1	1	1	1	1	0	7
Bilgin, Morales-Muñoz, et al. (2024)	1	1	1	1	1	1	1	1	8
Deutz et al. (2020)	1	1	1	1	0	1	1	0	6
Frazier et al. (2023)	1	1	1	1	1	1	1	0	7
Herbein et al. (2024)	1	1	1	1	1	1	1	0	7
Hofheimer et al. (2023)	1	1	1	1	1	1	1	0	7
Marino et al. (2019)	1	1	1	1	1	1	1	0	7
McQuillan et al. (2018)	1	1	1	1	1	1	1	0	7
Winsper and Wolke (2014)	1	1	1	1	1	1	1	1	8

Note. Thresholds for converting the Newcastle-Ottawa scales to AHRQ standards (good, fair, and poor):

Good quality: 3 or 4 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain

Fair quality: 2 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome/exposure domain

Poor quality: 0 or 1 star in selection domain OR 0 stars in comparability domain OR 0 or 1 stars in outcome/exposure domain

Table 5.

Summary of included studies

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
Adynski et al. (2023)	USA	206	18, 24, 30, 36, 60, 84 months	51.5% male; 48.5% female	2002	Durham Child Health and Development Study	CBCL	A sum score of ≥180; Dysregulation class trajectory	**Family related:** Social adversity*	6
Asmussen et al. (2022)	Denmark	1099	2.5 and 5 years	54.3% male; 45.8% female	2010-12	Odense Child Cohort	CBCL	≥ 11 points, equalling the 75% percentile	**Child related:** Sex, Gestational age, Birth weight. **Family related:** Maternal age,* Paternal age,* Maternal smoking during pregnancy,* Maternal depression symptoms,* Paternal depression symptoms, Maternal education.*	7

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
Ayer et al. (2013)	The Netherlands	489	6-16 years	47% male; 53% female	2003-05	Not available	CBCL	80% percentile	**Child related:** Sex.	8
Basten et al. (2013)	The Netherlands	6131	5-7 years	50.3% male; 40.7% female	2002-06	Generation R	CBCL	Latent class analysis: Highly problematic class	**Child related:** Sex.* **Family related:** Maternal education level,* Psychological symptoms of both parents at 3 years,* Parental hostility.*	7
Bilgin, Morales-Muñoz, et al. (2024)	UK	16,599	3, 5, 7, 11 years	51.2% male; 48.8% female	2000-02	Millennium Cohort Study (MCS)	SDQ	Parallel-process latent class analysis: Co-developing low increasing internalizing and high stable externalizing trajectory class	**Child related:** Sex,* Birth weight*, Temperament at 9 months (positive mood,* withdrawal,* low adaptability, regularity). Night waking frequency at 9 months.	8

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
									Family related: Maternal age at birth, Structured parenting beliefs, Maternal psychological distress at 9 months*	
Deutz et al. (2020)	USA	1073	8 and 14 years	50.2% male; 49.8% female	1991	NICHD Study of Early Child Care and Youth Development (SECCYD)	CBCL	Confirmatory Factor Analysis	**Child related:** Birth weight, Attachment, Temperament (negative affectivity*), Executive functioning (effortful control,* cognitive ability, delay of gratification*, impulsivity, planning/problem solving, self-control.*)	6

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
									Family related: Positive maternal parenting,* harsh control, Maternal depression,* Home environment.	
Frazier et al. (2023)	USA and Puerto Rico	4595	6-8 years 9-11 years 12-14 years 15-18 years	47.1% female 52.9% male	2009-2021	Environmental influences on Child Health Outcomes (ECHO)	CBCL	Sum score ≥180	**Child related:** Sex,* Small for gestational age. **Family related:** Prenatal tobacco use,* Physical health (Any prenatal infection,* Gestational diabetes), Maternal education level,* Family psychiatry history.*	7

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
Herbein et al. (2024)	France	871	3, 5 and 8 years	47% female 53% male	2003-06	EDEN cohort	SDQ	Latent class growth analysis: High mood dysregulation trajectory	**Child related:** Sex,* Gestational age, Birth weight. **Family related**: Maternal and paternal age, Maternal smoking and alcohol use during pregnancy, Depression symptoms at 6 months during pregnancy.*	7
Hofheimer et al. (2023)[b]	USA and Puerto Rico	3934	Across 4 time points from 18 to 72 months	53.2% male; 46.8% female	2009-2021	Environmental influences on Child Health Outcomes (ECHO)	CBCL	Sum score ≥180; High and increasing DP trajectory	**Child related:** Sex,* Gestational age.*	7

		Sample characteristics			Study Design					
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
									Family related: Maternal age, Maternal psychiatric diagnoses,* Psychosocial adversity,* Maternal education,* Overall substance use during pregnancy (specific effects of alcohol,* nicotine* and opiod*).	
Marino et al. (2019)	Italy	104	2 years	49% female 51% male	Not reported	Not available	CBCL	Sum score of DP	**Child related:** Gestational age.* **Family related:** Parental age, Maternal depression symptoms.*	7

		Sample characteristics				Study Design				
Author (year)	**Country**	**N**	**Mean Age at childhood DP assessment(s)**	**% Child Sex**	**Cohort recruitment year**	**Name of the Cohort**	**Childhood DP assessment instrument**	**Operationalization of Childhood DP[a]**	**Assessed Predictor(s)**	**Study Quality Rating**
McQuillan et al. (2018)	USA	585	Annually from 5 to 13 years	48% female; 52% male	1987-88	Child Development Project	CBCL by mothers; TRF by teachers	T score of ≥60	**Child related:** Temperament (resistance to control*), Social preference in peer relationships,* Language ability.* **Family related:** Harsh parenting, Stressful life events.	7
Winsper and Wolke (2014)	UK	10,630	4, 7, 8 & 9.5 years	48.4% female;51.6% male	1991-92	Avon Longitudinal Study of Parents and Children (ALSPAC)	SDQ	Latent class growth analysis: Very high dysregulation trajectory class	**Child related:** Infant and toddler regulatory problems (excessive crying, sleeping and feeding problems).*	8

Note. DP: Dysregulation Profile: CBCL: Child Behavior Checklist; YSR: Youth Self Report; SDQ: Strengths and Difficulties Questionnaire; TRF: Teacher's Report Form.

[a] Dysregulation profile measured with the combination of the following subscales: CBCL: Emotional (anxious/depressed), cognitive (attention problems), and behavioral (aggressive behavior) subscales; YSR: Anxious/depressed, the attention problems, and the aggression subscales; SDQ: Emotional symptoms, hyperactivity/inattention, conduct problems subscales.

[b] Same cohort with Frazier (2023). Included due to the report of different time points.

*Indicates significant findings.

Data extraction

Data were extracted using an Excel sheet and included information on author names, publication year, country of the data collection, number of participants, percentages (%) of male and female participants, age of assessment of the dysregulation profile, assessment scale of the dysregulation profile, name of the study cohort (if available), T1 (Time 1) assessment year of the cohort, and assessed predictors (child related and/or parent related).

Evidence synthesis

Given that quantitative synthesis was not feasible due to the lack of enough number of studies and heterogeneity across studies in design, all studies were narratively synthesised. To address the aims of our review, a narrative overview of the main findings is presented in two major sections: 1) Child-related predictors (child sex; birth weight, gestational age, and small for gestational age; child temperament; language and cognitive skills; early social development); and 2) family-related predictors (mental health; social adversity; education; parental behaviours; life stressors; age; substance use; physical health during pregnancy).

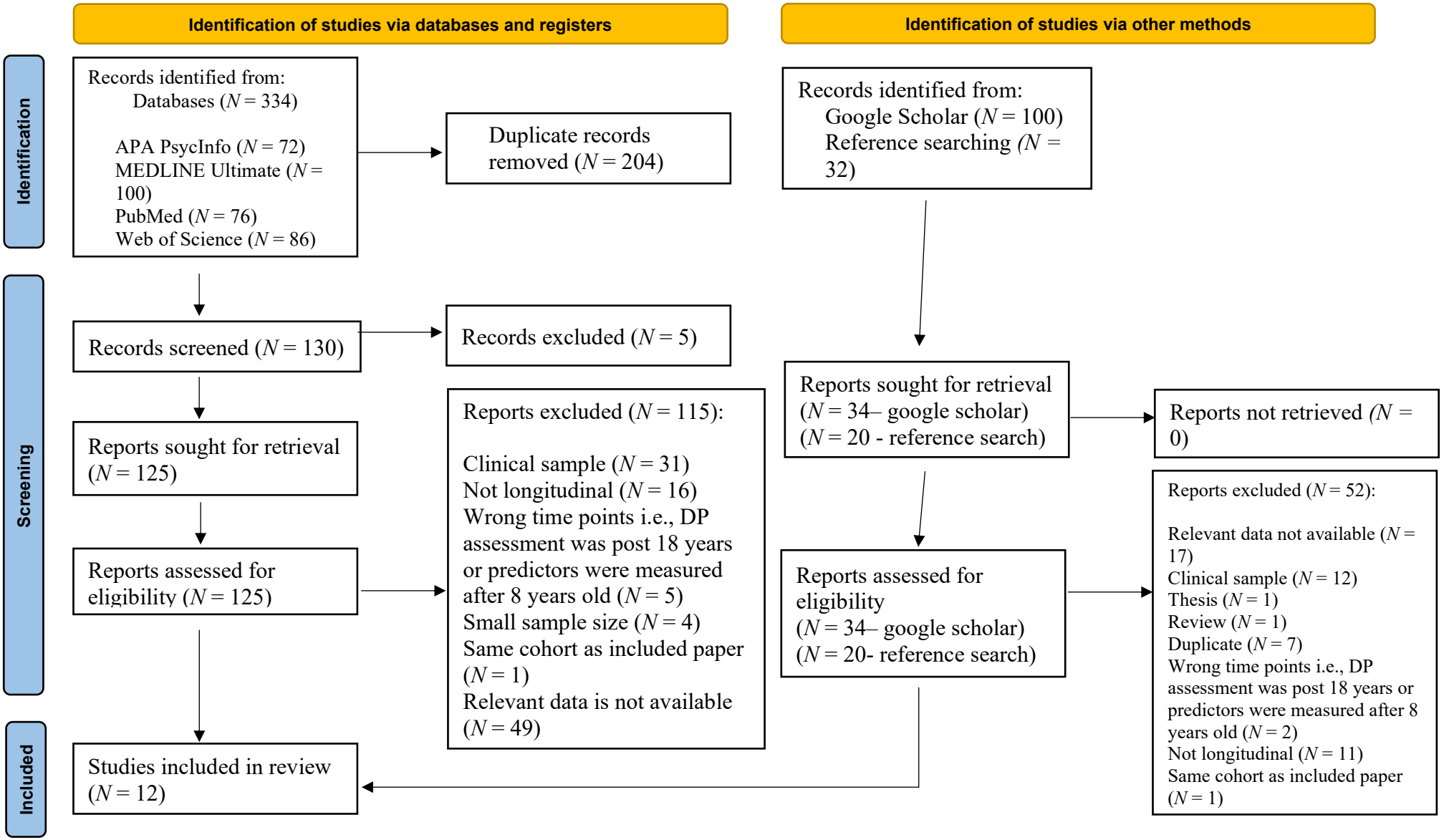
Results

Included Articles

The PubMed search yielded 76 articles, PsychINFO yielded 72 articles, MEDLINE yielded 100 articles, and Web of Science yielded 86 articles. Furthermore, 54 articles were found from bibliography search. Overall, 388 articles were included in the literature search. After the removal of 209 duplicates, the literature search included 179 articles (see Figure 1).

Figure 1.

Search Strategy



After title screening, 125 articles remained for abstract review. Based on the abstracts, 64 articles were excluded. The full texts of the remaining 61 articles were then assessed against the inclusion criteria, resulting in the exclusion of 44 studies due to one or more of the following reasons: inclusion of a clinical sample ($N = 10$), unsuitable study design ($N = 13$), insufficient or unavailable data ($N = 15$), participants outside the target age range ($N = 1$), inability to access the full text (N = 3), or small sample size ($N = 2$). Reference lists of included studies were reviewed, and a grey literature search of the first 100 Google Scholar results was conducted. In cases where multiple reports were published from the same cohort, only one study was included to avoid double-counting participants. When selecting between such studies, priority was given to those with the most comprehensive profiles such as largest sample sizes and a broader number of predictors. However, two studies (Frazier et al., 2023; Hofheimer et al., 2023) from the Environmental influences on Child Health Outcomes (ECHO) cohort were included as they reported on different time points. This resulted in 12 articles from 10 samples being included in the review (Table 3). The article selection process was conducted independently by EV and AB, with discrepancies at the abstract and full-text screening stages discussed and resolved collaboratively.

Study Characteristics and Quality Assessment

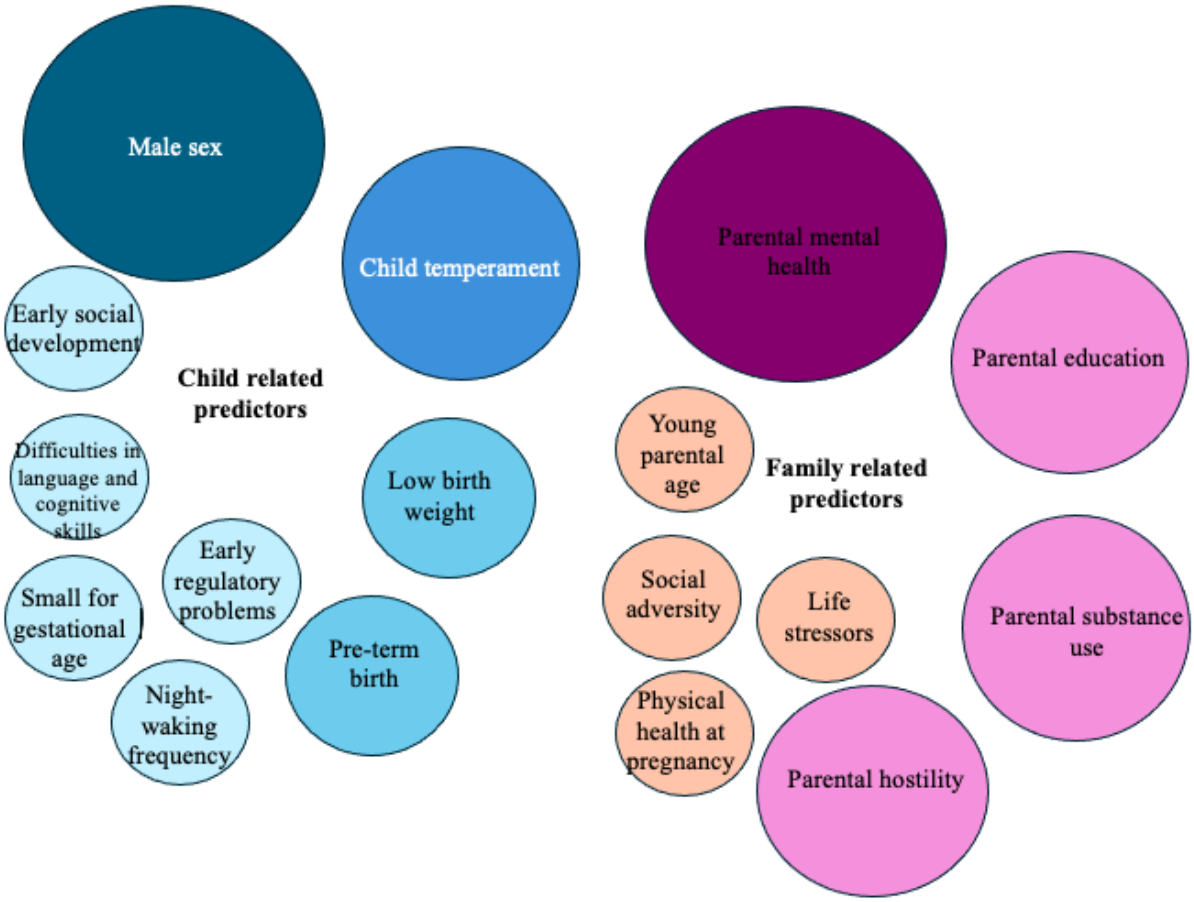
The majority of the studies (*N* = 9, 75%) reported on both child- and family-related predictors of childhood dysregulation, while 2 (17%) studies reported on child-related predictors only, and 1 reported on family-related predictors only. The number of participants ranged from 104 to 16,599. The majority of the studies were conducted in Europe (*N* = 7, 58%), and 5 (42%) were conducted in the USA and Puerto Rico. The assessment ages of childhood dysregulation ranged from 18 months to 18 years. The majority of the studies used CBCL to assess childhood dysregulation (*N* = 9, 75%) and 3 (25%) studies used SDQ. The quality assessment indicated low risk of bias in sample selection, low-moderate risk of comparability bias, and low risk of exposure/outcome bias. Overall quality ratings of the studies ranged from 6 to 8 (mean = 7.1, *SD* = .67), indicating overall high quality.

Predictors of Childhood Dysregulation Profile

Figure 2 illustrates the key child-related (blue) and family-related (pink) predictors of childhood DP. Larger circles with darker colours represent predictors supported by a greater number of studies and more consistent findings. In contrast, smaller circles with lighter colours indicate predictors with fewer studies or inconsistent evidence regarding their association with childhood DP.

Figure 2.

Key child related (blue) and family related (pink) predictors of childhood DP.



Child related predictors:

Male sex (***N*** = 7)

Child temperament (***N*** = 3)

Difficulties in language and cognitive skills (***N*** = 2)

Early regulatory problems (***N*** = 1)

Night-waking frequency (***N*** = 1)

Low birth weight (***N*** = 4)

Pre-term birth (***N*** = 4)

Small for gestational age (***N*** = 1)

Early social development (***N*** = 2)

Family related predictors:

Parental mental health (*N* = 7)

Parental education (*N* = 4)

Parental substance use (*N* = 4)

Young parental age (*N* = 5)

Parental hostility (*N* = 3)

Life stressors (*N* = 1)

Social adversity (*N* = 2)

Physical health during pregnancy (*N* = 1)

Child related predictors

Studies assessed several child-related predictors of childhood DP with most focusing on infant sex, birth weight, and gestational age. Other predictors included temperament, language ability, social preference, executive functioning skills, infant-parent attachment, and infant/toddler regulatory problems.

Child sex

Seven studies (Asmussen et al., 2022; Ayer et al., 2013; Basten et al., 2013; Bilgin, Morales-Muñoz, et al., 2024; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023) examined child sex as a predictor of childhood DP. Four studies (Basten et al., 2013; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023) found that boys are more likely than girls to show childhood DP symptoms. For example, Hofheimer et al. (2023) reported that boys are more likely to have higher and increasing DP symptoms trajectories from 18 months to 72 months (in USA), and Herbein et al. (2024) showed that they are more likely to be on a high mood dysregulation trajectory from 3 to 8 years of age (in France). Similarly, Basten et al. (2013) found more DP symptoms in boys aged 5-7 years (in the Netherlands). Across 3 to 11 years, Bilgin, Morales-Muñoz, et al. (2024) showed that boys were more likely to be in the high DP (co-developing low increasing internalizing and high stable externalizing) trajectory class in comparison to girls (in the UK). Using data from 69 paediatric longitudinal cohorts in the USA and Puerto Rico, Frazier et al. (2023) showed that boys are more likely to show childhood DP symptoms at ages 6 to 18 years in comparison to girls.

Conversely, two studies found no significant sex differences regarding childhood DP symptoms. Asmussen et al. (2022) reported no differences in high-persisting DP trajectories between boys and girls from 2.5 to 5 years (in Denmark). Ayer et al. (2013) also found no sex

differences in DP symptoms from 11.5 to 14.5 (the Netherlands), with boys comprising 47% and girls 43% of the persistent DP group.

Child Temperament

Three studies (Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; McQuillan et al., 2018) consistently found that child temperament influences the development of childhood DP symptoms. Bilgin, Morales-Muñoz, et al. (2024) reported that infant temperament at 9 months predicted a high DP symptom trajectory from ages 3 to 11, with positive mood and regularity reducing, and withdrawal increasing, the likelihood of high DP symptoms. Deutz et al. (2020) found that negative affectivity was associated with higher DP symptoms at ages 8 and 14. McQuillan et al. (2018) showed that resistance to control predicted higher DP symptoms in both mother (r=.15) and teacher reports (r=.05).

Birth weight, gestational age, and small for gestational age

Four studies (Asmussen et al., 2022; Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; Herbein et al., 2024) examined birth weight, four (Asmussen et al., 2022; Herbein et al., 2024; Hofheimer et al., 2023; Marino et al., 2019) examined gestational age, and one study (Frazier et al., 2023) assessed small for gestational age as predictors of childhood DP.

Regarding birth weight, Bilgin, Morales-Muñoz, et al. (2024), using a population representative cohort in the UK, found that higher birth weight was associated with a lower likelihood of being in a high DP symptom trajectory from ages 3 to 11. In contrast, three smaller cohort studies found no significant associations between birth weight and childhood DP symptoms. These included Asmussen et al., (2022; N = 1099), which found no impact of birth weight on the likelihood of high persistent DP symptoms from 2.5 to 5 years. Similarly, Herbein et al. (2024; N = 871) and Deutz et al. (2020; N = 1073) reported no impact of birth weight on DP symptoms from 3 to 8 years and at ages 8 and 14 years, respectively.

Findings on gestational age were mixed. Marino et al. (2019) reported increased DP symptoms with decreasing gestational age at 2 years. Hofheimer et al. (2023) found that preterm children were more likely to follow a high and increasing DP trajectory than those born full-term. Conversely, Herbein et al. (2024) and Asmussen et al. (2022) found no associations between gestational age and childhood DP symptoms.

Regarding small for gestational age, Frazier et al. (2023) reported no associations with DP symptoms between ages 6 to 18 years.

Language and Cognitive Skills

One study (McQuillan et al., 2018) explored the association between child language ability and change in childhood DP symptoms from ages 5 to 13. Results showed that children with more advanced language skills exhibited less increase in DP symptoms based on teacher or combined teacher and mother reports. However, no association was found when DP was reported by mothers alone.

Regarding cognitive skills, Deutz et al. (2020) showed that lower effortful control, cognitive ability and self-control were associated with higher DP symptoms at ages 8 and 14, with effortful control showing relatively larger associations (r=-.28 at 8 years and r=-.21 at 14 years).

Early Social Development

Regarding infant-mother attachment, Deutz et al. (2020) found no associations between insecure or disorganised attachment from birth to 54 months, and DP symptoms at ages 8 and 14. In contrast, McQuillan et al. (2018) reported that children with low social preference in early peer relationships (between grades 1 to 3) showed steeper growth in DP symptoms from ages 5 to 13.

Early regulatory problems (excessive crying, sleeping, and feeding problems) and night-waking frequency

Using a large-scale, prospective UK population representative data (recruitment years 1991-92), Winsper and Wolke (2014) found that regulatory problems at 6, 15-18 and 24-30 months were consistently associated with higher likelihoods of childhood DP symptom trajectories from ages 4 to 9.5. The strength of the associations increased as the age at the assessment of the regulatory problems increased (e.g., strongest associations found for 24-30 months regulatory problems), as the severity of the DP symptom trajectories increased (i.e., low, moderate, high, very high DP), and as the severity of the regulatory problems increased (i.e., single, multiple regulatory problems). In contrast, using population representative large-scale data from a later UK cohort study (recruitment years 2000-02), Bilgin, Morales-Muñoz, et al. (2024) showed no association between night waking frequency at 9 months of age and childhood DP symptom trajectories from 3 to 11 years.

Family related predictors

Parental Mental health

Eight studies investigated the association between parental mental health and childhood DP symptoms. Among these, four studies (Asmussen et al., 2022; Deutz et al., 2020; Herbein et al., 2024; Marino et al., 2019) focused on maternal depression, while three studies (Basten et al., 2013; Frazier et al., 2023; Hofheimer et al., 2023) examined broader indicators of family mental health and one study examined maternal distress (Bilgin, Morales-Muñoz, et al., 2024) in relation to childhood DP.

Across all studies, a consistent pattern emerged linking poorer parental mental health to higher levels of childhood DP symptoms. Regarding maternal depression, Deutz et al. (2020) found a significant association between postnatal maternal depression and elevated

childhood DP symptoms at both 8 and 14 years (p=.03 for both). Similarly, Herbein et al. (2024) reported that maternal clinical depression during pregnancy was associated with a 44% likelihood of children following a persistent mood dysregulation trajectory (44%) between ages 3 and 8. Bilgin, Morales-Muñoz, et al. (2024) also identified a significant association between maternal psychological distress at 9 months postpartum and child dysregulation from ages 3 to 11. Marino et al. (2019) provided a neurobiological explanation for these findings, demonstrating that children of mothers with high levels of postnatal depression exhibited left parietal alpha asymmetry, which is an indicator linked to greater levels of emotional dysregulation.

Asmussen et al. (2022) examined both maternal and paternal depression symptoms. They found that higher maternal depressive symptoms at 3 months postpartum predicted persistent childhood DP symptoms from 2.5 to 5 years, whereas paternal depressive symptoms at the same time point were not significantly associated with childhood DP trajectories.

Studies examining broader parental mental health difficulties revealed similar patterns. In a large sample of 6,131 children, Basten et al. (2013) found higher levels of both maternal and paternal postnatal affective symptoms (i.e., depression and anxiety) to be positively correlated with childhood DP. Additionally, Hofheimer et al. (2023) reported that current or historical maternal mental health difficulties, including major depression, dysthymia, phobias, and bipolar, anxiety, panic, obsessive-compulsive, post-traumatic stress, and attention-deficit disorders, were associated with both high and increasing (50%) and borderline but stable (29.4%) childhood DP trajectories. Frazier et al. (2023) further demonstrated that children with DP were more likely to have at least one parent with a psychiatric disorder (major depression, dysthymia, bipolar disorder, anxiety disorder not

otherwise specified, generalised, anxiety disorder, specific phobia, panic disorder, obsessive-compulsive disorder, social anxiety, post-traumatic stress disorder, attention-deficit/hyperactivity disorder, eating disorder, schizophrenia, alcoholism or other substance abuse, and autism spectrum disorder) compared to children without DP (68% vs. 50%). However, the timing of parental psychiatric diagnoses was not clearly specified in this study.

Parental Education

Four studies (Asmussen et al., 2022; Basten et al., 2013; Frazier et al., 2023; Hofheimer et al., 2023) investigated the association between parental education and childhood DP symptoms, revealing consistent findings across samples. In a longitudinal study following children from age 6 to 18 years in the United States and Puerto Rico, Frazier et al. (2023) found that children whose mother had less than a high school education were more likely to exhibit higher DP trajectories compared to those whose mothers had completed a university degree. Similarly, Basten et al. (2013) reported that children aged 5–7 years whose mothers had lower educational attainment (i.e., primary school or lower vocational education) displayed higher levels of childhood DP. Consistent with these results, Asmussen et al. (2022) and Hofheimer et al. (2023) also found that children of mothers with less than a college-level education were more likely to exhibit high or borderline DP levels.

Maternal Substance Use during Pregnancy

Four studies (Asmussen et al., 2022; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023) investigated the association between maternal substance use during pregnancy and childhood DP symptoms. Regarding maternal smoking during pregnancy, Asmussen et al. (2022) found an increased likelihood of children following a high-persisting or increasing DP trajectory. In addition, in a sample of 4,595 children aged 6 to 18 years, Frazier et al. (2023) reported that prenatal maternal tobacco exposure was associated with

higher levels of childhood DP. In contrast, Hofheimer et al. (2023), in a sample of 3,934 infants aged 18-72 months, found no significant associations between overall substance use during pregnancy and childhood DP. However, specific effects were observed for alcohol (p<.001), nicotine (p<.01) and opioid use (p<.04), each of which increased the likelihood of a high and increasing DP symptom trajectory. On the other hand, Herbein et al. (2024) did not find significant associations between maternal alcohol consumption and/or cigarette smoking during pregnancy with childhood DP symptoms.

Parental Age

Five studies (Asmussen et al., 2022; Bilgin, Morales-Muñoz, et al., 2024; Herbein et al., 2024; Hofheimer et al., 2023; Marino et al., 2019) examined parental age as a predictor of childhood DP. Asmussen et al. (2022) found that young motherhood (17-27 years) and young fatherhood (18-28 years) were associated with a high-persisting and increasing trajectory of childhood DP. In contrast, the remaining studies did not identify a significant association between maternal age at birth (Bilgin, Morales-Muñoz, et al., 2024; Herbein et al., 2024; Hofheimer et al., 2023), paternal age at birth (Herbein et al., 2024), or overall parental age (Marino et al., 2019) and childhood DP symptoms.

Parenting and family environment

Three studies (Basten et al., 2013; Deutz et al., 2020; McQuillan et al., 2018) investigated the association between parenting and childhood DP symptoms. Basten et al. (2013) found a significant association between higher levels of parental hostility and elevated childhood DP symptoms (p<.001 for both mothers and fathers). Similarly, Deutz et al. (2020) reported a negative association between positive maternal parenting and childhood DP (p<.001). However, both Deutz et al. (2020) and McQuillan et al. (2018) found no significant association between harsh parental control and childhood DP.

Beyond specific parenting behaviours, the broader home environment also showed mixed associations. Deutz et al. (2020) also found that a poorer quality home environment was associated with higher levels of childhood DP. In contrast, McQuillan et al. (2018) did not identify a significant relationship between stressful life events and childhood DP.

In addition to parenting behaviours, Bilgin, Morales-Muñoz, et al. (2024) examined parenting beliefs and found no significant association between structured parenting beliefs at 9 months and childhood dysregulation trajectories from ages 3 to 11 years.

Social adversity

Two studies (Adynski et al., 2023; Hofheimer et al., 2023) explored social adversity as a predictor of childhood DP. Hofheimer et al. (2023) found that the majority of children experiencing multiple social adversities (between 2-5) also exhibited high and increasing (86.2%) and borderline and stable (71.3%) DP trajectories *(*p<.001). Similarly, in a sample of infants aged 18-84 months, Adynski et al. (2023) reported that higher levels of social adversity were positively associated with elevated childhood DP symptoms (p<.001), although they were not significantly associated with DP trajectories.

Physical health during pregnancy

One study (Frazier et al., 2023) examined the impact of physical health during pregnancy on development of childhood DP. The authors found prenatal infections to be associated with childhood DP.

Discussion

The aim of this systematic review was to investigate the evidence for predictors of childhood DP, focusing on family- and child-related factors separately. Several family- and child-related predictors emerged including poorer parental mental health, lower parental education, greater substance use during pregnancy, social adversity, male sex, difficult

temperament, and early regulatory problems. These findings provide an overview of factors associated with the development of childhood DP.

Consistent with previous developmental psychopathology research (Babineau et al., 2015), poor parental mental health emerged as a key predictor of childhood DP symptoms, underscoring the critical role parents play in modelling and supporting the development of self-regulation skills (Morawska et al., 2019). Parental mental health difficulties, particularly in the postnatal period, could decrease parents' capacity to regulate their own emotions, thereby limiting their ability to help earn how to self-regulate their emotions and behaviours (Zitzmann et al., 2024). The risk for childhood DP could depend not only on the presence of parental mental health symptoms but also on the timing of parental mental health symptoms (Papp, 2012). Existing studies mainly investigated the impact of mental health symptoms of mothers in the postnatal period on the development and maintenance of childhood DP symptoms. Further research is required to examine the impact of mental health symptoms both in the prenatal and postnatal period including both mothers and fathers in the study.

Relatedly, evidence on the impact of parenting behaviours on the development of childhood DP symptoms remains mixed (Basten et al., 2013; Deutz et al., 2020; McQuillan et al., 2018), possibly due to variations in the developmental stages examined as the impact of negative parenting on the development of childhood DP could be more observable in the early years when childhood DP is emerging. It could also be due to the bidirectional association between parenting behaviours and childhood DP symptoms which is often overlooked.

Although research directly examining the association between parenting and childhood DP symptoms is limited, evidence from studies on the related construct of emotion dysregulation provides a valuable context. A review of decades of research on childhood

emotion dysregulation indicates that self-regulation skills are transmitted from parents to children (Bridgett et al., 2015), with meta-analyses showing small but significant associations between negative parenting and emotion dysregulation in childhood (Zimmer-Gembeck et al., 2021) and in adolescence (Goagoses et al., 2023). Stronger associations have been found between parents' emotion regulation difficulties (e.g., low emotional awareness, suppression, limited strategies) and children's internalizing problems, while associations between parents' adaptive regulation skills (e.g., cognitive reappraisal) and children's externalizing behaviours appear to be weaker (Zimmer-Gembeck et al., 2021). Collectively, these findings indicate that parental mental health and emotion regulation capacities play a central role in shaping children's emotion regulation development and underscore the need for further research on their contribution to childhood DP.

The current review provides new evidence that had not been identified in the previous review by Caro-Cañizares et al. (2015). It highlights that low maternal education is associated with a greater likelihood of both the development and persistence of childhood DP symptoms (Asmussen et al., 2022; Basten et al., 2013; Frazier et al., 2023; Hofheimer et al., 2023). This association could reflect broader contextual factors such as lower socioeconomic status, reduced social support network and limited knowledge of effective parenting techniques (Kondirolli & Sunder, 2022; Song, 2023). Furthermore, maternal smoking during pregnancy emerged as a key factor predicting the likelihood and trajectory of childhood DP, aligning with previous research linking maternal prenatal smoking to a range of adverse developmental outcomes in children (Chen, 2012; Knopik et al., 2012). This review also highlighted the impact of cumulative risk exposure (e.g., number of children in the household, low maternal education, single parenting, presence of maternal mental health problems), collectively reflecting a greater level of social adversity. Consistent with prior

findings, higher levels of social adversity are associated with an increased likelihood of childhood DP (Adynski et al., 2023; Hofheimer et al., 2023).

Regarding child-related predictors of childhood DP, male sex, difficult temperament (e.g., negative mood, low regularity, resistance to control), and early regulatory problems. (i.e., excessive crying, sleeping, or feeding problems) emerged as key factors associated with a higher likelihood of developing and maintaining DP symptoms. The association between these factors and the development of childhood DP symptoms may be explained by their potential impact on the formation of secure attachment with parents (Bilgin & Wolke, 2020), which in turn has been linked to the emergence of DP symptoms (Groh et al., 2012). Furthermore, difficult temperament and early regulatory problems may negatively influence sensitive parenting (Jaekel et al., 2021), which could mediate the association between these factors and later DP symptoms. Another plausible explanation involves underlying neurobiological mechanisms (e.g., differences in amygdala activity) that might contribute to these associations (Álvarez-Voces & Romero, 2025; Sammallahti et al., 2023; Urben et al., 2025).

On the other hand, the evidence regarding the effects of low birth weight, and gestational age on the development of childhood DP remains inconclusive. This inconsistency might reflect the differential of preterm birth and low birth weight on internalizing rather than externalizing symptoms (Bilgin et al., 2021). However, further research is required to clarify these mixed findings. In addition, the limited evidence concerning the roles of early language ability, cognitive skills and social development makes it difficult to draw conclusions about their potential contribution to the development of DP symptoms, warranting further investigation.

Comparison with other reviews

A previous systematic review (Caro-Cañizares et al., 2015) examined predictors of childhood DP but used broad search terms and included only a few studies specifically on this topic, limiting the generalisability of its findings. Consistent with that review, the current review identified parental behaviours, substance use, and psychological well-being as robust predictors, with multiple studies supporting each factor. Caro-Cañizares et al. (2015) also reported biological predictors (e.g., genetics, blunted HPA-axis responses); however, these findings were derived from cross-sectional data and were not included in the current review. In the current review, two longitudinal studies examined biological predictors of childhood DP. Firstly, Herbein et al. (2024) found lower levels of tumour necrosis factor-α at birth to be associated with higher levels of childhood mood dysregulation. Additionally, Marino et al. (2019) identified that mothers who experienced postnatal depression were more likely to have children with greater left parietal alpha asymmetry at 6 months of age, which later predicted higher levels of emotional dysregulation at 2 years of age. However, due to the limited number of longitudinal studies examining biological predictors, these biological factors could not be integrated into the current systematic review. Given the evidence that neural activity, thyroid function, and genetic risk influence childhood DP (Althoff et al., 2006; McGough et al., 2013; Tsai et al., 2025; Zepf et al., 2011), our findings highlight the need for further longitudinal studies investigating biological predictors of childhood DP. Differences between the reviews also reflect the focus on the study design, as Caro-Cañizares et al. (2015) mainly included cross-sectional studies. One longitudinal study from that review (Dougherty et al., 2014) was excluded here due to unavailable data on predictor factors.

Clinical Implications

The findings of the current study have important clinical implications, as they identify a range of modifiable family-related predictors of childhood DP. These findings highlight the

importance of implementing family-based interventions to support children and families affected by DP. For example, multi-component interventions that focus on enhancing both child and parental emotional sensitivity, as well as addressing broader family difficulties such as the Turning into Kids and the Triple P-Positive Parenting Program (Havighurst et al., 2013; Sanders, 2012) could be particularly beneficial for children exhibiting DP symptoms.

Limitations

To our knowledge, this is the first comprehensive review to examine predictors of childhood DP, highlighting the key child- and family-related factors. However, several limitations should be acknowledged. First, there was considerable heterogeneity in measurement of DP (e.g., latent class profiling, 75th percentile, 80th percentile), and timing of assessments, making it difficult to compare the study findings. Second, most studies did not account for potential bidirectional processes between child behaviour and family factors. Third, the review was limited to studies published in English-language peer-reviewed journals, which may have resulted in exclusion of studies published in other languages. Further studies are needed in non-Western contexts to determine whether these findings generalise across diverse cultural settings.

Conclusions

To conclude, this review identified several predictors of childhood DP. Family-related predictors, including poorer parental mental health, lower parental education and greater maternal substance use during pregnancy emerged as key risk factors. In addition, child characteristics such as male sex, difficult temperament and regulatory problems were associated with an increased likelihood of developing DP symptoms. Importantly, many of the family-related factors are modifiable, underscoring the potential value of family-based interventions to support children and families affected by DP. Understanding modifiable

early-life predictors is essential for identifying children at elevated risk and informing early intervention efforts. Future research should aim to replicate these findings in non-Western populations and explore additional contextual and cultural influences on the development of childhood DP.

Aims and Hypotheses of the Present Study

The above review indicates that most research on the predictors of childhood DP derives from Western countries using the CBCL to assess for symptoms. However, only two studies examined a UK population where participants were recruited from the 1990s and early 2000s (Bilgin, Morales-Muñoz, et al., 2024; Winsper & Wolke, 2014). Since then, there has been changes to society. For instance, there have been changes in education practices (Freedman, 2024), access to CAMHS (Children's Commissioner, 2025) and a global pandemic of COVID-19 (Gupta & Jawanda, 2020), all of which may impact the course and development of dysregulation in the current population. Therefore, the extent to which the results can be generalised to the current UK population remains limited.

Additionally, the two UK studies from the above systematic review used participants from two different datasets: the Millenium Cohort Study and the Avon Longitudinal Study of Parents and Children. For results to be generalisable, they must be replicated across multiple samples to reduce the chances of a generalisability crisis (Mitchell & Shivde, 2023). By using an additional secondary dataset (Understanding Society), this present study allows for examining of the consistency of earlier findings and the opportunity to expand knowledge of predictors of childhood DP within a current UK population.

From a developmental psychopathology perspective, early child characteristics such as temperament, regulatory capacity, and impulsivity represent proximal vulnerabilities for the emergence of DP symptoms, whereas family-related factors are typically conceptualised

as more distal contextual influences (Cicchetti, 2016). Accordingly, it is important to examine the impact of child-related factors first to establish to their association with borderline level and clinical level DP symptoms in childhood. Family-related variables were then considered to determine whether they explained additional risk for DP symptoms and their persistence over and above child-level vulnerabilities. This approach allows a clearer evaluation of the relative and incremental contributions of child- and family-related factors to early development and persistence of childhood DP symptomatology.

The current study will focus on modifiable variables of childhood DP because these variables have greater scope for providing advice on clinical implications based on the findings. The malleable nature of modifiable variables means they are most relevant for developing prevention strategies and interventions as there is scope for them to change (Trentacosta et al., 2008). Therefore, non-modifiable variables in the current study will be used as covariates to account for differences and better understand the contribution of each modifiable variable (Kraemer et al., 1997; Kraemer et al., 2001).

Because persistent DP is more strongly associated with later psychopathology than transient symptoms (Althoff et al., 2010), the primary focus is on predictors of stable borderline and clinical DP across early childhood. Transitions between borderline and clinical levels are examined in exploratory analyses to better understand factors associated with changes in symptom severity.

The aim of the present study is to identify early child and parent factors that predict different trajectories of DP in childhood within a UK population. This study has two hypotheses:

1) To identify child- and family-related predictors measured at infancy and 3 years old, of borderline and clinical DP symptoms at ages 5 and 8, and

2) To determine whether the predictors of persistent borderline and clinical level DP symptoms from ages 5 to 8 differ from those associated with borderline and clinical level DP symptoms at single time point.

Chapter 3: Method

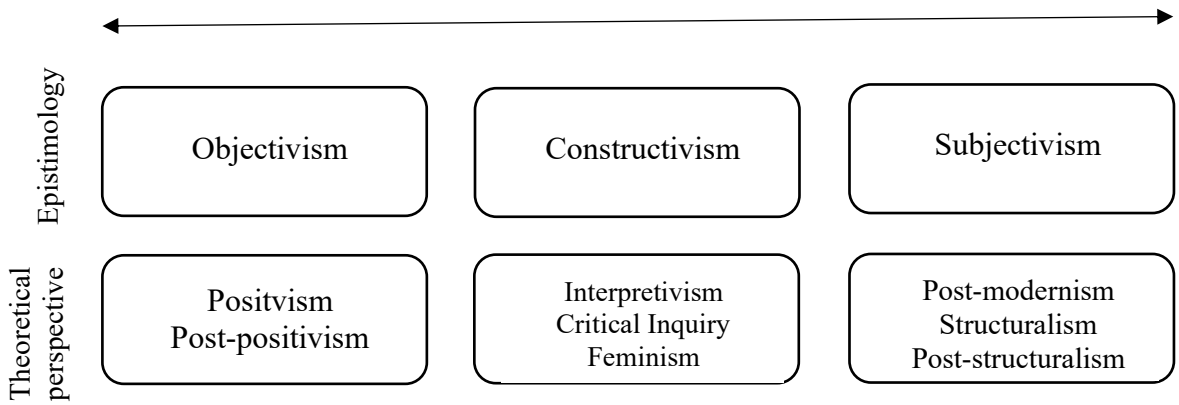
Epistemological positioning

Epistemology refers to the theory of knowledge: how knowledge is produced, what counts as knowledge (Moon & Blackman, 2014). A researcher's epistemological positioning can influence how their research is designed in an attempt to discover knowledge and how results are interpreted (Crotty, 1998, as cited in Moon & Blackman, 2014). Easterby-Smith et al. (2021) used the roots of a tree as a metaphor to explain the impact of epistemological positioning. The authors proposed that in a similar way to how the roots draw nutrients from the soil to support the tree, research is influenced by the researcher's philosophical positioning. The authors also proposed that when a researcher does not consider their epistemological positioning, the quality of their research is at risk of being impaired.

Crotty (1998, as cited in Feast & Melles, 2010) proposed three main epistemological positions: objectivism, constructivism and subjectivism. An objective epistemological position assumes that reality exists independent of a social thoughts and constructions. This means there is a set truth to be discovered. On the other hand, a constructionist epistemological position assumes that knowledge is constructed by social processes of collectives engaging with and interpreting the world. This means that different people could interpret the same event in different ways based on socially related factors such as their culture and/or historical perspectives. Whereas a subjective epistemological position assumes that knowledge depends on how a person understands and perceives reality. This means that knowledge is created by an individual, their beliefs and personal experiences. Objectivism, constructivism and subjectivism are not separate entities but rather lie on a continuum with related theoretical perspectives (Feast & Melles, 2010); see Figure 3 for a visual depiction.

Figure 3.

Epistemological positions and related theoretical perspectives



Note. Figure taken and adapted from Feast and Melles (2010)

Quantitative research is historically grounded in positivism, meaning that knowledge is objective and measured through direct observation of phenomena (Hartas, 2015). From this perspective, the researcher does not and is not influenced by phenomena which is considered to be objective (Easterby-Smith et al., 2021). A positivism perspective favours using quantifiable data, which can be analysed systematically to test hypotheses (Creswell & Creswell, 2018). Therefore, the quantitative methodological approach of this study would be in line with a positivism perspective. As would analysing data from a secondary dataset because the researcher is working with the measures and sampling decisions made by the original researchers of Understanding Society.

In recent literature, there has been a shift from positivism to post-positivism in regards to quantitative research (Creswell, 2003, as cited in Bahari, 2010). Creswell and Creswell (2023, p.7) acknowledged “in quantitative research the position of the researcher remains largely hidden and not expressed”. Similar to positivism, post-positivism accepts that knowledge is separate from the researcher; however, post-positivism acknowledges that

measurement tools and observations used may be limited, fallible and influenced by the researcher's context (Creswell & Poth, 2016; Phillips & Burbules, 2000). Therefore, findings are probabilistic rather than absolute certainty. For example, outcome measures have been criticised to be frequently culturally bound as the constructs that are assessed, the ways these constructs are understood and the responses provided are all influenced by the cultural context of the individual (Lacko et al., 2022; Markus & Kitayama, 1991; Rose & Rimes, 2018). Additionally, psychological literature has too been found to be subjective and relative to the researcher's context. For example, the 'Big Five' personality traits theory and subsequent outcome measures have been criticised for not being sensitive to non-Western cultures (Corr & Matthews, 2020).

It is important to note that concepts used within this research have been socially constructed, such as psychiatric conditions. Over time within the DSM and ICD, psychiatric diagnoses have been reclassified, removed and/or added (Dalal & Sivakumar, 2009). Additionally, differences exist between some psychiatric diagnoses within the DSM and ICD (Tyrer, 2014). The symptoms of what is now classified as childhood DP, was previously classified as childhood bipolar disorder (Biederman et al., 1995). Moreover, Johnstone and Boyle (2018) and Timimi (2014) argue the importance of shifting from traditional psychiatric practice based on the medical model where labels and/or diagnoses are often assigned to a person (i.e., "What is wrong with you?") towards practice that takes into consideration a person's experiences (i.e., "What has happened to you? What is your story?").

Similar to post-positivism, critical realism too assumes a reality independent of the researcher (Lawani, 2020). However, critical realism places greater emphasis on understanding underlying causal mechanisms. As the current study is focused on testing

relationships between variables rather than theorising unobserved mechanisms, a post-positivist approach is more appropriate to the research aims.

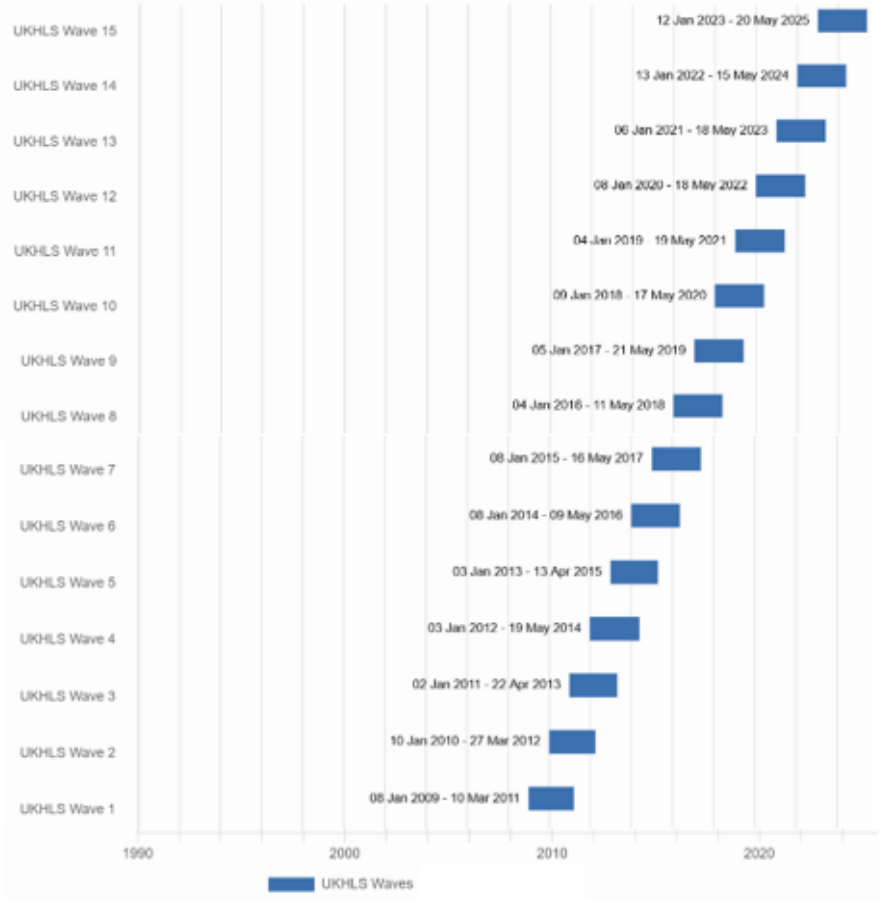
Therefore, this author identifies with a post-positivism perspective. Dysregulation is a phenomenon that can be observed through a person's behaviours and emotions. However, the concept what is considered as 'dysregulation' differs in the literature depending on the outcome measures used and how dysregulation is operationalised. Some authors focus on dysregulation being related to a single domain including: emotions (Goagoses et al., 2023), behavioural inhibitions and/or impulses (Welker et al., 2015), or a stress response within the body (Vinkers et al., 2021). Whereas this study looks at dysregulation as a multi-domain concept; difficulties regulation emotions, attention and behaviour (Althoff et al., 2010). Therefore, within this study, the phenomenon is childhood DP is considered to be real and observable but is operationalised by the parameters of the UKLS secondary dataset.

Overview of Understanding Society

The current project will use data from the Understanding Society: the UK Household Longitudinal Study (UKHLS) is a longitudinal national representative panel study in the UK. UKHLS includes a stratified clustered sample and targeted approximately 40,000 UK households in 2009, with additional ethnic minority boost samples. It builds on and incorporates its predecessor the British Household Panel Survey (BHPS), which began in 1991 (Platt et al., 2020). See Figure 4 for an overview of timings of UKHLS data collections.

Figure 4.

Timing of UKHLS data collection (University of Essex, 2026)



Understanding Society collects a wide range of data across bio-psycho-social factors (i.e. health, work, education, income and social life; Platt et al., 2020). Households are initially strategically randomly selected by the Understanding Society researchers equally across England, Scotland, Wales and Northern Ireland; all individuals living within that household become participants with the aim that participants will be representative of the United Kingdom general population and are able to represent various ages, educational and social backgrounds (Children Act, 2004; Platt et al., 2020).

Household longitudinal surveys re-interview household members annually, including if they move elsewhere in the UK and/or live with different people. Interviews are conducted

face-to-face at the respondent's home or via telephone by trained interviewers or self-completion via online questionnaires (Platt et al., 2020). Questionnaires for children who are younger than 10 years old are answered by their parents, young people aged 10-15 years complete their own questionnaires and those aged 16 years and over also complete their own questionnaires for the adult surveys.

Data collection

Figure 4 shows the timing of data collection from Wave 1 to 15 of the UKHLS (University of Essex, 2025). From 1991-2008, participant household data was collected between September and December. From 2009-2023, participant household data was collected between January and March. Although the latter waves cover a two-year period, household data is collected at one time point per wave. Each household is interviewed at approximately the same time period during each wave annually.

Early predictors

A range of child-related and family-related early predictors were included (Please see Table 6 for a brief overview, including questions that were asked and how they were answered). Variables of interest as predictive factors will be specific to when children are 0-3 years of age. However, not all parental variables of interest are included in the Pregnancy and Early Childhood (PEACH) dataset, therefore, selected parental variables from the main Study will be merged with the PEACH data using the parent identifier. Below will specify what variables were gathered from the PEACH dataset and the main Understanding Society dataset (University of Essex, 2025).

Table 6.

Description of included predictors, measurement, and assessment time point

Predictors	Measurement	Assessment Time Point
Child-related predictors		
Regulatory Problems	Sum score of two items per regulatory problem (Bilgin & Wolke, 2017). *Excessive crying* Difficult to soothe (0 = very easy to about average; 1 = somewhat difficult and very difficult). Cries a lot or most of the time (0 = some of the time to rarely if at all; 1 = a lot of the time and most of the time). *Sleeping problems* Long settling duration (0 = 30 minutes or less; 1 = more than 30 minutes). Night waking frequency (based on 90th percentile, 0 = 3 times or less; 1 = 4 times or more). *Feeding problems* Food refusal (0 = not true; 1 = somewhat true and certainly true). No appetite (0 = not true; 1 = somewhat true and certainly true).	Within one year after birth
Temperament: Negative affect	Sum score of three items: Usually unhappy, irritated, and difficult to comfort.	3 years
Risk aversion	Single item: Unwillingness to take risks (1 = completely unwilling to take risks; 7 = completely willing to take risks).	3 years
Impatience	Single item: Generally impatient (1 = very impatient; 7 = very patient).	3 years
Impulsivity	Single item: Generally impulsive (1 = not at all impulsive; 7 = very impulsive).	3 years
Regularity	Sum score of two items: Regularity of sleeping and eating times (No, never or almost never; yes, sometimes; yes, usually; yes, always).	3 years

Predictors	Measurement	Assessment Time Point
Screen media exposure	Single item: Duration of screen media exposure (hours) on a school day and weekend.	3 years
Family-related predictors		
Psychological distress	General Health Questionnaire (GHQ; Goldberg et al., 1997)	Within one year after birth
Stimulating home environment	Single item: Parent reads to child. (not at all; less often; once or twice a month; once or twice a week; several times a week; everyday)	3 years
Substance use during pregnancy		
a. Smoking during pregnancy	Single item: Smoking at all during pregnancy (Yes/no)	Within one year after birth (retrospective)
b. Alcohol use during pregnancy	Single item: Frequency of alcohol use (every day, 5-6 times per week, 3-4 times per week, 1-2 times per week, 1-2 times per month, less than once a month, never)	Within one year after birth (retrospective)

Child variables

Within first year of life.

Infant regulatory problems. Within one year after birth, mothers reported their infants' crying problems using two questions: 1) '*How easy or difficult is it for you to calm or soothe child when s/he is upset?*' The 5-point response scale was dichotomised (0 = very easy to about average; 1 = somewhat difficult and very difficult); 2) '*How often does child usually fuss and cry during a typical 24-hour period (e.g., yesterday)?*'. The 5-point response scale was dichotomised (0 = some of the time to rarely if at all; 1 = a lot of the time and most of the time). These two questions were summed and dichotomised (0 = no crying problems; 1 = 1 or 2 crying problems).

Sleeping problems were reported using two questions: 1) '*How long does it usually take you to settle child for his or her nighttime sleep once you have started the process?*' The

answers were dichotomised (0 = 30 minutes or less; 1 = more than 30 minutes; Bilgin & Wolke, 2016); 2) '*How many times does child usually wake him/herself up at night?*' (Bilgin & Wolke, 2020; Hiscock & Wake, 2001). The answers were dichotomised based on the 90th percentile (0 = 3 times or less; 1 = 4 times or more). These two questions were summed and dichotomised (0 = no sleeping problems; 1 = 1 or 2 sleeping problems).

Parents reported on feeding problems using two questions: 1) '*Child refuses to eat';* 2) *'Child seems to have no appetite'* (Bilgin et al., 2020).. The 3-point response scale was dichotomised (0 = not true; 1 = somewhat true and certainly true) for both questions, which were summed and dichotomised (0 = no feeding problems; 1 = 1 or 2 feeding problems).

Three years.

Negative affect. Mothers reported on their child's negative affect using three items which were adapted from the Mother and Child Questionnaire developed by the German Socio-Economic Panel (SOEP; Goebel et al., 2019): 1:'Child is usually happy and content' (Coffey et al., 2015); 2:'Child is easily irritated and cries frequently' (Bilgin & Wolke, 2016); 3:'Child is difficult to comfort when crying' (Wade et al., 2005). The response scale ranged from 1= 'agree completely' to 4= 'disagree completely'. In line with previous research (Brunsden, 2024), items 2 and 3 were recoded and all three items were summed to create a negative affect score with higher scores reflecting higher negative affect. The reliability score was α=.619.

Risk aversion. Mothers reported on their child's risk aversion using the following question, *"How willing is CHILD NAME to take risks?"* The response scale ranged from 1= 'completely unwilling to take risks' to 7= 'completely willing to take risks." This question was recoded to reflect risk aversion (1= willing to take risks to 7= unwilling to take risks).

Impatience. Mothers reported on their child's level of patience using the following question, "*Is child generally an inpatient child, or a child with a lot of patience?*" The

response scale ranged from 1= very impatient to 7= very patient. This is a question that has been used to assess patience in previous research (Dudek et al., 2022). This question was recoded to reflect impatience (1= very patient to 7= very impatient).

Impulsivity. Mothers reported on their child's ability to delay gratification using the following question: "*Is child generally a child who takes a long time to reflect on things and thinks before acting, in other words, not at all impulsive, or is child a child who acts without much reflection, in other words, is very impulsive?"* The response scale ranged from 1= not at all impulsive to 7= very impulsive. This is a question that has been used to assess impulsivity in previous research (Mittal et al., 2013).

Regularity of sleeping and eating. Mothers reported on their child's frequency of eating using the following question: *"Does CHILD NAME have meals at regular times?"* Mothers also reported on their child's frequency of going to sleep at a regular time using the following question: *"Does CHILD NAME go to bed at a regular time?"* Responses to questions ranged on a 4-Point Likert type response scale (1= No, never or almost never, 2= Yes, sometimes, 3= Yes, usually, 4= Yes, always). Higher scores reflect higher regularity.

Duration of screen exposure. Mothers reported on the level of their child's screen exposure by answering the following questions, *"On a normal school day, how many hours does CHILD NAME spend using a tablet, TV, smartphone, games console or computer?"* and *"On a weekend, that is on a Saturday or Sunday, how many hours does CHILD NAME spend using a tablet, TV, smartphone, games console or computer?"* Responses ranged on a 5-point Likert type response scale (1= None, 2= Less than an hour, 3= 1-3 hours, 4= 5-6 hours, 5= 7 or more hours). The two questions were merged, yielding a total score from 0 to 14.

Parent variables

Substance use during pregnancy.

Smoking. Parents answered, “Did you smoke at all during the pregnancy, including before you were aware that you were pregnant?” Answers were either “yes” or “no”.

Alcohol. Parents answered, “Which of these best describes how often you usually drank alcohol during this pregnancy?” Answers were either, “every day, 5-6 times per week, 3-4 times per week, 1-2 times per week, 1-2 times per month, less than once a month, never”. For the purpose of this study, maternal alcohol use was dichotomised to either “no alcohol use” (never) and “alcohol use” (every day, 5-6 times per week, 3-4 times per week, 1-2 times per week, 1-2 times per month, less than once a month). This is because research and government policies advise mothers to be completely abstinent from drinking any alcohol during pregnancy due to the negative effects it can have on the foetus and mother (Dejong et al., 2019; National Health Service, 2023; Scott & Sher, 2023).

Mental health. Parental mental health was measured using the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) in the main Understanding Society dataset, which is self-completed by adults in each wave. The GHQ-12 measures levels of psychological distress on range of mental health and wellbeing factors, including sleep and social functioning. It is one of the most commonly used measures to measure psychological distress in non-clinical samples, primary care patients, occupational therapy, the general population and at an organisational level (Anjara et al., 2020; Comotti et al., 2024; Comotti et al., 2023; Giorgi et al., 2014). The GHQ-12 derives from the original 60-item GHQ (Goldberg & Hillier, 1979). The 12-item version is considered to be a highly validated screening measure of mental wellbeing within different adult populations (Goldberg et al., 1997; Mayhew et al., 2021; Zhong et al., 2021). Specifically, Goldberg et al. (1997) measured the validity of the GHQ-12 across 15 centres worldwide including the UK and found the GHQ-12 to be sensitive in detecting mental health. Specifically, within the UK, the authors

reported an 84.6% sensitivity rating. Additionally, within the UK, the GHQ-12 was found to have internal construct validity within autistic adults (Mayhew et al., 2021).

The GHQ-12 has been translated to 38 languages and is validated and deemed as reliable for use in multiple countries, including the UK (Benoni et al., 2024; Hankins, 2008; Jackson, 2007). Wojujutari et al. (2024) found the GHQ-12 to have moderate to high internal reliability. This study found mother's GHQ-12 scores to show a very good reliability score (α=.83). This is in line with previous research that has found the Cronbach's alpha reliability of the GHQ-12 to typically range from 0.78-0.95 (Jackson, 2007).

Questions were divided into positively and negatively worded questions. See Table 7 for the GHQ-12 questions. Positively worded questions were answered on a Likert-scale with the options of "better than usual", "same as usual", "less than usual" and "much less than usual. Parents were asked if they have recently, "been able to concentrate on what you're doing", "felt you were playing a useful part in things", "felt capable of making decisions about things", "been able to enjoy your normal day-to-day activities", "been able to face up to your problems" and "been feeling reasonably happy, all things considered".

Negatively worded questions were answered on a Likert-scale with the options of "not at all", "no more than usual", "rather more than usual" and "much more than usual". Parents were asked if they have recently, "lost much sleep over worry", "felt constantly under strain", "felt you couldn't overcome your difficulties", been feeling unhappy and depressed", "been losing confidence in yourself" and "been thinking of yourself as a worthless person".

Scores are summed; a higher score indicates poorer mental health. GHQ-12 data was collected postnatally, within one year after birth.

Table 7.

GHQ-12 questions

Have you recently…	Positively/ negatively worded
1. …been able to concentrate on what you're doing	Positively
2. …lost much sleep over worry?	Negatively
3. …felt that you were playing a useful part in things?	Positively
4. …felt capable of making decisions about things?	Positively
5. …felt constantly under strain?	Negatively
6. …felt you couldn't overcome your difficulties	Negatively
7. …been able to enjoy your normal day-to-day activities?	Positively
8. …been able to face up to your problems?	Positively
9. …been feeling unhappy or depressed	Negatively
10. …been losing confidence in your self?	Negatively
11. …been thinking of yourself as a worthless person?	Negatively
12. …been feeling reasonably happy, all things considered?	Positively

Goldberg et al. (1997) reported two ways the GHQ-12 can be scored: Likert scoring and Caseness score. The Likert score is the total score of each of the 12 items, which are each scored on a four-point scale (0-1-2-3; range 0-36). The Caseness score is the number of items where the respondent selects one of two categories indicating poorer mental health (0-0-1-1; range 0-12). Within Understanding Society, the GHQ-12 has been scored on using a Caseness score, which is better at detecting severity of mental health (Goldberg et al., 1997).

Education. Parental education will be collected from the main Understanding Society dataset. Parents were asked what their highest qualification is using the 'hiqualb_dv' variable. Answers can be either, "Degree, other higher degree, A-level or similar, GCSE or similar, other qualification, no qualification". The highest qualification gained between 0-3 years of age will be examined.

Covariates. The following covariates were included to account for potential confounding effects and to enhance the robustness of the analysis (Bilgin, 2025): child sex, mother's and father's ethnicity (non-white British = 0; white British= 1), educational attainment (no university degree = 0; university degree or other higher degree = 1) and preterm (born on time = 0; born before expected due date = 1; Bilgin, 2025; Bilgin, Morales-Muñoz, et al., 2024).

Dysregulation Profile (DP)

The Strengths and Difficulties Questionnaire (SDQ; will be used to measure childhood DP. The SDQ is one of the most commonly used outcome measures for measuring child and adolescent psychosocial difficulties (Reiss, 2013). The total questionnaire contains 25 questions measuring five subscales: emotional symptoms, conduct problems, hyperactivity/ inattention, peer problems and prosocial behaviour. The summed scores can indicate the severity and direction of psychosocial difficulties. Specifically, the higher the score, the higher the severity of psychosocial difficulties. Its uses extend beyond clinical use to developmental, social, genetic, economic behaviour and educational research (Bryant et al., 2020; Kristoffersen et al., 2015; Turley et al., 2017). The SDQ has large clinical utility across various countries and cultures (Woerner et al., 2004). The SDQ has been translated in over 80 languages (Stolk et al., 2017) and provides normative data for different countries (Youth in Mind, 2013). The SDQ has been widely found to be a well-validated outcome measure in both clinical and community populations. Systematic reviews have found the SDQ to have good discriminative validity (area under the curve ≥ 0.80), convergent validity (≥ 0.50; Kersten et al., 2016), criterion validity (Bergström & Baviskar, 2021) and divergent validity (Vugteveen et al., 2019). In a study on Dutch children where the full SDQ was completed at multiple time points, the authors found SDQ scores to show predictive validity

regarding higher levels of meant health difficulties positively correlated with maladaptive parenting behaviours and daily hassles (Stone et al., 2015). The authors also confirmed construct validity using Confirmatory Factor Analysis.

For the emotional symptoms subscale, parents were asked how true the following statements were, “child often complains of headaches, stomach aches or sickness”, “child has many worries, often seems worried”, “child is often unhappy, down-hearted or tearful”, “child is nervous or clingy in new situations, easily loses confidence” and “child has many fears, easily scared”.

For the conduct problems subscale, parents were asked how true the following statements were, “child often has temper tantrums or hot tempers”, “child is generally obedient, usually does what adults request”, “child often fights with other children or bullies them”, “child often lies or cheats” and “child steals from home, school or elsewhere”.

For the hyperactivity/inattention subscale, parents were asked how true the following statements were, “child is restless, overactive, cannot stay still for long”, “child is constantly fidgeting or squirming”, “child is easily distracted, concentration wanders”, “child thinks things out before acting” and “child sees tasks through to the end, good attention span”.

Answers for all subscales were either, “not true, somewhat true, certainly true, can't say”.

In the current study, childhood DP will be analysed at two time points using the 15-item SDQ scores (Deutz, Shi, et al., 2018) answered by parents when their children were aged 5 and 8 years. Total scores will be summed. A higher score indicates a higher DP. See Table 8 for a summary of SDQ-DP questions summed.

Table 8.

SDQ Childhood dysregulation profile

Subscale	Question *How true are the following statements…*	Reverse coded
Emotional Symptoms	Child often complains of headaches, stomach aches or sickness	No
	Child has many worries, often seems worried	No
	Child is often unhappy, down-hearted or tearful	No
	Child is nervous or clingy in new situations, easily loses confidence	No
	Child has many fears, easily scared	No
Conduct Problems	Child often has temper tantrums or hot tempers	No
	Child is generally obedient, usually does what adults request	Yes
	Child often fights with other children or bullies them	No
	Child often lies or cheats	No
	Child steals from home, school or elsewhere	No
Hyperactive/ Inattention	Child is restless, overactive, cannot stay still for long	No
	Child is constantly fidgeting or squirming	No
	Child is easily distracted, concentration wanders	No

Subscale	Question *How true are the following statements…*	Reverse coded
Hyperactive/ Inattention	Child thinks things out before acting	Yes
	Child sees tasks through to the end, good attention span	Yes

Note. Answers for all questions are either: not true, somewhat true, certainly true, can't say

Within this study, DP at 5 years (α=.67) and 8 years (α=.69) showed good reliability scores. This is in line with previous research which has found the SDQ parent version to have acceptable reliability. In a study of 363 children aged 2-17 years found sensitivity and specificity scores to range between 65-78% and 57-78% in corresponding with mental health diagnoses (Bezborodovs et al., 2022). The SDQ parent version has also been found to be a good measure to identify emotional and behavioural difficulties in children with an intellectual disability (Murray et al., 2021). The authors reported that when a high cut off score is used provided optimum levels of sensitivity and specificity scores of 81% and 78%. Additionally, in a community sample, parent and teacher rated SDQ scores were similar (Keilow et al., 2019), whereas children rate themselves as having higher levels of symptoms compared to their parents and teachers (Mellor, 2005).

In line with the previous studies (Deutz, Shi, et al., 2018; Winsper & Wolke, 2014), emotional symptoms, conduct problems, and hyperactivity/ inattention subscales were summed to create a total childhood DP symptom score at each time point. Children were then classified as showing borderline and clinical symptoms at ages 5 and 8. Consistent with previous research (Mølland et al., 2023), the cut-off value for borderline symptoms was >10

and <14 (80th percentile) and for clinical symptoms was =>14 (90th percentile) at 5 and 8 years.

Design

Longitudinal designs consist of measuring the same variable within the same participant over an extended period of time (Caruana et al., 2015). Understanding Society allows for changes to be observed within the context of social and political changes within society (Platt et al., 2020). Such a design is more advantageous than a cross-sectional design utilising different participants of different ages because it often does not take into consideration contextual factors which can lead to errors in conclusions and possibly oversimplified conclusions (Grammer et al., 2013). Hence, longitudinal designs are especially important within child development research because researchers can postulate a child's developmental trajectory into adolescence and adulthood based on multiple variables within their early years (Belsky et al., 2020). Longitudinal designs have been used by researchers within psychology, medicine, economics, education and politics (Carless & Arnup, 2011; Kyriakides et al., 2015; McQuillan et al., 2018; Paul et al., 2019; Rekker et al., 2015) and has implemented policy changes (Department of Health and Social Care, 2023). Therefore, longitudinal designs provide a more complex and coherent understanding of developmental outcomes, including dysregulation profile.

Longitudinal associations between child and parent predicative variables during infancy and 3 years old, on childhood DP at 5 and 8 years separately. I will also analyse the stability of the DP between 5 and 8 years. It will be of interest to identify what factors are associated with persistent DP, as opposed to DP only at 5 years or 8 years.

Data Analysis Strategy

Missing data strategy

8-year pooled cross-sectional weights were applied to the analyses. This approach incorporates the sampling strata and primary sampling units (PSUs) specified in the survey design, allowing the authors to estimate population-level parameters that are generalisable to the target population while producing correct standard errors and test statistics that reflect the complex sample structure. Missing data in all analyses was accounted for with multiple imputation using chained equations with the "mi" command in Stata (StataCorp, 2023). Each data set was imputed 20 times.

Main analyses

Descriptive statistics were used to summarise the characteristics of the sample. Bivariate Pearson correlations were conducted to examine the relationships between dysregulation symptoms at ages 5 and 8, including total dysregulation scores and the three subscales (emotional symptoms, hyperactivity, and conduct problems) at each time point. One-way ANOVAs were conducted to compare the mean values of emotional symptoms, hyperactivity/inattention, and conduct problems between normative, borderline and clinical levels of dysregulation symptoms at 5 and 8 years, respectively.

To address the main hypotheses, firstly, a multinomial logistic regression analysis was conducted using SPSS version 27 (IBM Corp, 2020) to examine the predictors of borderline level and clinical level childhood DP symptoms at 5 and 8 years following the procedure outlined by Aiken and West (1991). This involved three steps: (a) entering covariates (i.e., female sex, parental ethnicity, parental education level, preterm birth); (b) including child-related predictors (i.e., regulatory problems, negative affect, risk-taking, impulsivity,

impatience, regularity, and screen media exposure); and (c) including family-related predictors (i.e., maternal and paternal psychological distress, and maternal substance use during pregnancy). Child-related predictors were entered prior to family-related predictors to reflect their proximal role in the development of DP symptoms and to examine whether family factors contributed additional explanatory value beyond child-level vulnerabilities. Second, to investigate the predictors of the persistence of DP symptoms from ages 5 to 8, the following two groups were created: 1) persistent borderline level DP (0 = no DP symptoms at 5 and 8 years, 1 = borderline level DP symptoms at both 5 and 8 years) or clinical levels (0 = no DP symptoms at 5 and 8 years, 1 = clinical level DP symptoms at both 5 and 8 years). The main analyses were repeated using these variables as outcome measures, following the same analytical procedure.

Exploratory analyses

To explore the predictors of changes in DP symptom severity, exploratory secondary analyses were conducted focusing on children whose DP symptom levels transitioned between ages 5 and 8 from borderline at 5 years to clinical at 8 years, and from clinical at 5 years to borderline at 8 years, Multinomial logistic regression models were estimated using transition status (i.e., borderline to clinical, and clinical to borderline) as outcome variables, following the same analytical procedure as the primary analyses, with covariates entered in the first step, child-related predictors in the second step, and family-related predictors in the final step. These analyses were intended to provide preliminary insights into factors associated with changes in DP symptom severity over time.

Interpretation

Results are presented as odds ratios (OR) and 95% confidence intervals (CI) for membership in each category relative to the reference category (Stable No Difficulties). Post-hoc pairwise comparisons were conducted to interpret significant predictors for specific category contrasts. In line with previous research which has used multiple pairwise comparisons (Patalay et al., 2017), a conservative Bonferroni correction was applied to the *p* value (.05), resulting in an *a* value of 0.0125 (=.05/4) for 4 comparison groups.

An odds ratio (OR) indicates how the likelihood of being in a particular childhood DP symptoms category changes with a one-unit increase in a predictor, relative to the reference category (Stable No Difficulties). An OR greater than 1 means higher odds of being in that category, while an OR less than 1 indicates lower odds. The 95% CI indicates the range within which we can be 95% confident that the true odds ratio lies. If the CI does not include 1, the predictor is considered significantly associated with the outcome. Given the likelihood of finding significant *P* values <.05 for small effects when using large sample sizes, the results are interpreted both in terms of their magnitude (i.e., effect size) and respective 95% CIs (Bilgin et al., 2025; Neville et al., 2021).

Ethics

All Understanding Society participants have provided written or oral consent following them receiving information about the purpose of Understanding Society, how they were selected, funding and the security of their data (Understanding Society, 2026; University of Essex, 2025). Ethical approval has been granted by the University of Essex Ethics Commitee approving all data gathering for all waves of the Understanding Society main Study (approval number: ETH2223-0264 for wave 15 data collection; Institute for Social and Economic Research, 2026). Understanding Society is compliant with the Data

Protection Act and GDPR legislation. Participants are able to withdraw from Understanding Society at any time. No additional ethical approval was required for the current study or to link the PEACH datafile with the main file. The ethical approval statement can be retrieved here: https://www.understandingsociety.ac.uk/documentation/mainstage/user-guides/main-survey-user-guide/ethics/.

The dataset was downloaded from the UK Data Archive on an Essex Partnership University Foundation NHS Trust Laptop, where anti-virus updates are completed automatically and routinely. The device is password protected and stored within a private residence. All analysis was completed on this device. Each participant within this study has been supplied a unique person identifier by UKHLS, meaning all data is anonymised. Linking the PEACH dataset with the main dataset did not provide any sufficient information to make any participant identifiable.

Dissemination

This research contributes to the written requirements for the Doctorate in Clinical Psychology at the University of Essex and will be uploaded to the University of Essex Research Repository that is available to access openly. Additionally, the University of Essex hosts an annual Health and Social Care Staff and Student conference, in which the early stages of this research had been presented in a poster format in June 2023 and June 2024. Preliminary findings were also shared at the same conference via presentation in October 2025. Finally, this research will again be presented at the annual Postgraduate research in Health and Social Care conference in June 2026. In addition, I presented my findings at the 2025 International Conference on Child and Adolescent Psychopathology. I also propose that I will also present my findings in national and international conferences such as European

Society for Child and Adolescent Psychiatry and British Psychology Society Clinical Psychology should this topic be an area of interest at these conferences.

As this topic may be of interest to clinicians and researchers, high-quality psychology and/or psychiatry journals will be approached for publication. Journals considered include Development and Psychopathology, Journal of Child Psychology and Psychiatry, Child and Adolescent Mental Health Journal, European Child and Adolescent Psychiatry and Child Psychiatry and Human Development.

At the time of writing the systematic review as part of the introduction of this study, the researcher found there to be a gap in the existing literature about predictors of childhood DP, which has been published (Vitkauskaite & Bilgin, 2026a). Additionally, this research has been presented as a poster at the 17th International Conference on Child and Adolescent Psychopathology in August 2025, where professionals from psychology and social care attended from multiple countries globally. The researcher plans to present the findings of this thesis as a presentation at the next conference.

Finally, this research may interest healthcare professionals who work with children/ and or parents to increase an understanding of early predictors of childhood DP. The findings may be used to inform how modifiable family-related variables for instance may influence the development of childhood DP and therefore can help the development of evidence needed to identify prevention and treatment initiatives. Similarly, if children who display certain characteristics from newborn and/or early childhood are more likely to develop childhood DP symptoms, can indicate which children and/or families may benefit from support to prevent symptoms from exacerbating. An introduction into what Childhood DP is has been disseminated as a guest writer on a Psychology Today blog (Vitkauskaite & Bilgin, 2026b) to reach a wide range of parents and clinicians who may benefit from understanding what the

profile is. Additionally, the researcher plans to further disseminate the results from the current study on Psychology Today blog to parents and clinicians who also may benefit from the results. This is beneficial as many parents seek parenting support and advice online (Plantin & Daneback, 2009). Psychology blogs are attractive due to ease in accessing and reading of information (Relojo, 2017). Additionally, the researcher plans to produce an infographic poster explaining what childhood DP is and the key findings of this thesis to share with local Child and Adolescent Mental Health services to educate mental health professionals and parents. This will allow for findings to be shared with a wider audience who may benefit from the learnings.

Chapter 4: Results

Participants

Participants were obtained from the PEACH subset of Understanding Society data (University of Essex, 2024). PEACH is a single cross-wave file that has gathered data reported by parents for all children under 10 years old including parental information including pregnancy, from all waves of the main study. Children's developmental variables are measured in infancy and at 3, 5 and 8 years. Children were excluded if they lacked data for at least one of the time points and/or if age inconsistencies were reported.

Therefore, the sample size is large enough to enable statical power. The original PEACH sample consisted of total data from 21,273 children. The sample of the current study included participants who had data on the outcome measure at both 5 and 8 years (N = 3,467). This is 16.3% of the original sample.

Sample characteristics

The sample included equal proportions of males (51%) and females (49%), which is representative of the UK population according to the UK 2021 Census (Office for National Statistics, 2023). Equal proportions of children were born early and late, with 19.4% of children born late and 18.9% of children born early. The mean birth weight of children was 3.41kg (SD = .65). The majority of children were ever breastfed (56.9%) and the mean duration of breastfeeding was 5.2 (SD = 4.7) months.

More mothers reported to have had a vaginal (76.8%) than caesarean (23.2%) delivery (p = 0.002). Most mothers had a single birth (96%), while 3% had twins and 0.3% had triplets. Fertility treatment was reported by 6.2%. The majority did not smoke during pregnancy (88.5% vs. 11.5% who smoked) and most did not drink alcohol (70.8%). Alcohol

use was reported as: never (73.1%), <1 per month (17.3%), 1-2 times per months (6.1%), 1-2 times per week (3.3%) and times 3-4 per week (0.3%).

Bivariate Correlations among childhood dysregulation profile symptoms at 5 and 8 years

Table 9 shows bivariate correlations among childhood dysregulation profile symptoms at 5 and 8 years including emotional problems, hyperactivity/inattention and conduct problems separately. There is a strong stability correlation between childhood DP symptoms at 5 and 8 years (.634). Emotional problems and conduct problems at 5 years are also well correlated with childhood DP symptoms at 5 years (.687 and .760). Hyperactivity/ inattention was strongly correlated with childhood DP symptoms at 5 (.838 and .841) and 8 years. The correlation between hyperactivity/ inattention and emotional problems at 5 years were not highly correlated (.291), with a similar pattern seen at 8 years (.365). Similarly, emotional problems and conduct problems were not highly correlated at 5 years (.364) and 8 years (.410). Whereas hyperactivity/ inattention and conduct problems were better correlated at 5 years (.493) and 8 years (.522).

Table 9.

Bivariate correlations among childhood dysregulation profile symptoms at 5 and 8 years

	1	2	3	4	5	6	7	8
1. Childhood dysregulation profile symptoms at 5 years	1							
2. Emotional problems at 5 years	.687**	1						
3. Hyperactivity/ inattention at 5 years	.838**	.291**	1					
4. Conduct problems at 5 years	.760**	.364**	.491**	1				
5. Childhood dysregulation symptom profile at 8 years	.634**	.404**	.546**	.493**	1			
6. Emotional problems at 8 years	.424**	.494**	.243**	.267**	.748**	1		
7. Hyperactivity/ inattention at 8 years	.569**	.221**	.625**	.391**	.841**	.365**	1	
8. Conduct problems at 8 years	.494**	.246**	.370**	.555**	.764**	.410**	.522**	1

Note. **p<.001

Percentages of childhood dysregulation symptom profile at borderline and clinical levels at 5 and 8 years, and persistence from 5 to 8 years

Figure 5 shows the percentages of normative, borderline and clinical symptoms of childhood dysregulation profile symptoms at 5 and 8 years. At both 5 and 8 years of age, there were similar percentages of borderline (i.e., 10.8% and 13.8%, respectively at 5 and 8 years) and clinical (i.e., 9.8% and 10.2%, respectively at 5 and 8 years) childhood dysregulation profile symptoms.

Figure 6 shows the percentages of the sample of young people showing either stable, increase or decrease in DP symptoms at 5 and 8 years. Changes were assessed using normative, borderline and clinical levels of childhood DP symptoms. The majority of children (84.1%) showed no childhood DP symptoms at both 5 and 8 years. The second largest group being children who showed persistent clinical DP symptoms (5.8%), followed by persistent borderline symptoms (3.8%), reduction from clinical symptoms at 5 years to borderline symptoms at 8 years (3.2%) and the smallest group being an increase from borderline symptoms at 5 years to clinical symptoms at 8 years (3%).

Figure 5.

Percentages of normative, borderline and clinical childhood DP symptoms at 5 and 8 years.

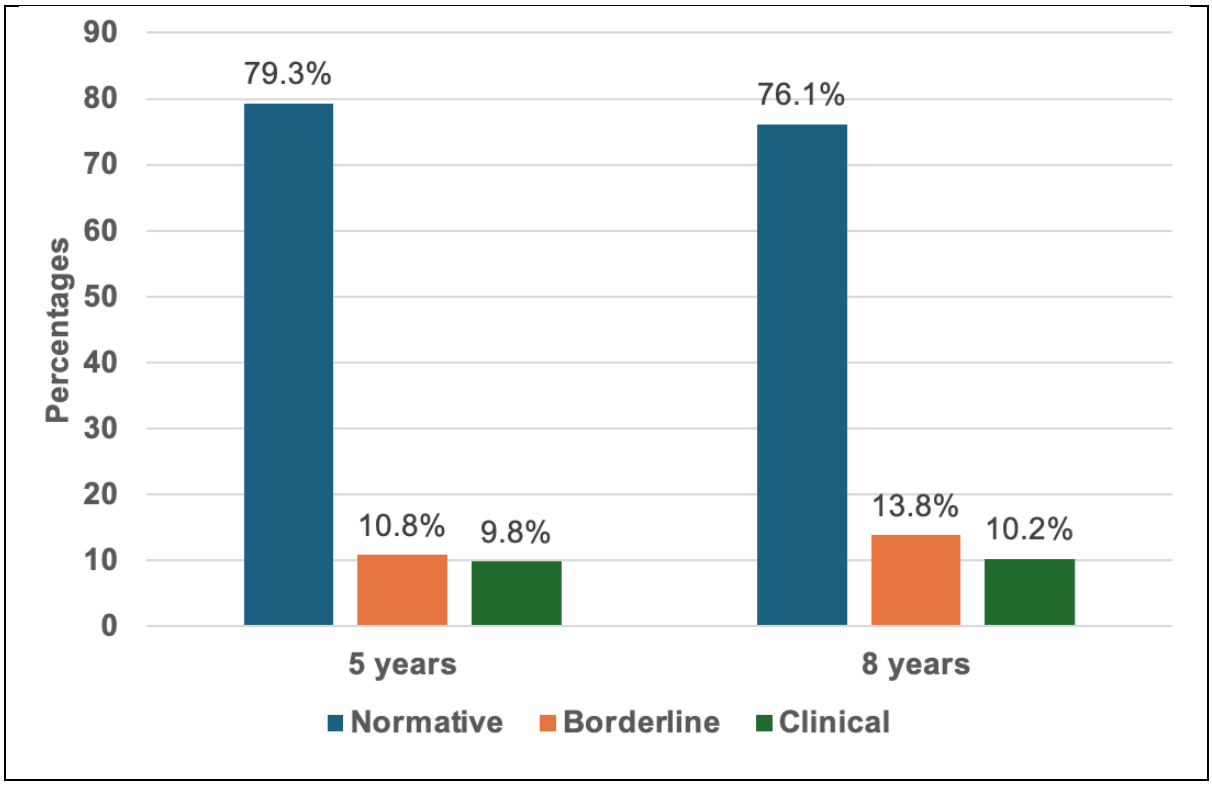


Figure 6.

Percentages of changes between normative, borderline and clinical childhood DP symptoms at 5 and 8 years.

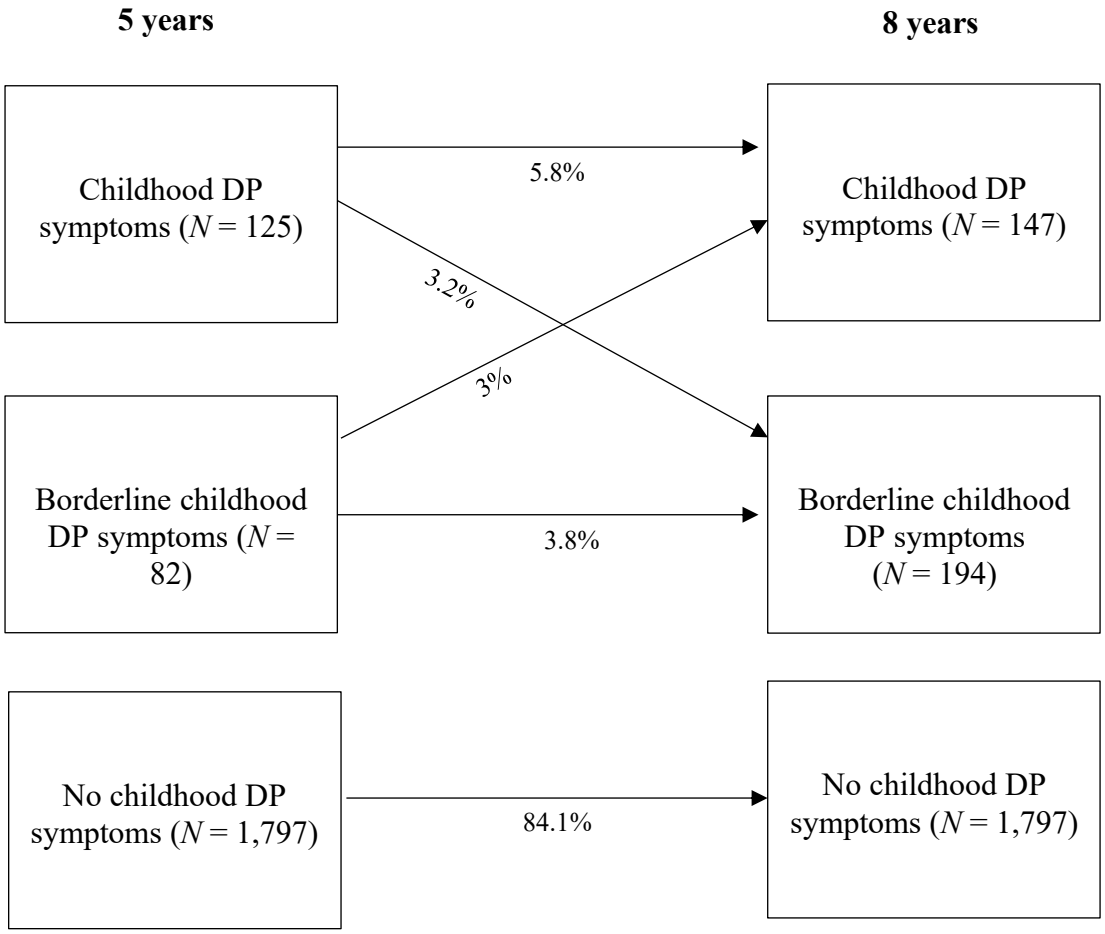
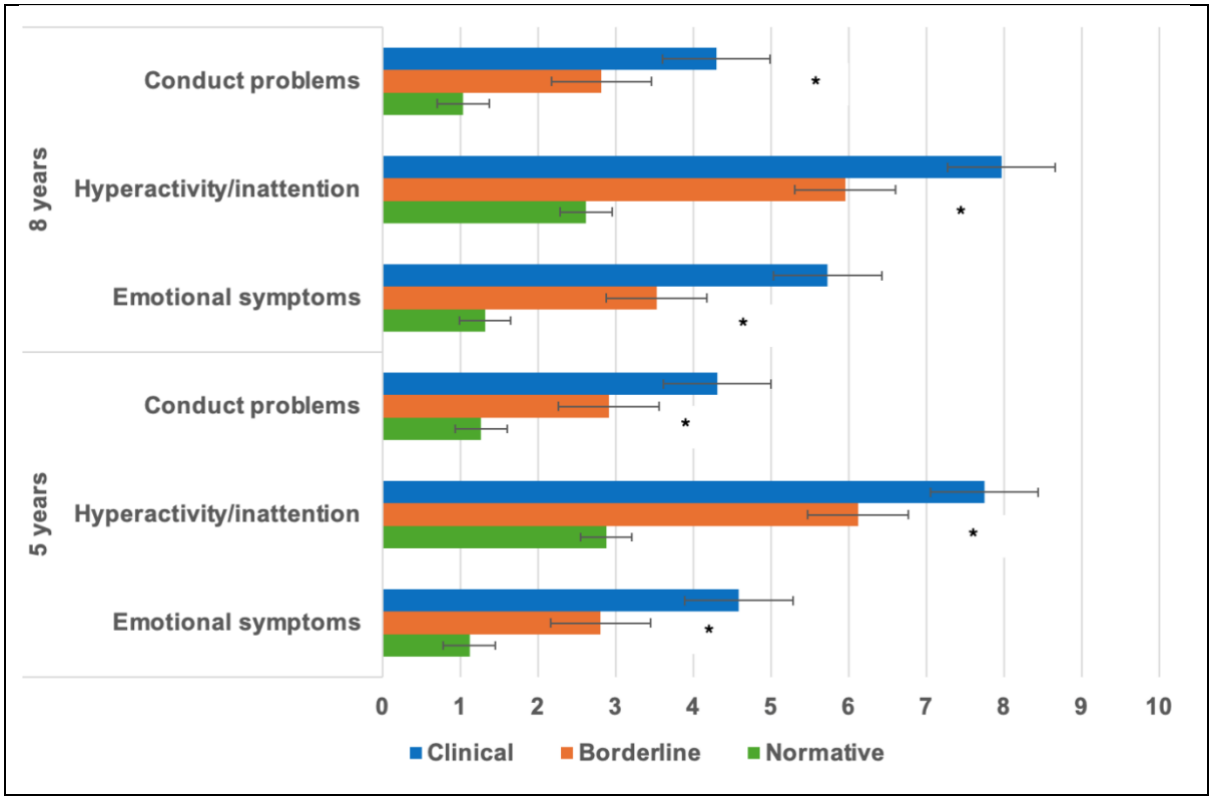


Figure 7 shows the mean values of emotional symptoms, hyperactivity/inattention and conduct problems according to the levels of severity of childhood dysregulation symptom profile at 5 and 8 years. What differentiates borderline symptoms from clinical symptoms is hyperactivity/ inattention symptoms at both 5 and 8 years, and emotional symptoms at 5 years. Children with clinical levels of childhood dysregulation symptom profile showed

markedly elevated hyperactivity/inattention problems at 5 years (M = 7.83, SD = 1.72; F(1, 4117) = 2908, p <.001) and at 8 years (M = 8.04, SD = 1.77; F(1, 4007) = 3169.63, p <.001) respectively. These were substantively higher than those in the normative group, both at 5 years and 8 years. Emotional problems represented the second highest set of difficulties among children with clinical levels of dysregulation symptoms, both at 5 (M = 4.58, SD = 2.23; F(1, 4117) = 2395, p <.001) and 8 years (M = 5.55, SD = 2.23; F(1, 4007) = 2903, p <.001), followed by conduct problems at 5 years (M = 4.40, SD = 1.76; F(1, 4117) = 2618, p <.001) and at 8 years (M=4.40, SD= 1.86; F(1, 4007) = 2950, p<.001) respectively.

Figure 7.

Mean values of emotional symptoms, hyperactivity/inattention and conduct problems by the severity of childhood dysregulation symptom profiles at 5 and 8 years.



Note. *p <.001

Bivariate correlations among predictors of childhood dysregulation profile

Table 10 shows bivariate correlations among child- and family-related predictors of childhood dysregulation profile as well as DP at 5 and 8 years. There is a strong stability correlation between childhood DP symptoms at 5 and 8 years (.642). Negative affect was strongly correlated with childhood DP symptoms at both 5 and 8 years (.346 and .272). Similarly, impatience was moderately correlated with childhood DP symptoms at both 5 and 8 years (.319 and .253). Remaining variables had a weak correlation with childhood DP symptoms at both 5 and 8 years.

Regularity and sleeping problems showed a strong correlation (.892). Similarly, regularity also had a strong correlation with feeding problems (.879). Negative affect and excessive crying had a moderate correlation (.517), as did paternal and maternal psychological distress (.401). Risk aversion and impulsivity has a moderate negative correlation (-.377). Remaining variables had a weak correlation between themselves. Paternal psychological distress and stimulating home environment showed zero correlation (.000).

Table 10.

Bivariate correlations among predictors of childhood dysregulation profile

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Excessive crying	1															
2. Sleeping problems	-.078 ***	1														
3. Feeding problems	-.070 ***	.568 ***	1													
4. Negative affect	.517 ***	-.155 ***	-.148 ***	1												
5. Risk aversion	.046 **	-.021	-.056 ***	.050 ***	1											
6. Impulsivity	.091 ***	-.018	-.045 **	.102 ***	-.377 ***	1										
7. Impatience	.211 ***	-.113 ***	-.089 ***	.333 ***	.008	.152 ***	1									
8. Regularity	-.084 ***	.892 ***	.879 ***	-.171 ***	-.043 **	-.035 *	-.115 ***	1								
9. Screen media exposure	.032 *	-.117 ***	-.100 ***	.087 ***	-.030 *	.085 ***	.082 ***	-.122 ***	1							
10. Maternal psychological distress	.060 ***	-.008	-.044 **	.050 ***	-.045 **	.029 *	.047 **	-.029 *	.006	1						
11. Paternal psychological distress	.025	.003	.020	.022	-.039 *	.035 *	.034 *	.013	.009	.401 ***	1					

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
12. Stimulating home environment	-.069 ***	.196 ***	.139 ***	-.143 ***	-.025	-.017	-.099 ***	.190 ***	-.204 ***	.007	.000	1				
13. Smoking during pregnancy	-.019	.068 ***	.067 ***	-.053 **	.051 **	-.036 *	-.069 ***	.076 ***	-.139 ***	-.045 ***	-.003	.115 ***	1			
14. Alcohol during pregnancy	-.023	-.019	-.015	.007	.011	-.018	.014	-.019	.066 ***	-.031 *	.038 *	-.049 **	.017	1		
15. Childhood dysregulation at 5 years	.216 ***	-.133 ***	-.114 ***	.346 ***	-.013	.164 ***	.319 ***	-.139 ***	.133 ***	.105 ***	.050 **	-.144 ***	-.180 ***	.075 ***	1	
16. Childhood dysregulation at 5 years	.180 ***	-.116 ***	-.140 ***	.272 ***	-.030	.145 ***	.253 ***	-.144 ***	.133 ***	.148 ***	.042 *	-.107 ***	-.178 ***	.084 **	.642 ***	1

Note. *p<.05
**p<.01
***p<.001

Percentages of the persistence of childhood dysregulation profile from 5 years to 8 years

Majority of children showed no symptoms of dysregulation profile at both 5 and 8 years (84.1%), A small percentage of children showed DP symptoms at borderline level persistently at 5 and 8 years (3.8%). The percentage of children who showed DP symptoms at clinical levels persistently at 5 and 8 years was 5.8%. Similar percentages of children moved from borderline symptoms at 5 years to clinical symptoms at 8 years (3.1%) and from clinical symptoms at 5 years to borderline symptoms at 8 years (3.2%).

Associations between early child and family-related predictors and childhood dysregulation symptoms at 5 and 8 years

Borderline DP symptoms at 5 years

In Model 1, feeding problems (OR = 1.76, 95% CI = 1.03; 3.01, p = .03), negative affect at age 3 (OR = 1.21, 95% CI = 1.11; 1.31, p <.001), impulsivity (OR = 1.26, 95% CI = 1.09; 1.46, p <.001) and impatience (OR = 1.18, 95% CI = 1.05; 1.33, p <.001) at age 3 were associated with an increased the likelihood of borderline level DP symptoms at age 5 (Table 11; Figure 8). Following Bonferroni correction, only negative affect and impatience remained significant.

After adjusting for family-related variables in Model 2, negative affect (OR = 1.24, 95% CI = 1.14; 1.36, p <.001), impulsivity (OR = 1.26, 95% CI = 1.09; 1.46, p = .001), and impatience at age 3 (OR = 1.21, 95% CI = 1.07; 1.37, p = .003) remained significant predictors. Only negative affect and impulsivity remained significant after correction for multiple comparisons. Father's postnatal psychological distress was also associated with an increased likelihood of borderline DP symptoms at age 5 (OR = 1.04, 95% CI = 1.00; 1.09, p

= .04). However, this association did not remain significant after correction for multiple comparisons.

Clinical DP symptoms at 5 years

In Model 1, sleeping problems during the first year (OR = 1.67, 95% CI = 1.09; 2.56, p = .01), negative affect (OR = 1.32, 95% CI = 1.20; 1.46, p <.001), impulsivity (OR = 1.49, 95% CI = 1.27; 1.76, p <.001), impatience at age 3 (OR = 1.49, 95% CI = 1.29; 1.72, p <.001) were associated with an increased likelihood of clinical DP symptoms at age 5. Regularity at age 3 was associated with a decreased likelihood of clinical level DP symptoms at age 5 (OR = .79, 95% CI = .66; .93, p = .006; Table 11; Figure 9). All survived Bonferroni corrections.

After adjusting for family-related variables in Model 2, negative affect (OR = 1.28, 95% CI = 1.17; 1.41, p <.001), impulsivity (OR = 1.57, 95% CI = 1.33; 1.84, p <.001), and impatience (OR = 1.44, 95% CI = 1.24; 1.68, p <.003) at age 3 remained significant predictors. These associations were robust to correction for multiple comparisons.

Additional predictors of clinical DP symptoms at 5 years included excessive crying during the first year (OR = 1.81, 95% CI = 1.02; 3.22, p = .04). A stimulating home environment at age 3 (OR = .76, 95% CI = .59; .98, p = .03) decreased the likelihood of clinical DP predictors. However, these associations did not remain significant after correction for multiple comparisons.

Borderline DP symptoms at 8 years

In Model 1, negative affect at age 3 (OR = 1.13, 95% CI = 1.06; 1.21, p <.001) was associated with borderline-level DP symptoms. Regularity (OR = .90, 95% CI = .82; .99, p = .04) was associated with a decrease in borderline-level DP symptoms. After adjusting for

family-related in Model 2, both negative affect (OR = 1.19, 95% CI = 1.06; 1.33, p = .003) and regularity (OR = .82, 95% CI = .68; .99, p = .04) at age 3 remained significant predictors. Only negative affect survived Bonferroni corrections. No other significant associations were observed (Table 11; Figure 10).

Clinical DP symptoms at 8 years

In Model 1, excessive crying during the first year (OR = 1.71, 95% CI = 1.13; 2.59, p = .01), negative affect at age 3 (OR = 1.12, 95% CI = 1.05; 1.21, p = .001), impulsivity (OR = 1.33, 95% CI = 1.19; 1.48, p <.001) and impatience (OR = 1.16, 95% CI = 1.06; 1.28, p = .001) were associated with an increased likelihood of clinical-level DP symptoms at age 3 (Table 11; Figure 11).

After adjusting for family-related variables in Model 2, only negative affect (OR = 1.21, 95% CI = 1.07; 1.38, p = .002) and impulsivity at age 3 (OR = 1.50, 95% CI = 1.22; 1.86, p <.001) remained significant predictors. These associations were robust to correction for multiple comparisons.

Additionally, maternal postnatal psychological distress was associated with an increased likelihood of clinical DP symptoms at 8 years (OR = 1.08, 95% CI = 1.01; 1.16, p = .03). However, this association did not remain significant after correction for multiple comparisons.

Table 11.

Hierarchical associations between early child- and family-related predictors and the likelihood of clinical and borderline level dysregulation profile at 5 and 8 years

	5 years				**8 years**			
	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*
Model 1: Child-related predictors								
Excessive crying during first year	.74 (.46; 1.17)	.20	1.01 (.58; 1.73)	.97	1.15 (.80; 1.66)	.43	**1.71 (1.13; 2.59)**	**.01**
Sleeping Problems during first year	1.24 (.88; 1.76)	.20	**1.67 (1.09; 2.56)**	**.01**	1.21 (.93; 1.56)	.14	1.15 (.86; 1.54)	.33
Feeding Problems during first year	**1.76 (1.03; 3.01)**	**.03**	1.25 (.65; 2.41)	.49	.87 (.58; 1.30)	.50	1.08 (.68; 1.71)	.71
Negative affect at 3y	**1.21 (1.11; 1.31)**	**<.001**	**1.32 (1.20; 1.46)**	**<.001**	**1.13 (1.06; 1.21)**	**<.001**	**1.12 (1.05; 1.21)**	**.001**
Risk aversion at 3y	1.02 (.90; 1.16)	.71	.94 (.81; 1.09)	.43	.96 (.88; 1.04)	.40	.98 (.89; 1.08)	.79
Impulsivity at 3y	**1.26 (1.09; 1.46)**	**<.001**	**1.49 (1.27; 1.76)**	**<.001**	1.05 (.95; 1.16)	.29	**1.33 (1.19; 1.48)**	**<.001**
Impatience at 3y	**1.18 (1.05; 1.33)**	**<.001**	**1.49 (1.29; 1.72)**	**<.001**	1.07 (.98; 1.16)	.11	**1.16 (1.06; 1.28)**	**.001**
Regularity at 3y	.89 (.78; 1.02)	.10	**.79 (.66; .93)**	**.006**	**.90 (.82; .99)**	**.04**	.90 (.81; 1.00)	.06
Screen media exposure duration at 3y	1.04 (.89; 1.21)	.57	1.15; (.97; 1.35)	.08	.92 (.83; 1.03)	.19	1.03 (.91; 1.17)	.56

	5 years				**8 years**			
	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*
Model 2: Child + family related predictors								
Excessive crying during first year	1.11 (.68; 1.83)	.65	**1.81 (1.02; 3.22)**	**.04**	.65 (.30; 1.39)	.27	1.54 (.84; 2.83)	.15
Sleeping problems during first year	1.07 (.71; 1.60)	.87	1.45 (.92; 2.30)	.10	1.25 (.74; 2.12)	.39	1.55 (.95; 2.52)	.07
Feeding problems during first year	1.27 (.75; 2.13)	.36	1.66 (.93; 2.94)	.08	.96 (.41; 2.27)	.93	1.13 (.51; 2.47)	.75
Negative affect at 3y	**1.24 (1.14; 1.36)**	**<.001**	**1.28 (1.17; 1.41)**	**<.001**	**1.19 (1.06; 1.33)**	**.003**	**1.21 (1.07; 1.38)**	**.002**
Risk aversion at 3y	1.00 (.88; 1.13)	.98	.91 (.79; 1.06)	.25	.96 (.81; 1.14)	.67	1.08 (.91; 1.29)	.35
Impulsivity at 3y	**1.26 (1.09; 1.46)**	**.001**	**1.57 (1.33; 1.84)**	**<.001**	1.11 (.92; 1.35)	.24	**1.50 (1.22; 1.86)**	**<.001**
Impatience at 3y	**1.21 (1.07; 1.37)**	**.003**	**1.44 (1.24; 1.68)**	**<.001**	1.11 (.94; 1.31)	.20	1.10 (.93; 1.32)	.24
Regularity at 3y	.93 (.82; 1.06)	.33	.86 (.73; 1.00)	.07	**.82 (.68; .99)**	**.04**	.83 (.67; 1.03)	.10
Screen media exposure duration at 3y	.96 (.96; 1.06)	.62	.94 (.78; 1.12)	.51	1.06 (.85; 1.33)	.56	1.06 (.96; 1.17)	.09
Maternal postnatal psychological distress	1.01 (.99; 1.04)	.12	1.04 (.97; 1.11)	.22	1.05 (.98; 1.13)	.12	**1.08 (1.01; 1.16)**	**.03**
Paternal postnatal psychological distress	**1.04 (1.00; 1.09)**	**.04**	1.03 (.98; 1.07)	.16	.97 (.91; 1.03)	.33	1.03 (.96; 1.11)	.32

	5 years				**8 years**			
	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*	Borderline OR (95% CI)	*P*	Clinical OR (95% CI)	*P*
Model 2: Child + family related predictors								
Stimulating home environment at 3y	.88 (.71; 1.09)	.27	**.76 (.59; .98)**	**.03**	1.18 (.90; 1.55)	.22	1.02 (.76; 1.38)	.86
Smoking during pregnancy	.87 (.51; 1.48)	.61	1.40 (.81; 2.41)	.22	1.10 (.52; 2.34)	.78	1.87 (.94; 3.72)	.07
Alcohol use during pregnancy	1.26 (.99; 1.61)	.06	1.19 (.86; 1.65)	.29	1.09 (.82; 1.45)	.52	1.32 (.94; 1.85)	.10

Note. Model 1= child-related predictors + covariates (child male sex, white ethnicity, higher education, preterm birth); Model 2= Model 1 + family-related predictors; OR= Odds Ratio; 95% CI= 95% Confidence Interval. Boldface type indicates significant associations.

Figure 8.

Forest plot between early child- and family-related predictors and the likelihood of borderline level dysregulation profile at 5 years

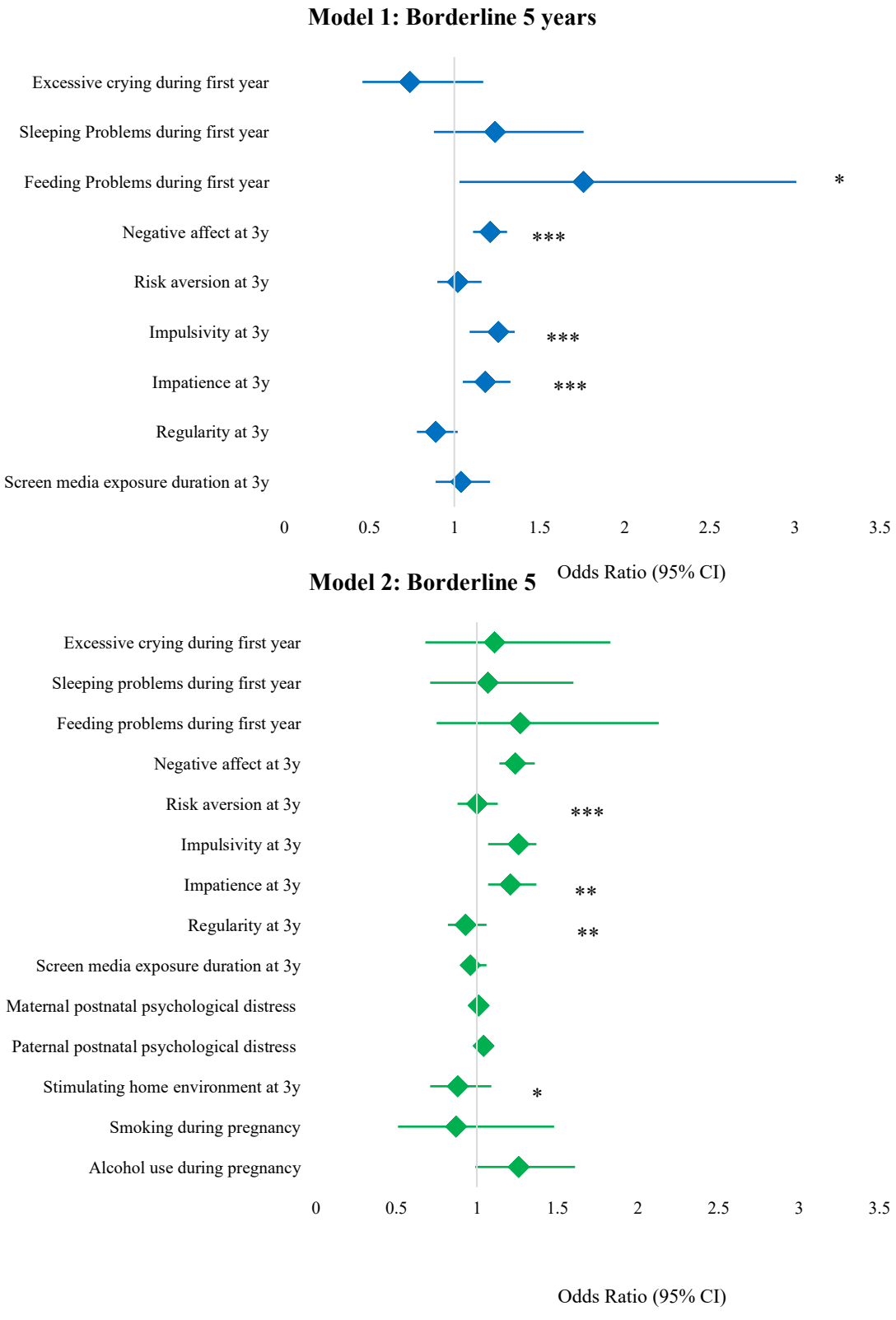
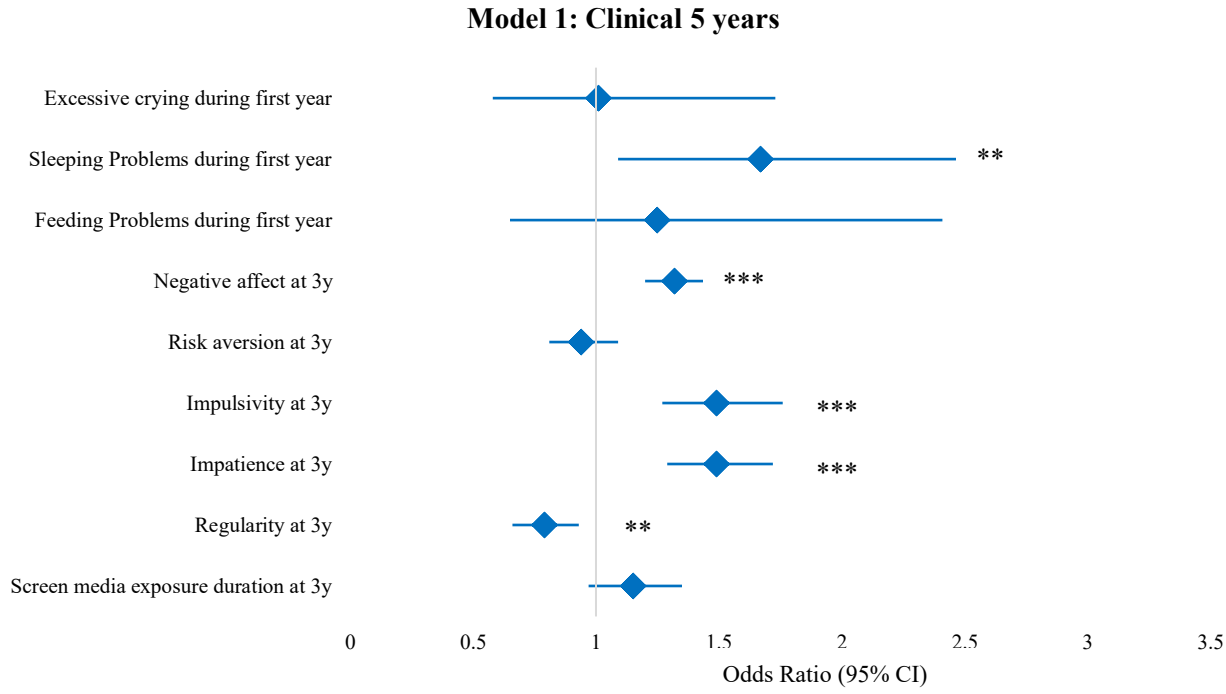


Figure 9.

Forest plot between early child- and family-related predictors and the likelihood of clinical level dysregulation profile at 5 years



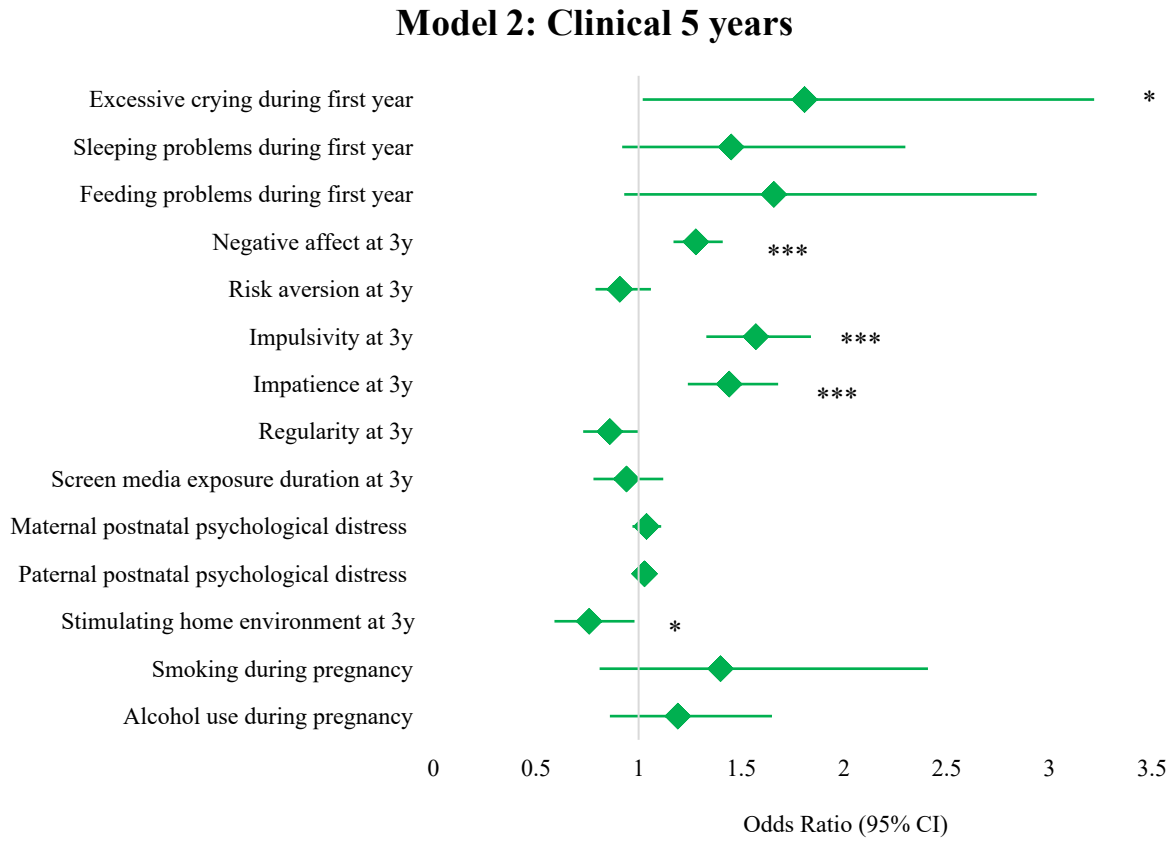
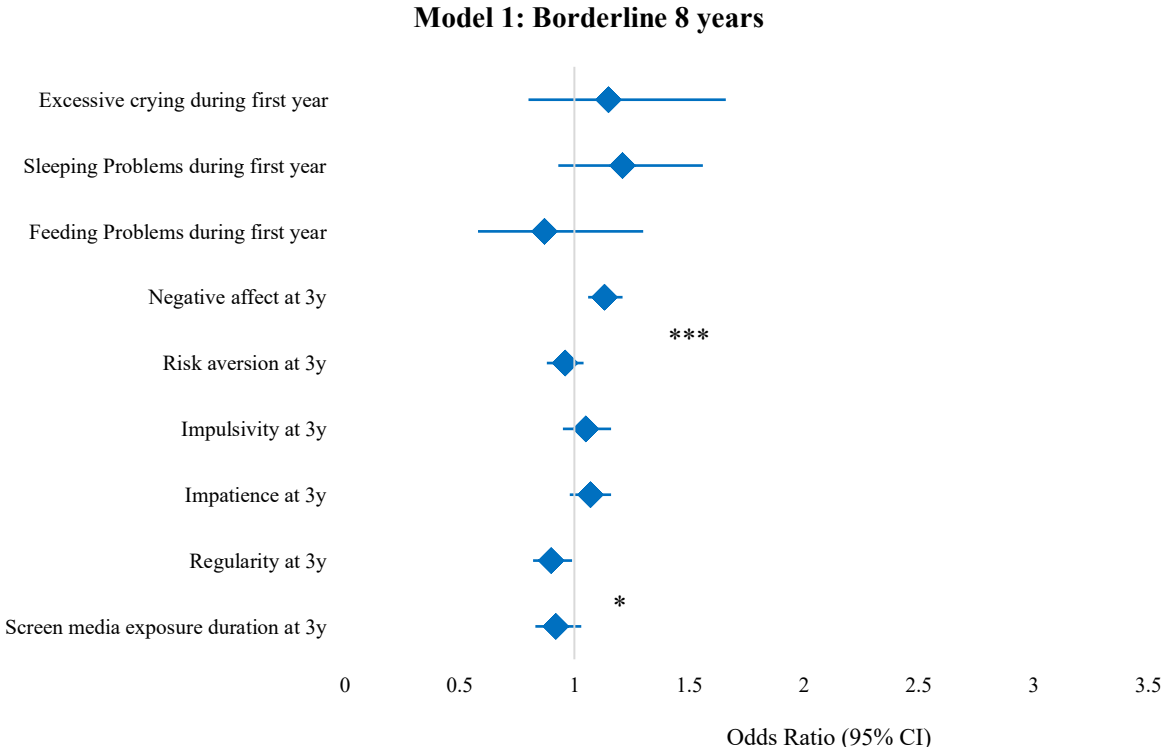


Figure 10.

Forest plot between early child- and family-related predictors and the likelihood of borderline level dysregulation profile at 8 years



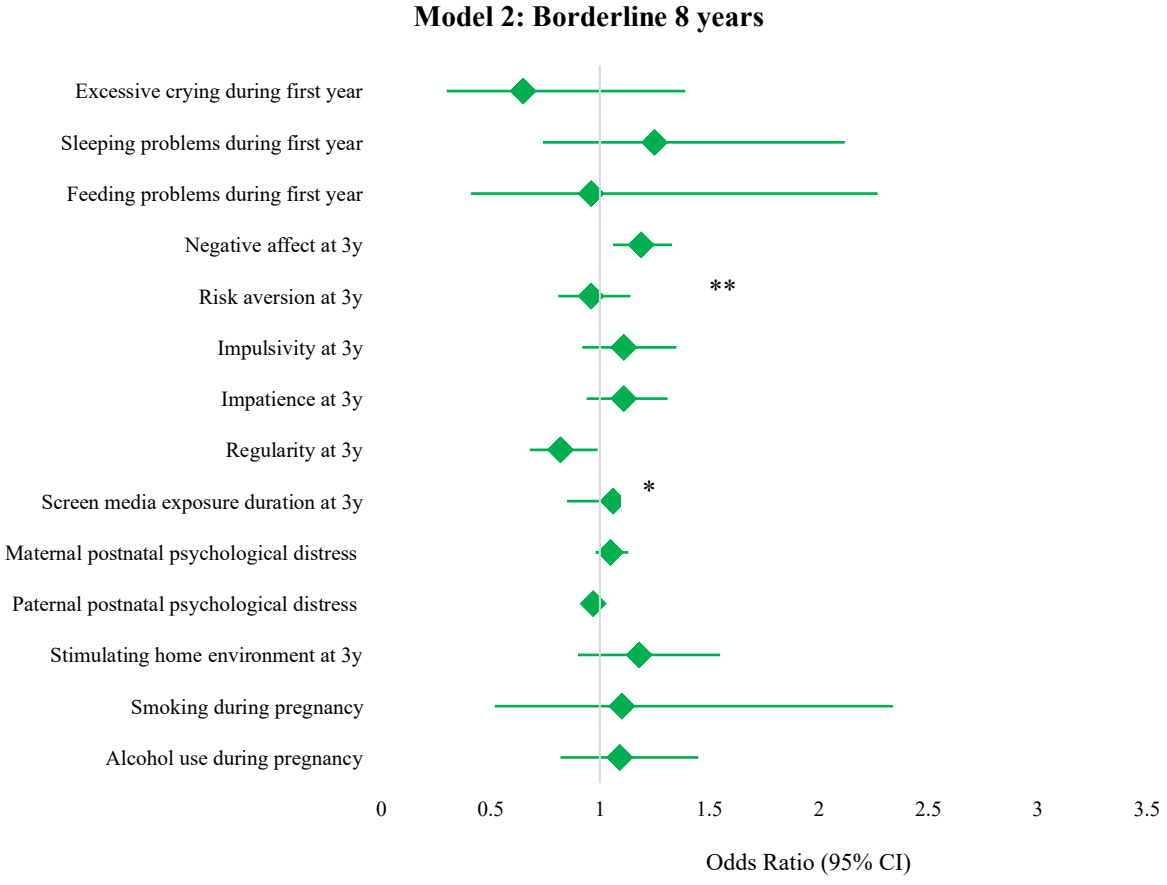
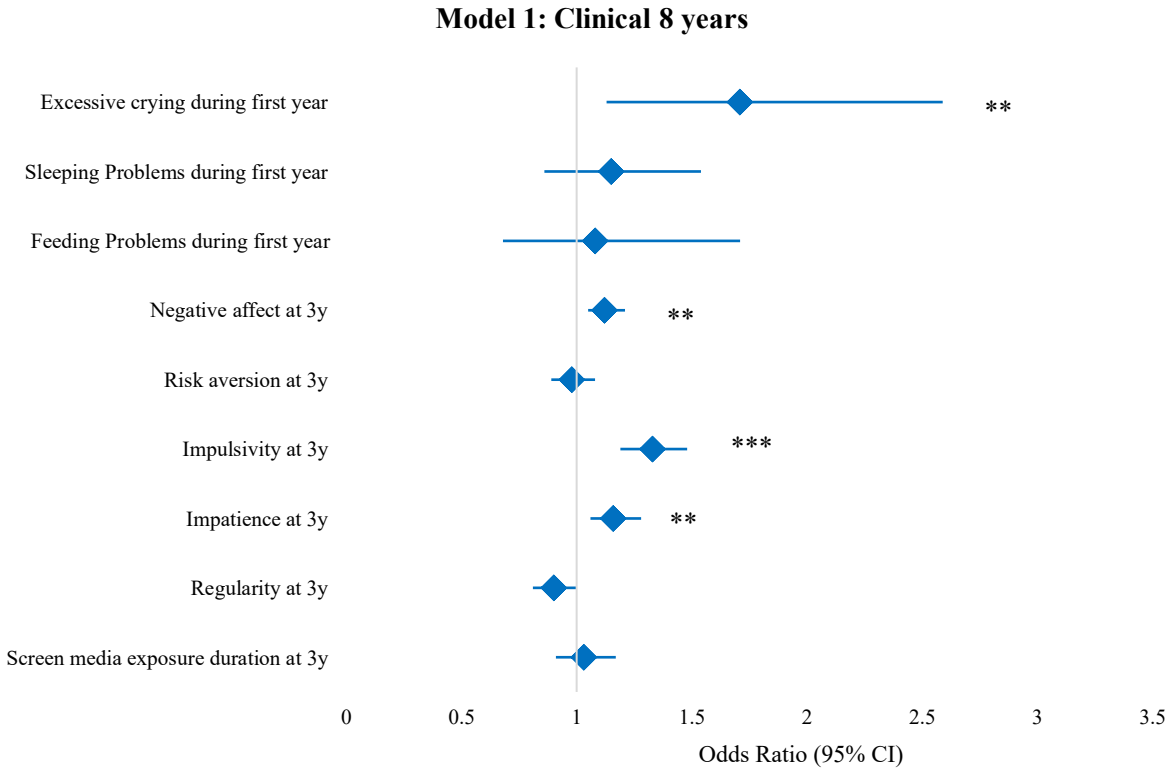
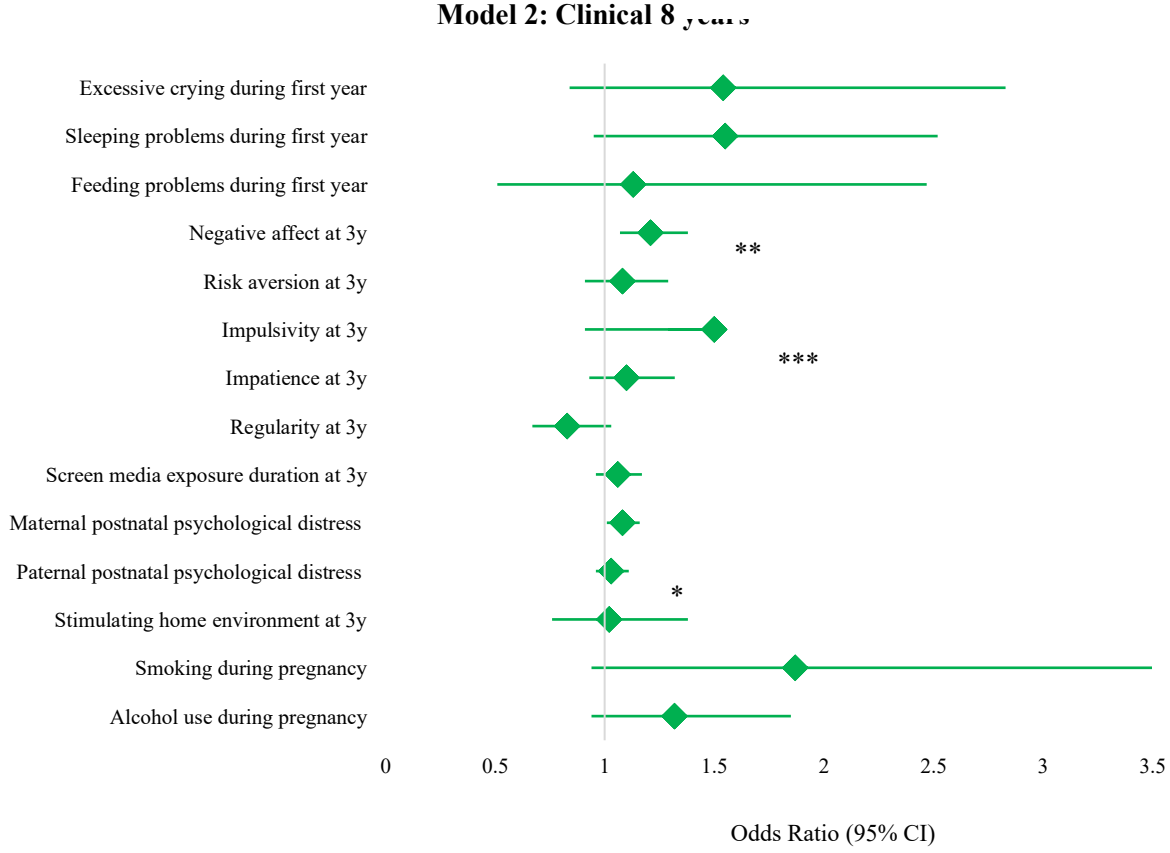


Figure 11.

Forest plot between early child- and family-related predictors and the likelihood of clinical level dysregulation profile at 8 years





Associations between early child and family-related predictors and the course of childhood dysregulation symptoms from 5 to 8 years

Persistent borderline DP symptoms

In Model 1, significant predictors of persistent borderline level DP symptoms were feeding problems during the first year (OR = 2.99, 95% CI = 1.22; 7.35, p = .01) and negative affect at 3 years (OR = 1.34, 95% CI = 1.16; 1.55, p <.001). After adjusted for family-related variables in Model 2, both feeding problems (OR = 2.88, 95% CI = 1.17; 7.11, p = .02) and negative affect at 3 years (OR = 1.34, 95% CI = 1.16; 1.54, p <.001) remained significant predictors (Table 12; Figure 12). The impact of negative affect at 3 years was robust to correction for multiple comparisons. No other significant associations were observed.

Persistent clinical DP symptoms

In Model 1, negative affect at age 3 (OR = 1.35, 95% CI = 1.18; 1.54, p <.001), impulsivity (OR = 1.60, 95% CI = 1.27; 2.02, p <.001) and impatience (OR = 1.35, 95% CI = 1.09; 1.67, p = .005) were associated with an increased likelihood of persistent clinical-level DP symptoms. In contrast, regularity at age 3 was associated with a decreased likelihood (OR = .66, 95% CI = .52; .84, p = .001).

After adjusting for family-related variables in Model 2, the effects of negative affect (OR = 1.31, 95% CI = 1.14; 1.51, p <.001), impulsivity (OR = 1.57, 95% CI = 1.23; 1.99, p <.001), impatience (OR = 1.36, 95% CI = 1.10; 1.68, p = .004) and regularity (OR = .68, 95% CI = .54; .86, p = .002) at age 3 remained significant (Table 12; Figure 13). All associations were robust to correction for multiple comparisons.

Maternal smoking during pregnancy was also associated with an increased likelihood of persistent clinical-level DP symptoms (OR = 2.30, 95% CI = 1.05; 5.14, p = .036). However, this association did not remain significant after correction for multiple comparisons.

Table 12.

Hierarchical associations between early child- and family-related predictors and the persistence of dysregulation profile from 5 to 8 years.

	Persistent Borderline	*P*	Persistent Clinical	*P*
Model 1: Child-related predictors				
Excessive crying during first year	**.41 (.16; 1.05)**	**.05**	1.72 (.82; 3.59)	.14
Sleeping Problems during first year	1.25 (.64; 2.44)	.50	1.35 (.72; 2.52)	.33
Feeding Problems during first year	**2.99 (1.22; 7.35)**	**.01**	1.18 (.43; 3.24)	.73
Negative affect at 3y	**1.34 (1.16; 1.55)**	**<.001**	**1.35 (1.18; 1.54)**	**<.001**
Risk aversion at 3y	.98 (.78; 1.23)	.91	.86 (.70; 1.07)	.20
Impulsivity at 3y	1.12 (.88; 1.43)	.32	**1.60 (1.27; 2.02)**	**<.001**
Impatience at 3y	1.15 (.94; 1.40)	.16	**1.35 (1.09; 1.67)**	**.005**
Regularity at 3y	.81 (.65; 1.03)	.09	**.66 (.52; .84)**	**.001**
Screen media exposure duration at 3y	1.04 (.80; 1.35)	.76	1.11 (.87; 1.41)	.38
Model 2: Child + family related predictors				
Excessive crying during first year	**.39 (.15;.99)**	**.047**	1.50 (.72; 3.15)	.27
Sleeping problems during first year	1.19 (.61; 2.30)	.60	1.42 (.77; 2.63)	.26
Feeding problems during first year	**2.88 (1.17; 7.11)**	**.02**	1.19 (.42; 3.34)	.73
Negative affect at 3y	**1.34 (1.16; 1.54)**	**<.001**	**1.31 (1.14; 1.51)**	**<.001**
Risk aversion at 3y	.98 (.78; 1.23)	.87	.86 (.69; 1.08)	.20
Impulsivity at 3y	1.11 (.88; 1.41)	.35	**1.57 (1.23; 1.99)**	**<.001**
Impatience at 3y	1.15 (.94; 1.40)	.16	**1.36 (1.10; 1.68)**	**.004**
Regularity at 3y	.82 (.64; 1.05)	.12	**.68 (.54; .86)**	**.002**
Screen media exposure duration at 3y	1.00 (.76; 1.32)	.95	1.09 (.85; 1.41)	.46

	Persistent Borderline	*P*	Persistent Clinical	*P*
Model 2: Child + family related predictors				
Maternal postnatal psychological distress	.98 (.88; 1.10)	.82	1.07 (.97; 1.18)	.17
Paternal postnatal psychological distress	1.06 (.97; 1.15)	.15	1.06 (.97; 1.16)	.13
Stimulating home environment at 3y	.85 (.62; 1.15)	.30	.91 (.66; 1.26)	.59
Smoking during pregnancy	.68 (.27; 1.72)	.42	**2.30 (1.05; 5.14)**	**.036**
Alcohol use during pregnancy	.94 (.58; 1.53)	.82	1.46 (.92; 2.30)	.10

Note. Model 1= child-related predictors + covariates (child male sex, white ethnicity, higher education, preterm birth); Model 2 = Model 1 + family-related predictors; OR= Odds Ratio; 95% CI= 95% Confidence Interval. Boldface type indicates significant associations.

Figure 12.

Forest plot between early child- and family-related predictors and the likelihood of persistent borderline level dysregulation profile.

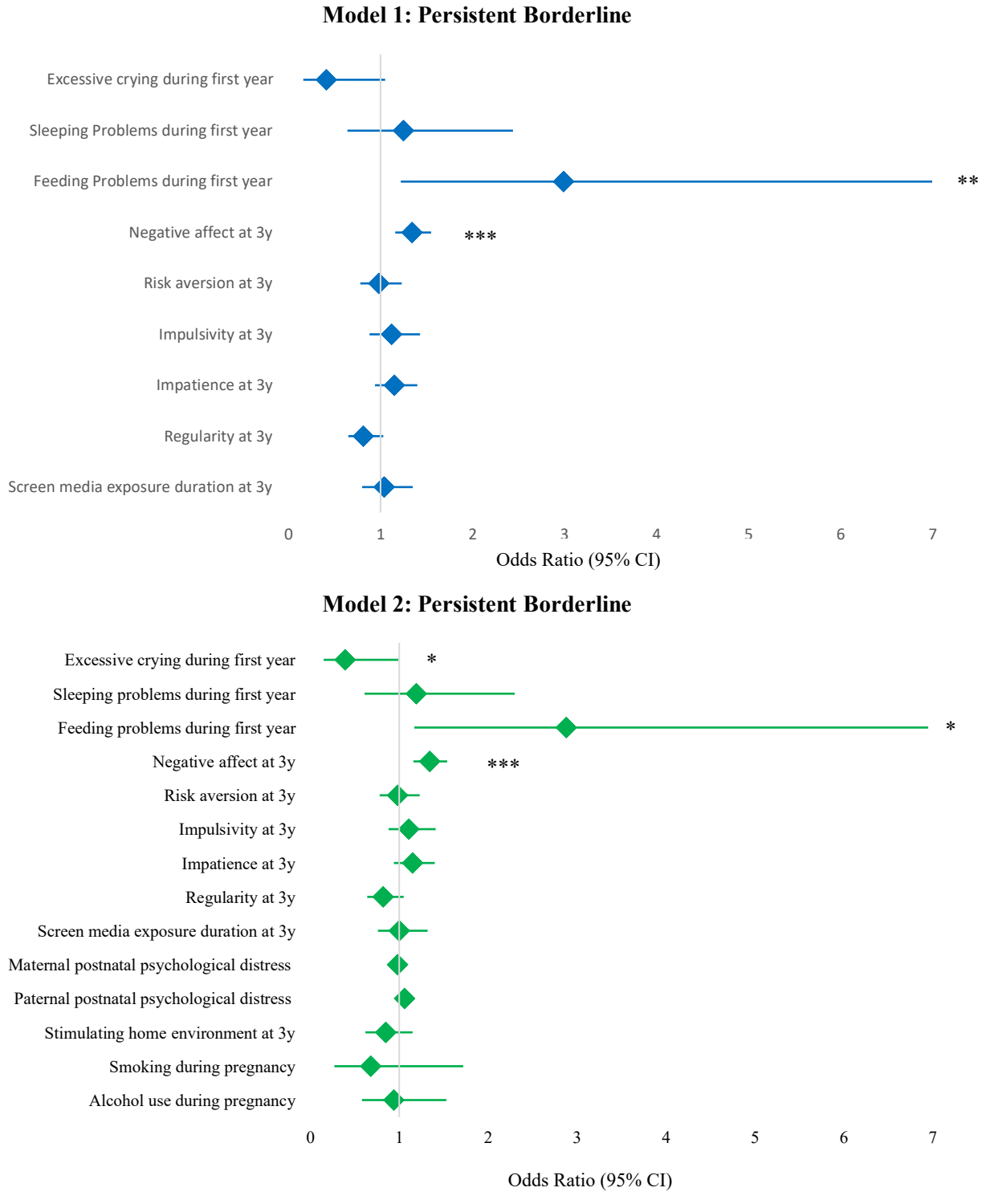
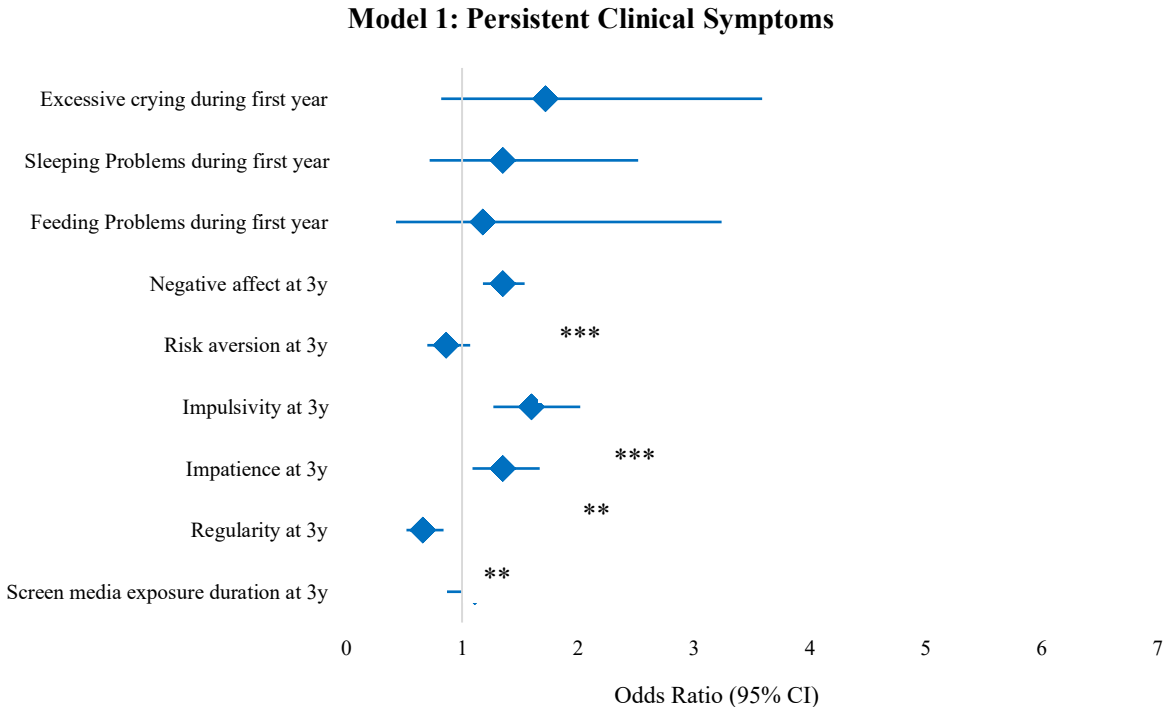
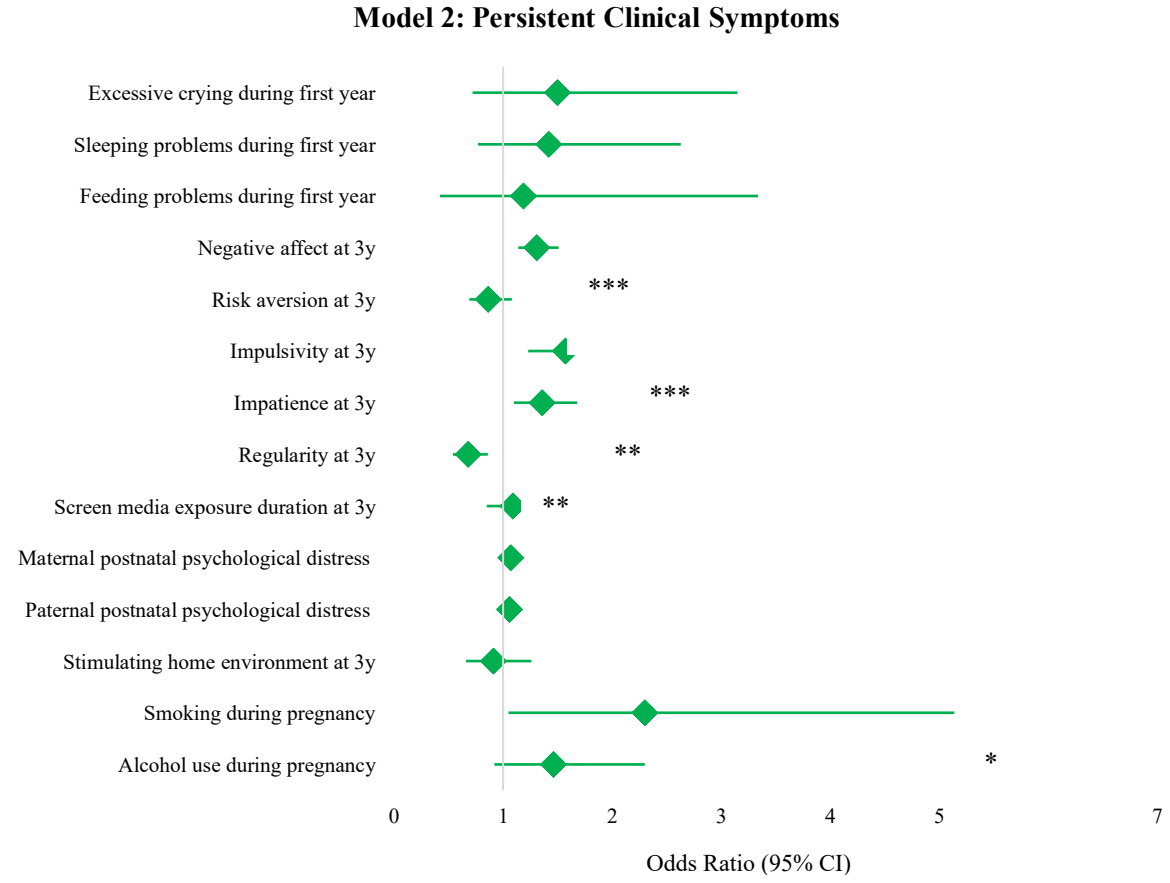


Figure 13.

Forest plot between early child- and family-related predictors and the likelihood of persistent clinical level dysregulation profile.





Associations between early child and family-related predictors and the change of severity of childhood dysregulation symptoms from 5 to 8 years

Borderline symptoms at 5 years to clinical symptoms at 8 years

When only child-related variables were included (Model 1), sleeping problems during the first year (OR = 1.81, 95% CI = 1.00; 3.26, p = .05), negative affect (OR = 1.22, 95% CI = 1.03; 1.45, p = .02), impulsivity (OR = 1.58, 95% CI = 1.18; 2.11, p = .002) and impatience at 3 years (OR = 1.40, 95% CI = 1.13; 1.74, p = .002) increased the likelihood of children who have borderline DP symptoms at 5 years to developing clinical DP symptoms at 8 years. Negative affect, impulsivity and impatience survived Bonferroni corrections (Table 13; Figure 14).

After family-related variables were added to the model (Model 2), sleeping problems during the first year (OR = 1.89, 95% CI = 1.03; 3.47, p = .03), negative affect (OR = 1.21, 95% CI = 1.01; 1.43, p = .03), impulsivity (OR = 1.58, 95% CI = 1.17; 2.15, p = .003) and impatience at 3 years (OR = 1.40, 95% CI = 1.14; 1.73, p = .001) remained significant. Only impulsivity and impatience survived Bonferroni corrections. No other variables were significant.

Clinical symptoms at 5 years to borderline symptoms at 8 years

When only child-related variables were included (Model 1), sleeping problems during the first year (OR = 3.43, 95% CI = 1.53; 7.67, p = .003), negative affect (OR = 1.35, 95% CI = 1.10; 1.65, p = .003), impulsivity (OR = 1.67, 95% CI = 1.18; 2.35, p = .003) and impatience at 3 years (OR = 1.84, 95% CI = 1.43; 2.36, p <.001) increased the likelihood of children who have clinical DP symptoms at 5 years to develop borderline DP symptoms at 8 years. All survived Bonferroni corrections (Table 13; Figure 15).

After family-related variables were added to the model (Model 2), sleeping problems during the first year (OR = 3.39, 95% CI = 1.54; 7.44, p = .002), negative affect (OR = 1.35, 95% CI = 1.10; 1.67, p = .004), impulsivity (OR = 1.62, 95% CI = 1.16; 2.26, p=.005) and impatience at 3 years (OR = 1.86, 95% CI = 1.45; 2.38, p <.001) remained significant. Again, all survived Bonferroni corrections. Further, there was an association between mother's postnatal psychological distress and the likelihood of children who have clinical DP symptoms at 5 years to develop borderline DP symptoms at 8 years (OR = 1.12, 95% CI = 1.02; 1.22, p = .01) and survived Bonferroni corrections.

Table 13.

Hierarchical associations between early child- and family-related predictors and the change of the severity of dysregulation profile symptoms from 5 to 8 years

	Borderline at 5 years → Clinical at 8 years	*P*	Clinical at 5 years → Borderline at 8 years	*P*
Model 1: Child-related predictors				
Excessive crying during first year	1.17 (.51; 2.69)	.70	.51 (.16; 1.60)	.25
Sleeping Problems during first year	**1.81 (1.00; 3.26)**	**.048**	**3.43 (1.53; 7.67)**	**.003**
Feeding Problems during first year	1.07 (.30; 3.84)	.90	1.41 (.41; 4.75)	.57
Negative affect at 3y	**1.22 (1.03; 1.45)**	**.02**	**1.35 (1.10; 1.65)**	**.003**
Risk aversion at 3y	1.13 (.84; 1.53)	.39	.95 (.73; 1.22)	.70
Impulsivity at 3y	**1.58 (1.18; 2.11)**	**.002**	**1.67 (1.18; 2.35)**	**.003**
Impatience at 3y	**1.40 (1.13; 1.74)**	**.002**	**1.84 (1.43; 2.36)**	**<.001**
Regularity at 3y	.88 (.68; 1.13)	.33	.91 (.68; 1.22)	.56
Screen media exposure duration at 3y	1.12 (.86; 1.47)	.37	1.18 (.90; 1.56)	.21
Model 2: Child + family related predictors				
Excessive crying during first year	1.20 (.52;.2.78)	.66	.51 (.18; 1.45)	.21
Sleeping problems during first year	**1.89 (1.03; .3.47)**	**.03**	**3.39 (1.54; 7.44)**	**.002**
Feeding problems during first year	1.03 (.28; 3.74)	.95	1.60 (.50; 5.09)	.41
Negative affect at 3y	**1.21 (1.01; 1.43)**	**.03**	**1.35 (1.10; 1.67)**	**.004**
Risk aversion at 3y	1.12 (.84; 1.50)	.40	.99 (.77; 1.27)	.94
Impulsivity at 3y	**1.58 (1.17; 2.15)**	**.003**	**1.62 (1.16; 2.26)**	**.005**
Impatience at 3y	**1.40 (1.14; 1.73)**	**.001**	**1.86 (1.45; 2.38)**	**<.001**

	Borderline at 5 years → Clinical at 8 years	*P*	Clinical at 5 years → Borderline at 8 years	*P*
Model 2: Child + family related predictors				
Regularity at 3y	.90 (.69; 1.16)	.43	.88 (.69; 1.14)	.35
Screen media exposure duration at 3y	1.08 (.80; 1.44)	.59	1.20 (.88; 1.64)	.24
Maternal postnatal psychological distress	1.00 (.90; 1.11)	.96	**1.12 (1.02; 1.22)**	**.01**
Paternal postnatal psychological distress	1.02 (.94; 1.11)	.55	.93 (.86; 1.01)	.10
Stimulating home environment at 3y	.82 (.54; 1.26)	.38	1.01 (.73; 1.40)	.93
Smoking during pregnancy	1.53 (.51; 4.54)	.44	2.07 (.63; 6.73)	.22
Alcohol use during pregnancy	1.18 (.79; 1.75)	.40	.88 (.46; 1.70)	.72

Note. Model 1= child-related predictors + covariates (child male sex, white ethnicity, higher education, preterm birth); Model 2= Model 1 + family-related predictors; OR= Odds Ratio; 95% CI= 95% Confidence Interval. Boldface type indicates significant associations.

Figure 14.

Forest plot between early child- and family-related predictors and the likelihood of transitioning from borderline level dysregulation profile symptoms at 5 years to clinical level symptoms at 8 years

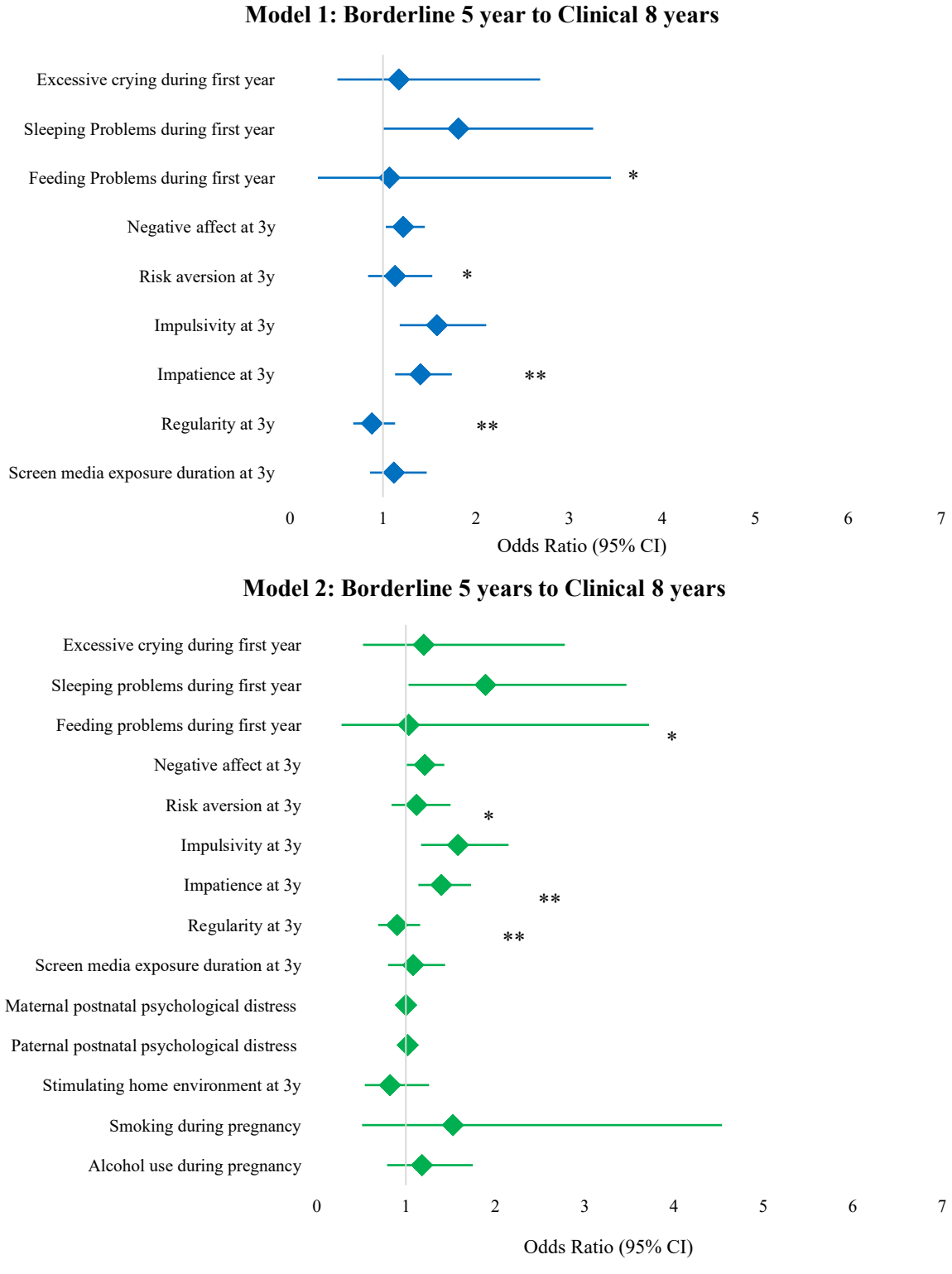
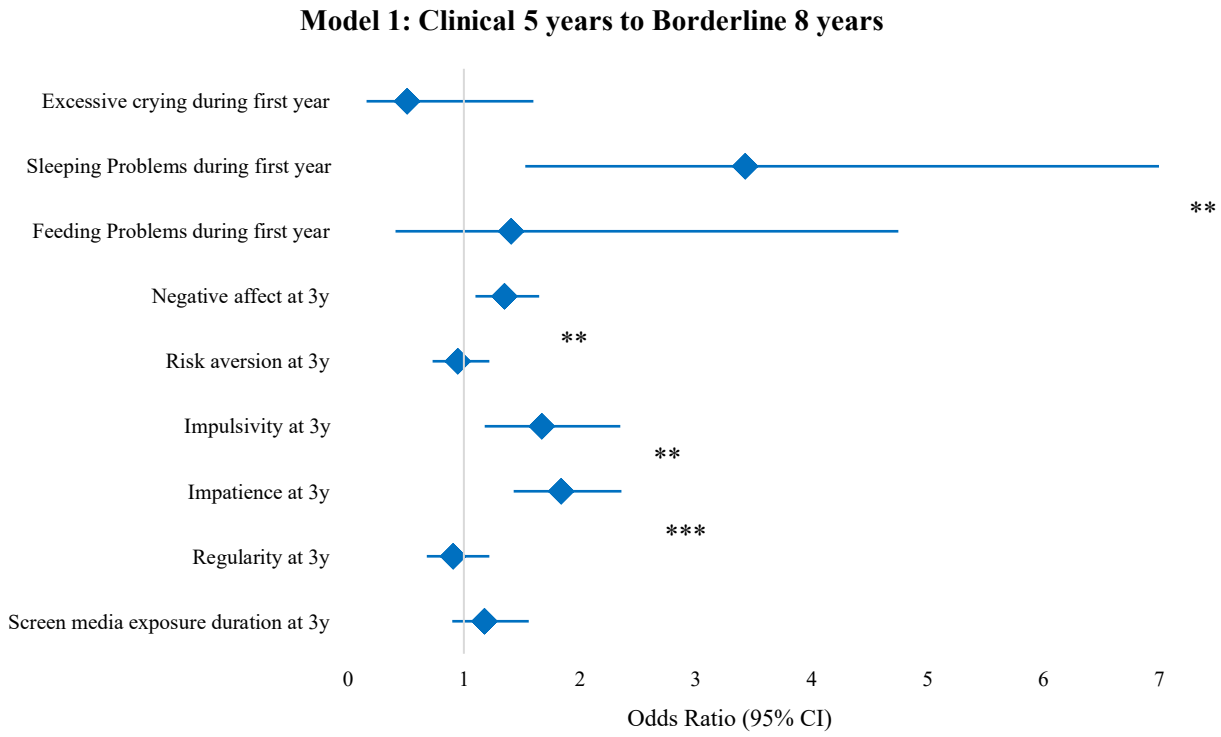
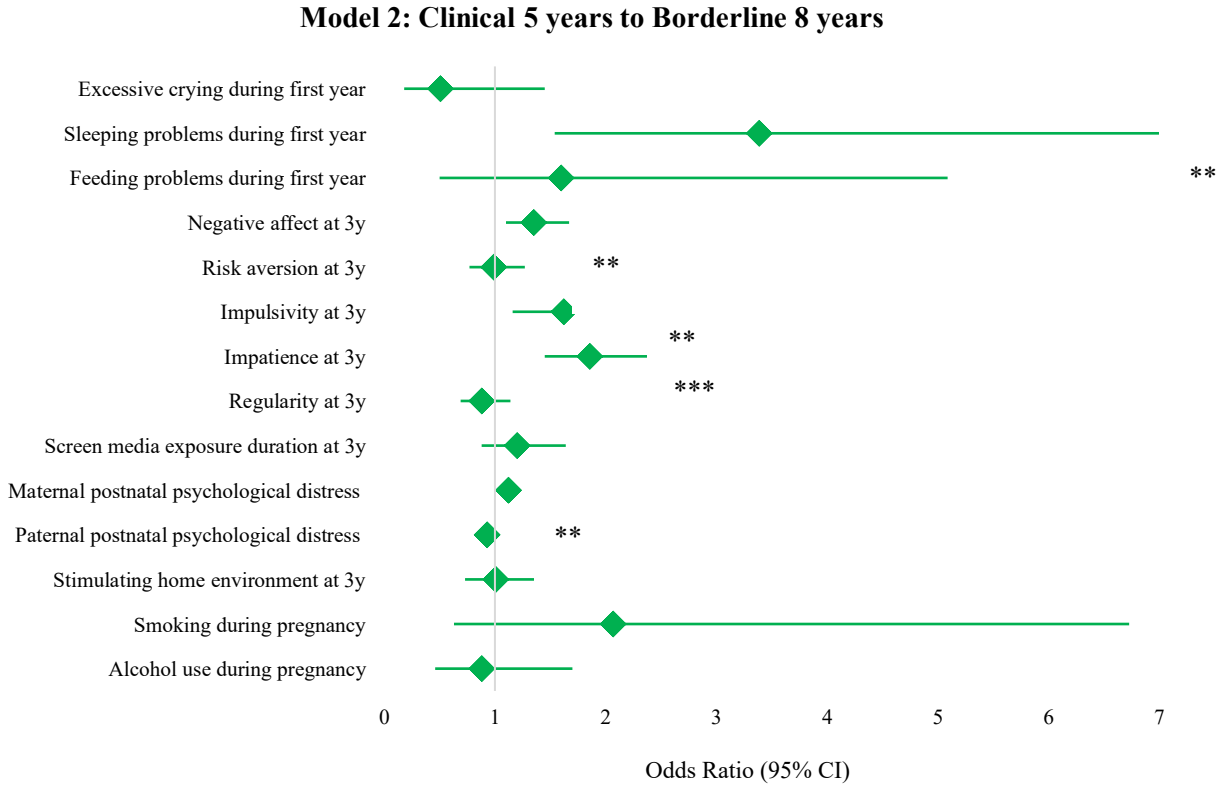


Figure 15.

Forest plot between early child- and family-related predictors and the likelihood of transitioning from clinical level dysregulation profile symptoms at 5 years to borderline level symptoms at 8 years.





Chapter 5: Discussion

This study aimed to identify early child and parent-related predictors of borderline and clinical DP symptoms at ages 5 and 8, as well as the predictors of the persistence of both borderline and clinical DP symptoms from 5 to 8 years. Several child-related predictors emerged as consistent predictors of childhood DP. Specifically, negative affect at 3 years was the most consistent and significant predictor of both levels of DP symptoms across the ages 5 and 8, as well as their persistence. These associations remained significant when the impact of family-related predictors were considered. Other temperament traits such as impulsivity, impatience, and regularity also predicted DP symptoms, though less strongly and with some variation depending on age and inclusion of family factors. Early life difficulties, including excessive crying, feeding, and sleeping problems, showed some associations with later DP symptoms and their persistence, but these findings were less consistent and often did not remain significant after correction for multiple comparisons, meaning they should be interpreted cautiously.

In terms of changes in symptom severity over time, factors such as negative affect, impulsivity, impatience, and early sleeping problems were linked to shifts between borderline and clinical levels, although some of these findings were also weakened after correction for multiple comparisons. In contrast, family-related predictors showed limited and inconsistent influence, with none remaining significant after correction.

Overall, the findings suggest that early child temperament could play a more important role than family factors in the development and persistence of childhood DP symptoms.

Child-related factors predicting the childhood DP symptoms at 5 and 8 years

Child negative affect at 3 years emerged as the strongest and most consistent predictor of both borderline and clinical DP symptoms at ages 5 and 8, as well as their persistence, even after accounting for family-related factors. This finding aligns with prior research identifying negative affect as a key predictor of childhood DP (Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; McQuillan et al., 2018). More broadly, negative affect has been consistently linked to poorer mental health outcomes across the life span, including depression, anxiety, schizophrenia and reduced wellbeing (Diehl et al., 2011; Flückiger et al., 2025; Moreta-Herrera et al., 2023; Rutter et al., 2024; Taylor et al., 2019). Taken together, these findings suggest that early negative affect may contribute to the emergence of childhood DP symptoms, which in turn may increase the vulnerability to later psychopathology. This developmental pathway should be examined in future longitudinal research spanning from early childhood to adolescence and adulthood.

Further support for this interpretation comes from longitudinal evidence. A study of 3,070 children found that higher levels of negative affect at 2.5 years predicted later difficulties in emotional and behavioural regulation (Xu et al., 2026). However, negative affect did not appear to operate in isolation. Children whose mothers experienced perinatal depression and who were born preterm were more likely to show elevated negative affect, which subsequently increased difficulties in regulating emotions and behaviours. This suggests that biological and prenatal mechanisms may shape early temperament development, in line with the biopsychosocial and developmental origins of health and disease model, which propose that prenatal factors influence later developmental outcomes (Doyle & Cicchetti, 2018; Engel, 1977; Lee et al., 2015; Zepf et al., 2008).

One possible explanation is that negative affect reflects underlying difficulties in emotional regulation, which may increase susceptibility to broader behavioural and cognitive dysregulation. Evidence also suggests that these difficulties may be influenced by a combination of biological and environmental factors, including genetic vulnerability and early life experiences (Barzman et al., 2015; Hawn et al., 2015). Genetics can influence brain regions associated with emotional, behavioural and cognitive regulation influencing how these regions function (Hawn et al., 2015; Zhylin et al., 2024). There is limited evidence on the role of specific genes; research suggests that it is likely that multiple genes interact, each with a small effect (Hawn et al., 2015; Saudino & Zapfe, 2008).

The association between negative affect and childhood DP may partly reflect shared genetic vulnerability. Negative affect, internalising and externalising, and cognitive regulation difficulties have been found to share moderate to strong genetic (i.e., short or low expressing 5-HTTLPR gene; NRC31 hypermyelination) and environmental influences (i.e., parental warmth, stress and stimulating home environment; Barzman et al., 2015; Cicchetti & Handley, 2017; Mikolajewski et al., 2013). For example, genetic factors such as the short expressing variant of the 5-HTTLPR gene is associated with poorer communication between the prefrontal cortex and amygdala, a neural pathway responsible for emotion regulation (Barzman et al., 2015). Disruptions in these pathways might increase emotional sensitivity, aggression, poorer self-control, attentional difficulties and altered reward processing (Berboth & Morawetz, 2021; Sun et al., 2023).

However, it is recognised that genetics do not predispose a person to experience emotional, behavioural and/or cognitive dysregulation, but instead, genetics may make a person more susceptible to these regulation difficulties when the genes interact with particular environmental factors (Barrantes-Vidal et al., 2025; Barzman et al., 2015; Belsky et

al., 2009; Fox et al., 2007; Mikolajewski et al., 2013; Zhylin et al., 2024). This means that if the susceptible gene interacts with a non-susceptible environmental factor (i.e., parental warmth), the person may not experience regulation difficulties. However, when the susceptible gene interacts with a susceptible environmental factor (i.e., highly stimulating home environment), the person is more likely to show dysregulation difficulties. Thus, there may a biological vulnerability which puts some children at greater risk of DP symptoms when interacting with environmental factors. A focus of future research could be to identify what biological factors may increase the risk of DP symptoms, and to what extent they interact with environmental factors.

In addition to negative affect, impulsivity, impatience, and regularity at age 3 were also associated with later DP symptoms, although less consistently. Impulsivity, in particular, was a robust predictor of clinical DP symptoms at both ages and of persistent symptoms, supporting previous research linking early impulsivity with later regulatory and attentional difficulties (Dougherty et al., 2014; Masi et al., 2015; Wang et al., 2022; Wang et al., 2018). Impatience showed more limited and age-specific effects, while regularity was only weakly associated with outcomes.

Impulsivity is also a core symptom in existing diagnoses such as ADHD and ODD (American Psychiatric Association, 2013; World Health Organization, 2018). Existing research has suggested there to be an overlap between childhood DP and ADHD, and ODD due to difficulties regulating attention and behaviour being a core feature (American Psychiatric Association, 2013; World Health Organization, 2018). However, whilst difficulties regulating emotions are a common co-occurrence in children with ADHD and ODD and can amplify dysregulation, it is not an essential diagnosis requirement. Not all children with ADHD or ODD struggle to regulate their emotions (Brænden et al., 2024;

Brunford et al., 2015). Similarly, childhood DP symptoms also align with DMDD, where difficulties regulating emotions and behaviours are core features (American Psychiatric Association, 2013). Again, unlike childhood DP, difficulties regulating cognitions are not a core feature of DMDD, highlighting it as a separate construct. Beyond externalising disorders, childhood DP can overlap with internalising difficulties such as anxiety and depression (American Psychiatric Association, 2013) regarding difficulties regulating emotions. Childhood DP is operationalised by children showing severe difficulties in regulating behaviours, cognitions and emotions, whereas all three symptoms are not essential for an ADHD, DMDD, ODD, anxiety or depression diagnosis. Therefore, whilst there is some overlap between childhood DP symptoms and ADHD, DMDD and, ODD, childhood DP is conceptually different to these already existing diagnoses. A child cannot be diagnosed with childhood DP, therefore when clinicians are assessing a child with DP symptoms, the child may be closely monitored or provided early intervention. Clinicians can also simultaneously assess whether the child meets threshold for ADHD, DMDD or ODD, and provide the relevant intervention as usual.

Early regulatory difficulties in infancy, such as excessive crying and sleep problems, also showed some associations with later DP symptoms, although these were less consistent. Excessive crying appeared to be an early indicator of later dysregulation (Bilgin et al., 2025; Finlay-Jones et al., 2024; Winsper et al., 2020), while sleep problems were linked to changes in symptom severity over time (Bathory & Tomopoulos, 2017; Bilgin & Wolke, 2020; Godzik et al., 2024; Pittner et al., 2023; Schlieber & Han, 2021; Schumacher et al., 2017). This highlights the potential importance of early behavioural regulation as part of developmental pathways to DP symptoms.

Sleep may be an important underlying mechanism in the trajectory of DP symptoms (Godzik et al., 2024; Schlieber & Han, 2021) due to important developmental changes occuring during this time (Bathory & Tomopoulos, 2017; Pittner et al., 2023; Schumacher et al., 2017). A review by Schlieber and Han (2021), found that poor sleep during infancy was associated with later difficulties in behavioural, emotional and cognitive regulation. Sleep is critical for brain maturation, emotional processing, and self-regulation, and disruptions during infancy may interfere with these developmental processes. Therefore, sleep may play an important role in child development and in pathways to dysregulation.

No effect was found for screen media exposure in the current study. It is possible that the inclusion of stronger child-level and family-level predictors reduced the apparent effect of screen media exposure. It is also possible that screen media exposure interacts with other variables rather than exerting an independent effect, which could be investigated further in future research.

Overall, the findings suggest that early child temperament, particularly negative affect, plays a central role in the development and persistence of childhood DP symptoms.

Family-related factors predicting childhood DP symptoms at 5 and 8 years

In contrast to expectations, no family-related variables were consistently associated with DP symptoms at ages 5 or 8, nor with their symptom persistence over time. Although small effects were found for parental psychological distress, these were inconsistent and did not remain significant after statistical correction. This finding differs from previous research that has highlighted the importance of family influences, particularly parental mental health, in predicting childhood dysregulation (Adynski et al., 2023; Asmussen et al., 2022; Basten et

al., 2013; Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023; Marino et al., 2019).

One explanation for this discrepancy may be methodological. The current study included a wider range of child-level factors, particularly negative affect, which was a strong and consistent predictor. When such robust child-related variables are included, they may account for variance that has previously been attributed to family factors, reducing their apparent impact. Earlier studies may have overestimated family effects by not adequately controlling for child temperament (Asmussen et al., 2022; Frazier et al., 2023; Hofheimer et al., 2023).

Another explanation is the role of bidirectional parent–child processes. Rather than family factors independently shaping child outcomes, children's temperament may also influence parenting behaviours and parental wellbeing (Ainsworth et al., 1978; Bilgin & Wolke, 2017; Crittenden, 2006; Fleck et al., 2024; Kiff et al., 2011; Sameroff, 2009; Wang et al., 2025). For example, a child with high negative affect may be more difficult to soothe, which could increase parental stress or affect the quality of interactions (Robson & Kuczynski, 2018). This suggests that parental mental health may, in some cases, be a response to child difficulties rather than a primary cause. Overall, these findings suggest that childhood DP symptoms may be more strongly driven by early child temperament, while family influences operate in more complex, interactive ways that require further longitudinal investigation.

The limited effect of maternal psychological distress may also reflect measurement issues. In the current study, parental mental health was measured one year postpartum, whereas symptoms can fluctuate considerably across the postnatal period (Asselmann et al.,

2022; McBean & Montgomery-Downs, 2015; Robbins et al., 2023). Therefore, by capturing information at one time point, does not account for changes in severity and timing of parental mental health. There is a risk of misclassifying parents whose symptoms peak earlier or later than the measured time point, which may have impacted the development and trajectory of child DP symptoms. Similarly, prior literature reporting maternal mental health as a significant predictor of childhood DP (Adynski et al., 2023; Asmussen et al., 2022; Basten et al., 2013; Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023; Marino et al., 2019) used varying instruments (e.g., GHQ-12, EPDS, Kessler scales, Brief Symptom Inventory). Whilst these instruments overlap to some extent in what they measure, there are differences in what mental health constructs they measure, which could explain the difference in findings of the current study.

The inclusion of paternal psychological distress represents a novel contribution, although this effect should be interpreted cautiously given the high *p* value and the mixed findings in previous research (Asmussen et al., 2022; Basten et al., 2013; Frazier et al., 2023).

The inclusion of child negative affect in the model may further explain the reduced significance of family-related predictors. Previous studies often did not control for negative affect (Asmussen et al., 2022; Frazier et al., 2023; Hofheimer et al., 2023), which may have inflated family-related associations. Methodological differences, including broader covariate adjustment and the inclusion of novel factors such as screen media exposure, may also have attenuated family effects compared to prior studies with fewer or aggregated covariates (Winsper & Wolke, 2014). Replication and longitudinal transactional models are needed to clarify these relationships.

Similarly, a stimulating home environment, which was measured by how often a parent read to a child, was also not a significant predictor of childhood DP. One reason could

be that parents are less likely to read to their infant if they receive feedback from their child which indicates that they are not interested in the story (Preece & Levy, 2018). Feedback could include not paying attention, crying, struggling to sit still, all of which could be signs of childhood DP. A parent reading to a child fosters a sense of a safe environment, which helps develop a secure attachment between the pair (Ainsworth et al., 1978; Canfield et al., 2020). A parent may engage in less reading to their child because they find the interaction less rewarding. This again is consistent with bi-directional parent–child processes (Ainsworth et al., 1978; Caro-Cañizares et al., 2015; Crittenden, 2006; Fleck et al., 2024; Kiff et al., 2011; Wang et al., 2025), which the current study could not account for.

The goodness of fit model (Thomas & Chess, 1977) may help explain these findings. This model emphasises the importance of the match between child temperament and the caregiving environment. For example, an irritable child may benefit most from a calm and patient parent. Other factors associated with parent-child interactions that were not measured in the current study include child and parental neurodiversity (Iao, 2024; Johnston et al., 2012; Lee et al., 2025), parent-child attachment style (Ainsworth et al., 1978; Crittenden, 2006), birth order (Legas & Gu, 2025), whether the child is in the social care system (i.e., fostered or adopted; Barone et al., 2017; Hornfeck et al., 2019) and number of adverse childhood and/or traumatic experiences (Lackner et al., 2018; Osborne et al., 2021) which could act as confounders or indirect family influences. Therefore, it would be beneficial for future research to examine the influence of these novel predictors and the interactions between child and family factors, rather than considering them independently.

Similarly, susceptible parental genetics interacting with susceptible environmental factors could also impact a child's DP symptoms (Barrantes-Vidal et al., 2025; Barzman et al., 2015; Belsky et al., 2009; Fox et al., 2007). It is possible that if a parent has a genetic

predisposition towards low stress tolerance or anxiety (Ohi et al., 2025; Raffagnato et al., 2025) can remain dormant until their environment becomes more challenging, for example, when having a baby who is difficult to sooth. There can be a reciprocal dynamic where the child's biological temperament elicits a parental response that is also influenced by their biology, influencing the emotional environment that could shape the development and trajectory of childhood DP symptoms. Whereas a parent with a genetic tendency towards more efficient stress recovery may be able to attune and respond to a baby with a difficult temperament. It is important to note that childhood DP is not the child's 'fault' if they have a difficult temperament, but instead reflects the interaction between a child's temperament and the parent's genetically influences stress response. Therefore, parental genetics can influence how a parent may respond to their child.

Substance use during pregnancy was also not a significant predictor, which was unexpected given previous findings linking prenatal tobacco and alcohol exposure to self-regulation difficulties (Chen, 2012; Cornelius & Day, 2000; Frick & Morris, 2004; Knopik et al., 2012; Moylan et al., 2015). This may reflect broad measurement. Parents were asked only general questions about smoking and alcohol use across pregnancy, without assessing quantity, timing, or frequency. (Bailey & Diaz-Barbosa, 2018). Future studies should include more detailed assessments, including vaping and nicotine exposure, which are increasingly common and may have distinct developmental effects (Calder et al., 2021; Jackson et al., 2024).

Predictors of the persistence of DP symptoms

Children with clinical DP symptoms at age 5 often continued to show clinical or borderline symptoms at age 8, whereas most children without symptoms at age 5 remained symptom-free. Only a small proportion developed clinical symptoms by age 8, suggesting

that late onset DP is relatively uncommon. These findings align with previous research showing that clinical DP symptoms typically emerge early and remain relatively stable over time (Aebi et al., 2020; McQuillan et al., 2018; Wang et al., 2018).

Sleeping problems, negative affect, impulsivity and impatience were all consistent significant predictors of children's DP symptoms increasing from borderline at 5 years to clinical at 8 years, as well as DP symptoms decreasing from clinical at 5 years to borderline at 8 years. This bidirectional relationship suggests that these factors may not act alone in whether they cause childhood DP, but instead may interact with other family or environmental factors, which then impacts the development and trajectory of childhood DP symptoms. This idea is in line with the circulatory feedback process suggested by Caro-Cañizares et al. (2015); children who struggle to self-regulate are more likely to be met with harsher parenting behaviours and negatively impact parental mental health, which could in turn lead to the development of later severe mental health difficulties in the child. Thus, it is possible that an infant who struggles to self-regulate and is met with parental warmth may be more likely to show a decrease in childhood DP symptoms because of how the parent and child factors interacted (Aebi et al., 2020; Kim et al., 2012). Whereas if the same infant was met with harsh parenting behaviours and poor parental mental health for instance, the child may be more likely to show an increase in childhood DP symptoms because of the difference in how the parent and child factors interacted (Breeman et al., 2018; Diemer et al., 2021; Zitzmann et al., 2024). Therefore, it would be beneficial for future research to examine the interactions between factors to explore how they influence the persistence of childhood DP symptoms.

Persistent childhood DP symptoms are particularly important to identify given their association with later adverse outcomes, including mood disorders and ADHD (Asmussen et

al., 2022; Caro-Cañizares et al., 2019; De Genna et al., 2013; Holtmann et al., 2011; Masi et al., 2015; Wang et al., 2018). In the current study, negative affect at age 3 emerged as the most robust predictor of persistent borderline and clinical DP symptoms, even after controlling for family factors.

Changes in symptom severity over time

Sleeping problems, negative affect, impulsivity and impatience were all consistent significant predictors of changes in childhood DP symptom severity over time. Specifically, these factors were associated with an increase in symptom severity (from borderline at 5 years to clinical at 8 years) and decrease (form clinical at 5 years to borderline at 8 years). This bidirectional relationship suggests that these factors may not operate in isolation, but instead they likely interact with broader family and/or environmental factors, shaping the development and trajectory of childhood DP symptoms.

Clinical Implications

The present findings have important implications for early identification and prevention of dysregulation problems. First, negative affect at age 3 emerged as a robust predictor of persistent borderline and clinical DP symptoms, suggesting that early temperamental indicators may be more informative than many family-related risk factors in predicting long-term dysregulation. Clinicians working in early childhood settings (e.g., health visiting, primary care, early years services) could use assessments of negative affect and emotional reactivity to identify children at heightened risk for persistent dysregulation and related psychopathology. Brief parent-report measures or structured observations of how a child responds to frustration, novelty, or distress may help identify those at risk for persistent dysregulation. at age 3 emerged as a robust predictor of both borderline and clinical DP symptoms at ages 5 and 8, as well as their persistence over time (Bilgin & Wolke, 2016;

Leerkes & Wong, 2012). Children who are frequently irritable, intensely reactive, and slow to calm may warrant closer monitoring, even in the absence of marked family adversity.

Similarly, screening systems in primary care, health visiting, and early education settings could integrate questions about persistent irritability, impulsivity, and difficulties with calming by age 3. Whilst mental health support in schools within the UK have increased over the past few years from Mental Health Support Teams, many of their self-regulation based groups for children are tailored for 6 years plus (Brain Buddies Emotional Regulation Course, 2020; Galán-Luque et al., 2024; NHS England, 2025b). However, existing research has routinely shown that regulation difficulties during infancy are associated with psychosocial difficulties in later life (Bäuml et al., 2019; Galling et al., 2023; Jaekel et al., 2023). Therefore, at-risk children would benefit from receiving early intervention support before 6 years old. Identifying at-risk children before school entry creates an opportunity to intervene during a developmentally sensitive period, when regulatory systems are still maturing and more amenable to change. In this way, clinicians can use early temperamental markers not only to identify risk, but to act preventively and potentially alter longer-term developmental trajectories.

Temperamental markers can be incorporated as a predisposing factor into formulations used by psychological health professionals, to help better understand the child (Johnstone & Dallos, 2013). A formulation typically incorporates biological, psychological, social, cultural and spirituals factors to provide a holistic understanding of the person (Manassis, 2014). Typically, when a child is better understood, they are able to understand themselves better, supporting professionals understand the child better, and the child can feel more accepted (Lawrence et al., 2025; Redhead et al., 2015).

The i-THRIVE framework could be utilised to provide support to at-risk children, in line with NHS guidelines (Wolpert et al., 2019). This framework categorises children into five groups: 1) thriving, 2) getting advice, 3) getting help, 4) getting more help and 5) getting risk support. The findings of the current study suggest that a 'getting advice' approach could be to provide psychoeducation to new parents and early years staff about temperament, impulsivity and impatience, and childhood DP symptoms. This could increase their awareness of symptoms to look out for and provide generalised support. A 'getting more help' approach could include brief interventions for children with higher levels of negative affect, impulsivity or impatience by an early intervention mental health professional such as Mental Health Support Teams or Child Wellbeing Practitioners in schools. Finally, 'getting more help' could be specialist support from CAMHS to support children and family members when childhood DP symptoms are causing significant impairment to their daily functioning. Therefore, children's needs could still be met even without a diagnosis.

For this to be possible, there needs to be consistency in how DP is assessed (i.e., 5 item or 15 item SDQ; Deutz, Shi, et al., 2018; Holtmann et al., 2011; Levantini et al., 2024) and what thresholds are used (sum score of subscales or each subscale meeting a specific threshold; Aitken et al., 2019). Otherwise, childhood DP risks lacking clinical usefulness if a child would be identified as having clinical levels of DP in one service but not another, which may in turn, impact their access to early intervention and support. The Early Years Health Development Review (HM Government, 2021) outlines the need for professionals to work collaboratively and have fast access to reliable information about their child's health and development. Therefore, it is important for a consistent childhood DP threshold criteria to be identified and communicated nationwide across different child professional settings.

Whilst early detection can lead to early intervention support, there are potential ethical considerations associated with identifying young children as being at increased developmental risk. Firstly, there is risk of stigmatising and labelling children from an early age, as well as feelings of anxiety or shame (Cohen-Filipic et al., 2015; Martin et al., 2025) if findings of the current study are interpreted as causal. It is important for professionals to understand that although the findings have shown that negative affect for instance is associated with later childhood DP, this does not mean that a child with negative affect will definitely develop childhood DP; correlation does not equate to causation. As the findings show, there is a complex interplay of factors associated with childhood DP. There is also a risk of pathologizing normal variations of an infant's temperament. Therefore, early risk factors should be using to inform holistic assessment of a child's regulation and access preventative support, rather than be used as a form for labelling and stigmatising children.

Third, although several early predictors (e.g., feeding problems, impulsivity, impatience, and regularity) initially showed associations with DP, these effects were attenuated after controlling for family-related variables. This suggests that early regulatory difficulties may reflect broader developmental processes that are influenced by both child and family factors. Clinically, this highlights the importance of comprehensive, multi-informant assessments that consider child temperament, behaviour, and family context rather than relying on single risk markers. This is especially important when considering the bi-directional influence that children and parents have on each other (Ainsworth et al., 1978; Bilgin & Wolke, 2017; Crittenden, 2006; Fleck et al., 2024; Kiff et al., 2011; Sameroff, 2009; Wang et al., 2025). With this extensive research, it is very challenging to assume that one risk marker will solely predict childhood DP. Therefore, a multi-informant approach allows

clinicians to see a more holistic picture of the child and can in turn recommend and/or implement more suitable interventions.

Fourth, the lack of consistent family-related predictors of persistent DP symptoms, coupled with the non-robust association between prenatal smoking and persistent clinical DP, suggests that child-level emotional and behavioural markers may provide more proximal indicators of risk in some populations. However, given the extensive evidence linking family factors to child dysregulation, these findings should not diminish the importance of family-focused interventions. Instead, they suggest that interventions targeting child emotion regulation skills (e.g., parent–child interaction therapy, emotion coaching, and early behavioural interventions) may be particularly beneficial when implemented early in development (Easdale-Cheele et al., 2024; Galán-Luque et al., 2024; Moltrecht et al., 2021). Clinicians may focus on helping children build skills in identifying emotions, tolerating frustration, and using adaptive calming strategies. Parent-focused components can emphasise scaffolding, co-regulation, consistent responses to emotional outbursts, and structured support for behavioural control. Even when family-related predictors are not independently robust, involving caregivers remains essential, as they are central to shaping children's regulatory environment.

Fifth, clinicians can use early temperament information to inform psychoeducation. Explaining to parents that high negative affect may reflect temperamental vulnerability, rather than intentional misbehaviour, can reduce blame and increase engagement in supportive strategies (Augustin et al., 2024). This framing may also encourage parents to adopt proactive regulation-building approaches rather than reactive disciplinary responses, which are associated with high childhood DP symptoms (Jucksch et al., 2011; Smorti et al., 2024). Empowering parents is associated with greater confidence and are more likely to engage in

interventions, whereas parents who feel blamed are less likely to engage in change (Crompton et al., 2023; Seetharaman et al., 2022). Additionally, it is important for health professionals to remember that parents are also the product of their own upbringing, the socioeconomic difficulties of the current world climate and societal pressures of being a parent, who are trying to do their best to parent their child.

As parents have a direct role in supporting their child to have a good sleep routine, it may be important for clinicians to educate parents about the importance of their child's sleep. By explaining to parents that children with temperamental difficulties often have poor sleep, which then leads to self-regulation difficulties could be mediated by teaching children sleep hygiene (Jusienė & Breidokienė, 2019). Sleep hygiene includes, regular bedtime, routine, limited screen use before sleep and gradual extinction of a parent's presence in the child's bedroom (Bathory & Tomopoulos, 2017; Halal & Nunes, 2014; Schlieber & Han, 2021). Whilst sleep training for parents of babies is not mandatory in any country globally, several voluntary programs have shown to be effective, including the Possums Infant Sleep Program in Australia, which is accessible globally online in a self-help format (Ball et al., 2018). Health visitors are frequently asked by new parents about sleep for their new baby as such information is not typically shared by UK health practitioners to new parents (Ball et al., 2020). Therefore, the Possums Infant Sleep Program has been adapted in the UK, 'Sleep, Baby and You', in which health visitors were trained how to deliver it to 535 new parents across the UK (Ball et al., 2020). The program was found to be effective by both parents and practitioners. It could be helpful for new parents and existing parents as a refresher, to have access to psychoeducation about sleep.

Finally, the rarity of late-onset clinical DP symptoms underscores the importance of early emergence. Most children with persistent clinical dysregulation already exhibited

symptoms by age 5, indicating that early childhood represents a critical window for screening and intervention. Early identification of negative affect and dysregulation symptoms may enable timely preventive interventions, potentially altering developmental trajectories and reducing later mental health burden (Augustin et al., 2023; Georg et al., 2024). Additionally, by childhood DP appearing to be a relatively stable construct, allows clinicians to think about how they can prevent symptoms from worsening in the children who show borderline or clinical symptoms at 5 years.

Strengths and Limitations

A key strength of using the UKHLS for research is that children in Understanding Society are followed from pre-birth using parental reports until the child turns 10 years old where they provide self-reports, allowing children's development to be monitored from a longitudinal perspective as opposed to cross-sectional analysis (Benzeval, 2020). The impact of family members on one another's individual life trajectories known as 'linked lives' (Settersten Jr, 2015) allows for examining the impact that parental circumstances and behaviours can have on their child(ren)'s developmental outcomes (Benzeval, 2020). Therefore, inferences can be made on early life influences on later life. It also allows for examining how children may impact parental circumstances.

A further strength of the current study is the large sample size, which increases statistical power and the precision of estimates. The large dataset also allowed the inclusion of a broad range of child- and family-related predictors. Previous studies have typically focused on fewer predictors (Adynski et al., 2023; Deutz et al., 2020; Frazier et al., 2023; Marino et al., 2019; Winsper & Wolke, 2014), limiting understanding of the relative contribution of individual and combined risk factors. By examining multiple predictors simultaneously, the current study provides a more comprehensive understanding of factors

associated with the development and persistence of childhood DP symptoms. This may help improve early identification and intervention for children at risk of adverse later outcomes (Althoff et al., 2010; Caro-Cañizares et al., 2019; De Caluwé et al., 2013; De Genna et al., 2013; Masi et al., 2015).

Despite these strengths, several limitations should be considered.

First, all variables in the current study were based on parental report, introducing the possibility of shared method variance and reporter bias, which could impact how results may be interpreted. Parents may under- or over-report behaviours due to social desirability, stigma, or subjective perceptions. This may be particularly relevant for parental mental health, alcohol use and smoking during pregnancy, child temperament, and internalising difficulties, which are known to be under-recognised or under-reported (Dempster et al., 2013; Eaton et al., 2016; Gagné et al., 2023; Huggett et al., 2018; Paz et al., 2024; Weber et al., 2021). Parent reports remain valuable and practical in large-scale studies, and parents are often reliable informants of observable child behaviour (Miller et al., 2017).

Research has shown a moderate effect when multiple people report on a child's temperament and can discrepancies in ratings can complement each other to provide a better understanding of the child (Sulyok et al., 2024). However, when considering alternative ways of gathering data such as through observations or contacting the individual's General Practitioner for instance, for participant data would be very time consuming and expensive considering the large number of participants used in this study. Adult self-reporting provides the advantage of capturing information that implicit measures such as observations would miss (Corneille & Gawronski, 2024). Nonetheless, a more reasonable alternative could be teacher reports because teachers typically spend a large amount of time with children at

school, which has been done by previous researchers examining childhood DP (Aitken et al., 2019; Deutz et al., 2016; Deutz, Vossen, et al., 2018; Levantini et al., 2021). The authors reported mixed findings on how consistent parental and teacher ratings were. Therefore, future research would benefit from incorporating multiple informants, such as teacher reports or observational measures, to provide a more comprehensive picture. Teacher reports may be particularly useful, as teachers observe children across social and structured contexts and have been used in previous DP research.

Second, secondary datasets are limited by the variables available. Some potentially important predictors could not be examined because they were not collected or were inaccessible. For example, parental age at childbirth was unavailable in the accessible dataset, despite previous evidence linking younger parental age to persistent or increasing DP trajectories (Asmussen et al., 2022). Similarly, biological and neurological variables such as genetic markers or neuroimaging data were not available, despite evidence that these may influence children's self-regulation and dysregulation risk (Althoff et al., 2010; Ayer et al., 2013; Knezevic et al., 2023). Finally, environmental and systemic variables such as parenting behaviours, exposure to trauma, neurodiversity of the child and/ or parent(s) were also not available in the current dataset which could have influenced the results of the current study (Jucksch et al., 2011; Knowles et al., 2021; Iao, 2024). Therefore, the current findings should be interpreted as part of much wider system of complex and interacting developmental pathways leading to DP.

Third, the timing of data collection in UKHLS may have introduced variability. UKHLS collects data in waves, meaning children may be assessed at slightly different ages. For example, infant regulatory problems were assessed within the first year of life, so some

parents may have responded when their child was 3 months old and others at 10 months. This is important because self-regulation changes rapidly across infancy; for example, crying frequency typically decreases across the first year (Ekas et al., 2013). Similarly, substance use during pregnancy was assessed broadly, without distinguishing trimester-specific exposure, despite evidence that timing of prenatal exposure may affect outcomes differently (Eiden et al., 2023; Reyentanz et al., 2025). These timing issues may have reduced measurement precision and should be considered when interpreting findings.

Fourth, SDQ data were only available at ages 5 and 8, limiting the ability to examine more nuanced developmental trajectories of childhood DP symptoms. With more time points, analyses such as latent class growth analysis could have identified more detailed symptom trajectories, such as remitting, increasing, or late-onset patterns (Jung & Wickrama, 2008). Although the current study identified broad patterns of persistence and change, future research with more repeated assessments could provide a more detailed understanding of heterogeneity in DP development.

Fifth, some variables may not have been measured optimally for the purposes of the current study. For example, maternal mental health was measured only postnatally in the main analyses, rather than both prenatally and postnatally. The timing of maternal mental health difficulties may differentially affect child outcomes, and existing evidence is mixed regarding whether prenatal or postnatal symptoms are more influential on a child's developmental outcomes (Eves et al., 2023; Pearson et al., 2013; Rees et al., 2019). Including prenatal mental health data substantially reduced sample size in the current study, so postnatal data were prioritised. Future research should examine both periods simultaneously.

Finally, some child-related predictors, such as impulsivity, impatience, and risk aversion, were measured using single items, which may have reduced reliability and validity compared with multi-item scales. Breastfeeding was another example of a variable not ideally captured: UKHLS recorded when breastfeeding stopped, but not clearly when it began, making duration difficult to estimate. More precise measurement of these variables may improve future analyses.

Recommendations for future research

Firstly, it would be important for future research to consider the bi-directional relationship between predictive variables to provide a better understanding of the direction of the relationship. Within existing literature and the current study, the direction of influence is currently unclear. For example, it is not clear if poor sleep causes childhood DP or if poor sleep is a consequence of childhood DP. Understanding the direction of the relationship is important to understand what behaviours could be of interest to professionals to identity early warning signs of dysregulation. This could be achieved by having multiple assessments at the same time using a cross-lagged panel model to get a better understanding how the interactions between predictors and childhood DP symptoms interact and influence each other. Knowing this could be helpful for CAMHS and parenting support services to better understand how they can best support parents and their child(ren) by understanding what factors would be most influential to be targeted, and in result, shape interventions.

Secondly, it would also be beneficial to have more time points measuring childhood DP symptoms from an earlier age than 5 years old and post 8 years old. This would allow for a better measurement of the development of childhood DP across childhood. The parental version of the SDQ can be used for children from 2 years old (Goldberg et al., 1997), meaning childhood DP symptoms could be measured from 2 years old. Having multiple

assessment time points, could provide an understanding of critical time points for interventions target. Additionally, parents generally find it more challenging reporting on their child's internalised state and temperament compared to overt behaviours (Arslan et al., 2021; Gooren et al., 2011; Willner et al., 2016). When parent-child interactions are observed by a clinician in addition to parental reports can result in a much better understanding of the child (Federico et al., 2021).

Similarly, it could be helpful for future research to include assessments from teachers. It is mandatory in Autism and ADHD assessments for children in the UK to have assessment information from both home and school. De Los Reyes et al. (2015) suggested for clinicians to have an unstructured phone call with the teacher of the child before their structured assessment which can help guide the clinician in exploring differences and similarities between the home and school environment to get a better understanding of the child. Additionally, considering that internalising difficulties are harder to be observed by others, multi-informant assessments help to build a more holistic understanding of the child as a teacher may have some information that a parent may not be privy to (Navarro et al., 2020). De Los Reyes et al. (2015) suggested that multi-informant assessments should not have a standardised structure, instead they should be personalised to the child's needs.

Thirdly, future research should further incorporate the impact of sleep in the development of childhood DP by using a mediation model (Gunzler et al., 2013). A mediation model helps to understand how and why an independent variable (i.e., child- and family-related predictors) may affect a dependent variable (i.e., childhood DP symptoms) through a mediator variable (i.e., sleep). As sleep was found to be associated with changes in symptoms from borderline symptoms at 5 years to clinical symptoms at 8 years, and clinical symptoms

at 5 years and borderline symptoms at 8 years, it is possible that the changes in symptoms could be explained by sleep. Sleep may exacerbate later DP outcomes.

Fourth, qualitative research would be beneficial to explore parental experiences of parenting a child who shows early symptoms of childhood DP. To date, all current research on childhood DP is quantitative. Qualitative research provides an opportunity to explore experiences and opinions on a topic, learn information that quantitative data may not be able to capture and give voice to a person's experiences (Bazen et al., 2021; Lim, 2024). Moreover, when qualitative research is feedback to those who participated, can help participants feel less alone in their experiences (Matthews, 2025), which parents have shared to find beneficial as it can reduce feelings of isolation (Thompson-Janes et al., 2016; Vella et al., 2015). Exploring parental experiences of parenting a child with childhood DP symptoms could also provide further insight into the relationship between predictors. This author and their supervisor hope that they can conduct qualitative research after the author has graduated to continue adding to the research field.

Finally, the aims of the current study were used using one approach, being the UKHLS dataset. When research is repeated using multiple longitudinal datasets, it not only improves the reliability and validity of the data, but it also allows for mental health to be understood in a wider context, taking into account geopolitical, economic and cultural differences, which increases the applicability of the data (Arseneault et al., 2025). It would be of interest to see if results are replicated in other UK based longitudinal datasets such as the Millenium Cohort Study and the Avon Longitudinal Study of Parents and Children. To further increase the generalisability of results, it is important for the analysis to be replicated outside of the UK and Western countries. Most longitudinal studies on the predictors of childhood DP have predominantly derived from Western cultures (Adynski et al., 2023;

Asmussen et al., 2022; Ayer et al., 2013; Basten et al., 2013; Bilgin, Morales-Muñoz, et al., 2024; Deutz et al., 2020; Frazier et al., 2023; Herbein et al., 2024; Hofheimer et al., 2023; Marino et al., 2019; McQuillan et al., 2018; Winsper & Wolke, 2014). There are numerous other longitudinal databases from different populations including non-Western global regions such as Africa and Asia (Arseneault et al., 2025) which could be analysed. Therefore, similar analyses should be completed using different samples from different countries before definitive conclusions can be made about predictors of childhood DP.

Conclusion

To conclude, this study identified early child-related factors as key predictors of childhood DP. Negative affect at age 3 emerged as a robust predictor of persistent borderline and clinical DP symptoms, whereas other child factors (impulsivity, impatience, and regularity) and early feeding problems were attenuated after accounting for family-related variables. No family-related factors were consistently associated with the development or persistence of DP, and the association between prenatal smoking and persistent clinical DP did not survive correction for multiple comparisons. These findings suggest that early child temperament, particularly negative affect, may be a more proximal and stable predictor of persistent dysregulation than family factors.

Self-reflexivity

As a researcher, I acknowledge that my personal and professional experiences have influenced my choice for focusing on this topic. Whilst conducting quantitative research through using a secondary dataset minimises subjectivity to an extent, as mentioned above in my epistemological positioning, research can rarely be complete neutral.

When choosing a thesis topic, I knew I wanted to focus on children and young people. Throughout most of my childhood, my parents fostered children of various ages ranging from

new-born to 18 years, which really intrigued me as I noticed that they would respond differently to the same situation of being fostered. I would often wonder why that was; was it to do with their earlier life experiences when living with their parents? Was it to do with their personalities? Was it to do with us? I saw first-hand what it's like to live with a wide range of mental health difficulties and how it impacts children and their families especially when unrecognised by professionals. I saw when a child's needs were better understood, the difference it could make to them.

Most of my clinical practice has been working in various CAMHS settings. For me, it is important to work in a trauma-informed way (Johnstone & Boyle, 2018); seeing a person beyond diagnostic labels by meeting their individual needs, and trying to understand what happened to them as opposed to what may be "wrong" with them. When reading the literature about the long-term consequences of childhood DP, I was taken about at how hopeless and deterministic the label seems. Whilst I appreciate that childhood DP at this present time is not a diagnosis, the label could still have the same negative connotations as a diagnosis does. This was a contributing factor as to why I wanted to focus on modifiable variables to elicit hope of change; I want to challenge societal narratives that people are 'pre-determined' to experience difficulties for life.

Similarly, having worked in a CAMHS early-intervention service, gave me hope for change in young people's mental health. Early intervention meant that unhelpful patterns in a child's life could be targeted and supported with, to prevent these unhelpful patterns from becoming more rigid and therefore, more difficult to change in adulthood. I often thought about how in an ideal world, early intervention services could support at an even earlier time than when the child goes to school. In many situations, I saw how developmental risks escalated because support was provided too late. This drew me to want to look at predictors

during infancy and early childhood because the earlier a risk is identified, the earlier support could hopefully be placed. However, I wonder whether my beliefs on the importance of early intervention may have had on the conclusions I drew from my analysis. I wonder if I may have placed greater emphasis on patterns that may have suggested a change in DP symptoms as an indicator of risk, rather than typical developmental fluctuation, as a way to justify the need for more early intervention support for children and their family.

I found it challenging at times that this study used quantitative data because in my clinical work and personal life, I value understanding a person's experience through stories they share. However, I appreciate that the aim of this study was not to explore experiences. Over time when completing my thesis, I learned to appreciate the benefits and importance of using a large-scale secondary dataset. I found it exciting and was curious to see what my results were and explore why this may be.

Writing my thesis has felt like one of, if not the biggest, task I have had to face in life so far. I have learned so much and developed personally, professionally and academically. For that, I am grateful for the experience.

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List of Abbreviations

Abbreviation	Meaning
ADHD	Attention Deficit Hyperactive Disorder
BHPS	British Household Panel Survey
CAMHS	Child and Adolescent Mental Health Services
CBCL	Child Behaviour Checklist
DP	Dysregulation Profile
GHQ	General Health Questionnaire
M	Mean
NHS	National Health Service
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
SD	Standard Deviation
SDQ	Strengths and Difficulties Questionnaire
SPSS	Statistical Package for Social Sciences
UKHLS	UK Household Longitudinal Study