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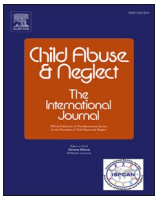

# Risk and protective factors of mental health in children in residential care: A nationwide study from Luxembourg

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ABSTRACT

*Background:* Children who grow up in residential care are at high risk for mental health problems. Existing studies have focused on negative mental health indicators and risk factors. There has been less emphasis on identifying protective factors, particularly those associated with positive mental health outcomes.
*Objective:* This study explores positive and negative dimensions of mental health and their links to risk and protective factors in children who have experienced early adversity and trauma and have been placed in residential care.
*Participants and settings:* Children aged 11 to 18 ($N = 264$) were recruited from residential care homes in Luxembourg, a small, high-income European country.
*Methods:* The children completed self-report questionnaires on mental health, perceived stress, school pressure, and participation. Residential care workers provided information on demographic factors, developmental and care history, and pre-care experiences of early adversity and trauma.
*Results:* Confirmatory factor analysis indicated that subjective well-being, internalising problems, and externalising problems are separate yet interconnected components of mental health. Multiple Indicators Multiple Causes models showed that individual, contextual, and psychosocial predictors contribute differentially to positive and negative mental health outcomes.
*Conclusions:* Using a national sample of children in residential care in Luxembourg, this research indicates that subjective well-being, internalising problems, and externalising problems are distinct but related aspects of mental health. 'Child participation' and 'school pressure' displayed strong links with positive mental health outcomes and may serve as a potential path for improving public health interventions for children in care.

## 1. Introduction

Children deprived of family-based care and raised in institutions are at risk of negative mental health and compromised development (Desmond, Watt, Saha, Huang, & Lu, 2020; van IJzendoorn et al., 2020). High rates of mental health disorders in care-

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experienced children have been associated with the early experiences of adversity and trauma (EAT), including but not limited to maltreatment, neglect, disrupted attachment, and deprivation (Kumsta, Rutter, Stevens, & Sonuga-Barke, 2010; Sonuga-Barke et al., 2017; Tarren-Sweeney, 2008a).

Experiences of EAT may result in children being taken into state custody, where the state acts in loco parentis ("in the place of the parent") for these children and bears responsibility for their developmental needs (Smithgall, Gladden, Howard, Goerge, & Courtney, 2004). This represents one of the most intrusive interventions that can be imposed on a child and is carried out under the principle of 'best interest of the child', aiming to protect children from harm and enable them to thrive (United Nations, 2010). However, previous research has consistently demonstrated that care-experienced children are at elevated risk of poor developmental outcomes (Berlin, Vinnerljung, & Hjern, 2011; Brady & Gilligan, 2018; Scherr, 2007; Snow, McLean, & Frederico, 2020; Trout, Huscroft-D'Angelo, DeSalvo, & Gehringer, 2011). Consequently, the issue of promoting mental health and well-being in care-experienced children stands at the forefront of child welfare and protection policies (Lerch & Nordenmark Severinsson, 2020). A better understanding of the factors affecting mental health and developmental outcomes is necessary for the development of effective interventions and preventive measures for children in the care system (OECD, 2021). Effective prevention programmes depend on the identification and targeting of modifiable risk and protective factors (Wight, Wimbush, Jepson, & Doi, 2016).

Existing research into the correlates of mental health in care-experienced children has primarily focused on negative mental health indicators and risk factors in the pathogenesis of mental disorders. These studies have identified various demographic and historical factors, such as age (Allen, Combs-Orme, McCarter, & Grossman, 2000), neurodevelopmental disorders (Tarren-Sweeney, 2008b), maltreatment severity (Hindt & Leon, 2022), age of entry into care (Tarren-Sweeney, 2008b) and placement moves (Dubois-Comtois et al., 2021) as predictive of increased mental health risk in children in alternative care. These studies mostly focused on children living in family-based care settings. Fewer published studies have investigated mental health in institutional care settings (González-García et al., 2017; Jozefiak et al., 2016), and as yet no research has been conducted in the residential care settings of Luxembourg.

There has been less research on protective factors, and potential mechanisms that determine resilience among children in care are not fully understood (Tarren-Sweeney, 2008a,Tarren-Sweeney, 2008b). In recent years, the concept of 'child participation' has received increased attention in the field of residential care and child welfare practices (Kennan, Brady, & Forkan, 2019). This is often attributed to the ratification of the United Nations Convention on the Rights of the Child (UNCRC, United Nations, 1989), that explicitly addresses children's rights of having their views heard and acted upon in Article 12 (Lundy, 2007; Noyes, 2005). The term 'participation' is widely used to describe how children are involved in decisions about matters that affect their lives (Brady et al., 2019). However, research has shown that child participation is an imprecise and multi-dimensional concept (Sinclair, 2004) that is challenging to implement in residential care settings (Seim & Slettebø, 2017; Vis, Holtan, & Thomas, 2010). The Lundy model of child participation was developed out of the need to facilitate the effective implementation of a child's right to participate in practice. It centres on the separate but interconnected components of the right to participate, as enshrined in Article 12 of the UNCRC (Lundy, 2007). There is a suggested link between reduced child participation and negative mental health outcomes. However, the evidence supporting this hypothesis is predominantly of qualitative nature (Bessell, 2011; McCarthy, 2016).

Most studies investigating the mental health of children in alternative care have been conducted with children from Anglophone countries, where family-based care is the primary form of alternative care (Dubois-Comtois et al., 2021). In fact, a significant body of evidence indicates that family-based care is more favourable for child development than institutional care (van IJzendoorn et al., 2020). Despite repeated calls by international organisations to phase out institutional care that runs contrary to the UN-recognised right of children to be raised in a family setting (United Nations, 2019), millions of children worldwide are still raised in such facilities (Goldman, Bakermans-Kranenburg, Bradford, et al., 2020).

Our case is Luxembourg, where residential care is the dominant model of alternative care. Luxembourg is one of the leading countries in Europe in terms of institutionalising of children and court ordered care (United Nations Committee on the Rights of the Child, 2021). Although foster care is the preferred alternative, Luxembourg's foster care system is not sufficiently developed to meet the country's placement needs (Le Gouvernement du Grand-Duché de Luxembourg, 2023; United Nations Committee on the Rights of the Child, 2021). The country is currently reforming its child protection system at national level (Le Gouvernement du Grand-Duché de Luxembourg, 2022). During the transition from institutional care, it is crucial to ensure that children receive high-quality residential care that supports healthy growth and development. It has also been argued that high quality residential care can be an effective intervention in specific situations and may have a role to play in the wider range of alternative care options for children and young people (Giraldi et al., 2022). However, it is currently unclear what constitutes 'high quality' care and under what circumstances residential care is conducive to positive outcomes for children.

There are significant gaps in the existing evidence base on the mental health and it's correlates of children in residential care in different cultural, social, and economic contexts (Giraldi et al., 2022). The present study addresses this gap by taking a comprehensive approach to mental health based on the dual-continuum model proposed by Keyes (2005a, 2005b) in an understudied population of children in residential care in Luxembourg. The dual-continuum model postulates that mental health is a multifactorial construct that encompasses related but distinct negative and positive dimensions, also referred to as psychopathology and well-being. Specifically, this model postulates that children may exhibit symptoms of psychopathology while experiencing high levels of well-being – children referred to as 'symptomatic but content' in the terminology of the dual-continuum model. Although some studies support the dual-continuum model (Suldo & Shaffer, 2008; Teismann et al., 2018), it has not yet been investigated in a high-risk population of children in residential care.

### 1.1. The present study

This study uses data from a nationwide sample of children growing up in residential care in Luxembourg. Luxembourg is a small country (approximately 643,550 inhabitants) in central Europe with one of the highest GDP per capita in the world. Luxembourg's alternative care system provides temporary or permanent care for children and young adults who cannot be safely cared for at home or who exhibit behaviours that threatens the safety or well-being of themselves or others. Alternative care can be divided into residential homes (including special homes with secure-units), family-based foster care (including kinship care), and supported housing, primarily for young adults. The total number of children and young adults in alternative care at the time of the study was 1299, of which 59 % were in residential care and approximately 66 % of adolescents aged 11–18 were in residential care (Ministère de l'Éducation nationale, de l'Enfance et de la Jeunesse, 2022). Most children are placed in care following a court-order (approx. 70 %, Ministère de l'Éducation nationale, de l'Enfance et de la Jeunesse, 2022). Decisions on protective measures, including decisions on placement modalities, are taken by the juvenile judge or the juvenile court, taking into account social investigations carried out by qualified professionals on behalf of the court (L'Etat du Grand-Duché de Luxembourg, 2023). In principle, family-based foster care (including non-kinship care) is the preferred option for younger children (Clees & Steffgen, 2022). However, due to the insufficient number of foster carers compared to the need for placements, placement decisions (residential or foster care) are frequently influenced by availability.

Residential care in Luxembourg covers a variety of settings, from emergency and standard group homes providing socio-educational, orthopedagogical or psychotherapeutic care in an institutional setting, to larger residential care facilities with secure accommodation. Children live in group-living arrangements ('residential groups' of typically eight to 10 children) in designated facilities where paid staff provide care. Each child is assigned to a key residential care worker, who is usually a professional specialised in social pedagogy. Most residential care homes are located in regular community settings, residential areas, and ordinary houses or flats. Only a few residential care facilities (mostly those providing secure care accommodation) are more segregated from the wider community. At the time of the study, the provision of residential care was coordinated by nine third sector and two state service providers, all of which participated in the study.

This study addresses the following research questions: (RQ1) Are positive and negative dimensions of mental health distinct but related constructs in a high-risk sample of children in residential care? (RQ2) How do individual, contextual, and psychosocial variables that have been associated with mental health in children in family-based care, explain individual differences in mental health outcomes in children in residential care? (RQ3) What factors contribute to well-being despite the presence of psychopathological symptoms?

Based on the dual continuum model (Keyes, 2005a, 2005b), we predicted that mental health would emerge as a multifactorial construct. We also expected that a proportion of children would be classified as 'symptomatic but content' and that predictors would contribute differentially to positive and negative aspects of mental health. Specifically, we tested the hypothesis that 'child participation' would emerge as a significant predictor of positive mental health in this high-risk population study of children in residential care.

Ethical approval for the study was obtained from the Ethics Review Panel of the University of Luxembourg (21-057 HERO), with administrative approval from the Office National de l'Enfance (ENG: National Office for Children) and the service providers. Participation was voluntary and anonymous. Informed consent was obtained from the children's legal representatives and from the children themselves. Children gave consent after the procedures were fully explained to them by ticking a box on an age-appropriate consent form. To increase motivation and reduce the risk of coercion, children were given a hoodie for returning the consent form, whether they agreed to participate in the study or not.

## 2. Methods

### 2.1. Participants

The research is part of the larger nationwide study HERO of children aged four to 18 living in alternative care in Luxembourg. The larger study includes data on children in residential and foster care and multi-informant reports on children's mental health. (reported on in Wealer, Kumsta, & Engel de Abreu, 2023). Data were collected between April 18, 2022, and May 27, 2022. The analysis presented here focuses on the self-reports of children in residential care to examine the self-perception of mental health and its correlation from a child perspective. Data from children aged between 11 and 18 years were analysed. Inclusion criteria were age (born between 2004 and 2011) and residence in a day-and-night care institution under the case management of the National Office for Children (ONE) in Luxembourg. The age range was chosen because the data collection for 11–17-year-olds included self-report instruments with published normative data.

The sampling frame included all children in Luxembourg who met the inclusion criteria. Participation in this study was anonymous in order to give participants the freedom to express their views, attitudes, and experiences. Of the 355 eligible participants, six (2 %) could not be contacted (e.g., had gone missing during the time of data collection), 75 (21 %) did not consent to take part in the study, and 13 (4 %) were excluded due to missing data. Data from 264 children were analysed, giving a response rate of 74 %.

### 2.2. Procedure

The children were contacted by the residential care home staff. They explained the purpose of the study and the procedures,

following standardised guidelines and using materials developed by the research team. The children were invited to complete a self-report paper questionnaire in either German or French (the languages of literacy instruction in Luxembourg).

The "HERO" questionnaire, which includes both custom-built items and validated scales, was developed specifically for this study to assess established constructs of mental health, stress, and school pressures. It is important to consider the presentation of constructs and the wording used in the questionnaire's instructions in order to avoid children feeling inadequate. For ease of completion, the questionnaire combined questions covering both positive and negative aspects of mental health. Child-friendliness was ensured by careful design of the questionnaire and consent form, including clear presentation and appropriate language. The questionnaire was developed to be completed independently by children with a third grade reading level and was piloted with a group of younger children. It followed the principles of 'plain language' by using simplified language that is easy to read and understand, especially for children who are learning a second language or who have special educational needs. The questionnaire also included pictorial scales to enhance comprehension.

Children were instructed to complete the questionnaire in private and return it in a sealed envelope to their key residential care worker. They could ask for help from a care worker if they needed it. This was an inclusive study and children with additional support needs were not excluded. Residential care workers were given clear instructions on how to support children with additional needs, such as reading the questions neutrally or translating them into a language that the child understands better than German or French, without influencing their responses. In cases where assistance was provided, it was recommended that children mark their responses themselves, which should not be visible to the residential care worker. The overall completion rate of the child questionnaire was 95 %.

Background information on each child was collected from the person(s) in the care home with the most knowledge of the child's care and pre-care history. In the majority of cases (78 %), this was the key residential care worker. This information was linked to data from the child questionnaire using a unique anonymous identifier. Data collection was supervised by one of the authors (CW), who delivered all the questionnaires and study materials to all the residential care homes, provided training and assistance, and collected the questionnaires at the end of the data collection period.

### 2.3. Measures

#### 2.3.1. Demographic, developmental, and historical variables

Background and child questionnaires provided information on age and gender. Information on migration status, pre-care history, placement status, and residential care settings was collected from the background questionnaire completed by the care home professionals. 'Age at entry into care' and 'time in care' were defined in terms of children's age at first separation from their family of origin and age at the time of data collection. 'Placement moves or disruptions' refers to the number of institutions or family-based care placements the child had lived in prior to the current placement. 'Reason(s) for entry into care' was the main reason (or reasons) that led to separation from the family of origin.

'EAT experiences' was assessed using the *Early Adversity and Trauma Experiences Questionnaire* (EAT-Q) developed for this study. The 18-item questionnaire is based on the Adverse Childhood Experiences International Questionnaire (World Health Organization, 2018) and includes different experiences that fall into 13 EAT categories. Residential care staff were asked to indicate for each EAT whether it had been 'clearly experienced', was 'suspected to have been experienced' or 'clearly not experienced'. We used the 13 categories and answers reported as 'clearly experienced' for the analysis reported here, with a total maximum score of 13. Professionals were also asked about the presence of neurodevelopmental disorders (intellectual disability, attention-deficit hyperactivity disorder, language disorder, specific learning disorder), school problems (academic delay, school exclusion, truancy), and mental health treatment over the last six months.

#### 2.3.2. Psychosocial variables

The short version of the *Perceived Stress Scale* (PSS-4, Cohen, Tom Kamarck, & Mermelstein, 1983) is a four-item scale that measures the extent to which children rate general life situations as stressful. Items are rated on a five-point Likert scale ranging from 'never' (0) to 'very often' (4), with a maximum total score of 20. Children reported their perception of school pressure on a one-item scale from the HBSC survey (Biewers et al., 2021). They were asked to indicate how pressured they felt by the demands of schoolwork on a four-point Likert scale ranging from 'not at all' (0) to 'a lot' (3). Child participation was assessed with a specially developed '*child participation*' scale. Item development was based on the Lundy model of child participation (2007). Children were asked to indicate their level of agreement with various statements relating to having the opportunity to express their view (e.g. 'I can openly tell adults what I think'), being asked to express their views (e.g. 'Adults ask for my opinion), having their views listened to (e.g. 'Adults listen to me'), and having their views taken into account (e.g. 'I can help with planning my daily activities'). The measure consists of six items rated on a five-point Likert scale ranging from 'not true at al' (0) to 'very true' (4). The total score is the sum of each point value response and can range from 0 to 24.

#### 2.3.3. Mental health variables

*2.3.3.1. Subjective well-being - Positive mental health.* Children completed the *WHO-Five Well-Being Index* (WHO-5, Allgaier et al., 2012) which consists of five items reflecting the presence or absence of positive affect. Children are asked to rate the frequency of five positive feelings on a six-point Likert scale ranging from 'at no time' (0) to 'all of the time' (5). A summed score is calculated, ranging from 0 (absence of positive affect) to 25 (maximal positive affect). In addition to the WHO-5, the one-item Cantril scale of global life

satisfaction from the *Health Behaviour in School-aged Children* (HBSC) survey was administered (Biewers et al., 2021). Children are shown an 11 steps ladder, with the top representing the 'best possible life' (10) and the bottom the 'worst possible life' (0). They are asked to think about their life and indicate at which step of the ladder they are on.

*2.3.3.2. Psychopathological symptoms - Negative mental health.* Three negative mental health subscales with a three-point Likert scale ranging from 'not true' (0) to 'very true' (2) were used. The *Short Mood and Feelings Questionnaire* (SMFQ, Angold, Costello, Messer, & Pickles, 1995), is a 13-item scale that assesses symptoms of depression in children and adolescents. Total scores can range from zero to 26. Children were administered the nine-item *Generalized Anxiety Disorder* (GAD) subscale of the *Screen for Child Anxiety Related Emotional Disorders* (SCARED, Birmaher et al., 1999). Total scores can range from zero to 18. The *Strengths and Difficulties Questionnaire* (SDQ, Goodman, 1997) assesses children's emotions and behaviours in several domains, including emotional symptoms, peer relationship problems, conduct problems, and hyperactivity-inattention. Each subscale contains five items, with a maximum score of 10. A total difficulty score is calculated by summing the scores on the four problem subscales. The total score can range from zero to 40. Factor analysis from previous work broadly supports second-order internalising and externalising factors consisting of the emotion and peer relationship problem sub-scales for internalising problems and the conduct problems and hyperactivity-inattention subscales for externalising problems (Di Riso et al., 2010; Goodman, Lamping, & Ploubidis, 2010).

### 2.4. Data analysis

Missing data for multi-item outcome measures were replaced by the within-person subscale mean. Descriptive data and reliability coefficients (*M* and *SD*) were calculated for all instruments. Percentages of clinically significant psychopathological symptoms were based on recommended cut-off points. As there are no published norms for the Luxembourg population for the negative mental health measures, we used established cut-off scores based on German norms and validation studies from Germany when available (Lohbeck, Schultheiß, Petermann, & Petermann, 2015; Weitkamp, Romer, Rosenthal, Wiegand-Grefe, & Daniels, 2011). For the positive mental health measures, comparative data from Luxembourg and cut-off scores from the large-scale representative HBSC survey were available (Biewers et al., 2021).

We used confirmatory factor analysis (CFA) based on structural equation modeling (SEM) to test the latent structure of different models of mental health. All analyses were performed on the covariance structure using maximum likelihood estimation. Our starting point was a single-factor model in which all positive and negative mental health indicators loaded on the same latent variable (model 1). We contrasted the single-factor model with a two-factor solution (model 2), in which the two positive mental health measures were specified to load on a common factor and the six measures of psychopathological symptoms were treated as indicators of a distinct but correlated latent variable. In a final model 3, we included a two-dimensional structure of negative mental health. This three-factor model included the same positive mental health construct as model 2, but the latent factor for negative mental health was split into two separate but related constructs labelled 'internalising problems' and 'externalising problems'. The goodness of fit of the estimated mental health models was assessed by the chi-square ($\chi^2$) statistic. As the $\chi^2$ statistic is sensitive to large samples, additional fit indices were examined: the minimum discrepancy per degree of freedom (CMIN/DF), with values of less than three indicating good fit; the comparative fit index (CFI), and the incremental fit index (IFI), for which values of 0.90 or higher indicate acceptable fit; and the root mean square error of approximation (RMSEA), for which values of 0.08 or less indicate adequate fit (Kline, 2016).

Next a multiple indicators multiple causes (MIMIC) model (Joreskog & Goldberger, 1975) was established by simultaneously regressing the latent factors obtained from the mental health measurement model on 13 predictors: Chronological age (11–17 years), gender (boy = 0, girl = 1), migration status (Luxembourg-born = 0, non-Luxembourg-born = 1), intellectual disability (absence = 0, presence = 1), attention-deficit hyperactivity disorder (ADHD, absence = 0, presence = 1), specific learning disorder (absence = 0, presence = 1), language disorder (absence = 0, presence = 1), age at entry into care (0–17 years), placement moves or disruptions (0 moves = 0, 1 move = 1, 2–3 moves = 2, 4–5 moves = 3, ≥ 6 moves = 4), number of EAT experiences (0−13), perceived stress (0−20), perceived school pressure (0–3), and participation (0–24). Predictors that were likely to be a consequence of mental health problems (e.g. 'mental health treatment') or that were confounded (e.g. 'time in care' with 'age at entry into care') were not included in the model. Likelihood ratio tests were used to assess the significance of regression coefficients. This procedure was used because it is more reliable than test statistics based on standard errors (Gonzalez & Griffin, 2001).

For the typological analysis, children were classified into mental health groups based on the presence or absence of psychopathological symptoms (presence of psychopathology: SDQ ≥ 18) and low versus medium to high levels of well-being (low well-being: life satisfaction ≤5 and/or WHO-5 ≤ 9). The SDQ, life satisfaction and WHO-5 scales were chose as the main classification measures because of the availability of norms from Germany (SDQ, Lohbeck et al., 2015) and comparative data from Luxembourg (life satisfaction and WHO-5, Biewers et al., 2021).

Children manifesting psychopathological symptoms with low well-being were compared with children manifesting psychopathological symptoms but with medium to high well-being in terms of risk and protective factors. Multivariate logistic regression was performed, to determine the relative predictive ability of the potential predictors of either a favourable (moderate to high well-being) or a less favourable (low well-being) outcome in this group of children manifesting psychopathological symptoms. The regression model for children with psychopathological symptoms included well-being (moderate to high vs. low well-being) as the outcome variable and the 13 predictor variables, using the enter method. Statistical analysis and data management were performed using IBM SPSS Statistics (IBM Corp., 2021), and all SEM analyses were performed using AMOS software version 26.0 (Arbuckle, 2019).

**Table 1**
Characteristics of the care-experienced children in the study (N = 264).

| | *M* (*SD*, Range); n (%) |
|---|---|
| Age (years) | 14.58 (1.91, 11–17) |
| Gender | |
| Girls | 136 (53 %) |
| Boys | 122 (46 %) |
| Other gender | 4 (2 %) |
| Migration status (non-Luxembourg-born) | 78 (31 %) |
| Placement status (court-ordered) | 187 (75 %) |
| Type of residential care setting | |
| Standard residential home | 219 (83 %) |
| Emergency care | 5 (2 %) |
| Residential care with secure accommodation | 40 (15 %) |
| Size of residential care setting | |
| Number of children in the residential group | 8.35 (1.37, 3–12) |
| Number of residential groups sharing a care home | |
| 1 | 192 (74 %) |
| 2 | 46 (18 %) |
| ≥ 3 | 23 (9 %) |
| Age at entry into care (years) | 8.42 (4.92, 0–17) |
| Time in care (years) | 6.12 (4.84, 0–17) |
| Reason(s) for entry into care | |
| Inadequate care and/or maltreatment of the child | |
| Overwhelming parental demands | 154 (58 %) |
| Neglect | 102 (39 %) |
| Emotional abuse | 68 (26 %) |
| Physical abuse | 59 (22 %) |
| Sexual abuse | 18 (7 %) |
| Precarious life situation of the family of origin[a] | 139 (53 %) |
| Problem behaviour of the child[b] | 63 (24 %) |
| EAT experiences | |
| Clearly experienced (0–13) | 3.95 (2.03) |
| Number of EAT categories (clearly experienced) | |
| 1 | 15 (6 %) |
| 2 | 48 (18 %) |
| 3 | 74 (28 %) |
| ≥ 4 | 127 (48 %) |
| Number of placement moves or disruptions | |
| 0 | 77 (31 %) |
| 1 | 86 (34 %) |
| 2–3 | 63 (25 %) |
| ≥ 4 | 26 (10 %) |
| Neurodevelopmental disorder(s) | |
| Intellectual disability | 30 (11 %) |
| Attention-deficit hyperactivity disorder (ADHD) | 28 (11 %) |
| Language disorder | 15 (6 %) |
| Specific learning disorder (reading or mathematics) | 15 (6 %) |
| Problem(s) at school | |
| Academic delay | 109 (43 %) |
| School exclusion | 35 (14 %) |
| Truancy | 30 (12 %) |
| Mental health | |
| Treatment in the last 6 months | 41 (16 %) |
| Distribution of the sample according to the dual-factor model of mental health | |
| Absence of psychopathological symptoms | 145 (55 %) |
| Medium-high subjective well-being ('complete mental health') | 89 (34 %) |
| Low subjective well-being ('vulnerable') | 56 (21 %) |
| Presence of psychopathological symptoms | 119 (45 %) |
| Medium-high subjective well-being ('symptomatic but content') | 60 (23 %) |
| Low subjective well-being ('troubled') | 59 (22 %) |

*Note*. EAT = Early Adversity and Trauma; [a] 'Precarious life situations of the family of origin' includes: homelessness or precarious housing; escape from conflict or oppression in the country of origin; substance abuse; parental illness, disability or death; abandonment; delinquency; [b] 'Problem behaviour of the child' includes: antisocial behaviours of the child; drug abuse; behaviours that pose a risk to themselves or others.

## 3. Results

### 3.1. The sample

#### 3.1.1. Demographic features and sample characteristics

The characteristics of the participants are summarised in Table 1. The children were M = 14.6 years old (SD = 1.9), 53 % ($n = 136$) were girls, and 31 % ($n = 78$) were not born in Luxembourg. Most participants ($n = 187$, 75 %) had been placed in care by court order. On average, children had entered care at the age of eight (SD = 4.9, range 0–17). At the time of data collection, 83 % ($n = 219$) of the children were living in standard group homes, 2 % ($n = 5$) were in short-term emergency care, and 15 % ($n = 40$) were living in semi-secure or secure care institutions. Residential groups consisted of between three and 12 children, and most groups ($n = 192$, 74 %) were living in homes that were not shared with other groups. The most common reasons for removal from the family of origin were overwhelming parental demands ($n = 154$, 58 %) and neglect ($n = 102$, 39 %). The precarious situation of the family of origin was a factor in 53 % ($n = 139$) of the removals. Almost half of the children ($n = 127$, 48 %) were reported to have clearly experienced more than four categories of EATs. For 77 children (31 %) this was the first placement outside the family of origin and 89 children (35 %) had experienced more than two previous alternative care placements. The proportion of children with an identified neurodevelopmental disorder (including intellectual disability, language disorder, learning disorder, ADHD) was 33 % ($n = 88$). Almost half of the children ($n = 109$, 43 %) were reported to have experienced grade retention, 12 % ($n = 30$) had not attended school regularly, and 14 % ($n = 35$) had experienced formal disciplinary action (exclusion from school). Sixteen percent of the children ($n = 41$) have received or are currently receiving treatment for a mental health concern within the last six months.

### 3.2. Mental health

Table 2 presents the descriptive statistics for the mental health outcome measures (including the frequency of scores in the abnormal range) and the psychosocial predictors.

Apart from the PSS-4, for which reliability was low (Cronbach's $\alpha = 0.40$), all the remaining internal consistency coefficients were within an acceptable range (with Cronbach's αs ranging from 0.70 to 0.89). The low internal consistency of the PSS-4 scale is consistent with other studies and has been attributed to the fact that the PSS-4 contains few items (Lee, 2012). The prevalence of clinically significant depressive (SMFQ score $\geq 8$) and anxiety (GAD score $\geq 9$) symptoms was 56 % ($n = 149$) and 54 % ($n = 142$), respectively. The proportion of children with 'abnormal scores' on the SDQ (score $\geq 18$ based on the top 10 % of scores from German population norms) was 45 % ($n = 119$). For life satisfaction, 27 % ($n = 71$) of the care-experienced children in this sample reported scores in the low range (score $\leq 5$). This compares to rates of low life satisfaction of 13 % in the general population of 11–17-year-olds in Luxembourg (Biewers et al., 2021). The percentage of children with WHO-5 scores $\leq 9$, indicating low affective well-being, was 30 % ($n = 78$).

### 3.3. Multiple Indicator Multiple Cause (MIMIC) models of mental health

The goodness of fit statistics for the estimated mental health measurement models are presented in Table 3. The single factor model provided an unsatisfactory fit to the data. The two-factor model explained the data significantly better than the single-factor model, but

**Table 2**
Reliability coefficients (α), mean raw scores (M), standard deviations (SD), and frequencies of abnormal scores of the care-experienced children in the study (N = 264).

| | Reliability | *M* | *SD* | Abnormal scores[b] n (%) |
|---|---|---|---|---|
| Subjective well-being – Positive mental health | | | | |
| WHO-5 (25) | 0.88 | 13.46 | 6.38 | 78 (30 %) |
| Life satisfaction (10)[a] | | 6.83 | 2.12 | 71 (27 %) |
| Psychopathology – Negative mental health | | | | |
| SMFQ (26) | 0.89 | 9.36 | 6.51 | 149 (56 %) |
| GAD (18) | 0.86 | 8.94 | 4.87 | 142 (54 %) |
| SDQ total difficulty score (40) | 0.69 | 16.70 | 5.45 | 119 (45 %) |
| Emotional symptoms (10) | | 4.48 | 2.48 | |
| Peer relationship problems (10) | | 3.64 | 1.72 | |
| Conduct problems (10) | | 3.56 | 2.11 | |
| Hyperactivity-inattention (10) | | 5.06 | 2.19 | |
| Psychosocial predictor variables | | | | |
| PSS-4 (16) | 0.40 | 8.04 | 2.88 | |
| Perceived school pressure (3)[a] | | 1.29 | .98 | |
| Participation (24) | .85 | 15.99 | 5.33 | |

*Note.* () = Maximum possible raw scores; WHO-5 = WHO-Five Well-Being Index; SMFQ = Short Mood and Feelings Questionnaire; GAD = Generalized Anxiety Disorder from Screen for Child Anxiety Related Emotional Disorders (SCARED); SDQ = Strengths and Difficulties Questionnaire; PSS-4 = Perceived Stress Scale; [a] one item scale from the HBSC survey; [b] cut-off values for abnormal scores: WHO-5 $\leq 9$, life satisfaction $\leq 5$, SMFQ $\geq 8$, GAD $\geq 9$, SDQ $\geq 18$.

**Table 3**
Fit statistics for the mental health measurement models with chi-square tests of difference (N = 264).

| Models of mental health | $\chi^2$ | df | *p* | CMIN/DF | CFI | IFI | RMSEA |
|---|---|---|---|---|---|---|---|
| Model 1: One-factor model | 120.63 | 20 | <0.001 | 6.03 | 0.82 | 0.82 | 0.14 |
| Model 2: Two-factor model | 78.02 | 19 | <0.001 | 4.11 | 0.89 | 0.90 | 0.11 |
| Model 3: Three-factor model | 42.03 | 17 | 0.001 | 2.47 | 0.96 | 0.96 | 0.07 |
| Tests of model differences | $\Delta\chi^2$ | Δdf | *p* | | | | |
| Model 1 - Model 2 | 42.61 | 1 | <0.001 | | | | |
| Model 2 - Model 3 | 35.99 | 2 | <0.001 | | | | |

*Note.* $\Delta\chi^2 = \chi^2$ test of model differences; Model 3 is represented in Fig. 1.

the goodness of fit indices still suggests an unsatisfactory fit. The fit statistics in Table 3 indicate that model 3 provides a good fit to the data with a CMIN/DF value below 3, CFI and IFI indices above 0.95 and an RMSEA value below 0.08.

Fig. 1 summarises the three-factor solution consisting of the internalising, externalising and subjective well-being latent constructs, with standardised factor loadings and factor correlations obtained from the measurement model. Following SEM graphical conventions, the observed variables are represented by rectangles and the latent constructs by ovals. Regression effects are indicated by single-headed arrows and correlations by double-headed arrows.

All paths from the latent factors to their indicators were statistically significant ($p < .05$), with factor loadings ranging from 0.30 to 0.87. The latent constructs were significantly correlated, with moderate associations between internalisation problems and both externalisation problems ($r = 0.40$) and subjective well-being ($r = -0.54$), and weak associations between externalisation problems and subjective well-being ($r = -0.24$). The three-factor model accounted for the data significantly better than the two-factor model [$\Delta\chi^2$ (2) = 35.99; $p < .001$], supporting the hypothesis that internalising problems, externalising problems, and subjective well-being reflect different latent variables in this sample of care-experienced children.

Next, we found that the MIMIC model provided a good fit to the data (CMIN/DF value = 1.88, CFI = 0.94, IFI = 0.95, RMSEA = 0.06). Table 4 presents the standardised regression parameters of the MIMIC models together with the proportion of variance in the mental health outcome factors accounted for by the predictors in the model (R2). The data showed that higher levels of internalising problems were associated with higher levels of perceived stress and school pressure, being a girl, and not being born in Luxembourg.

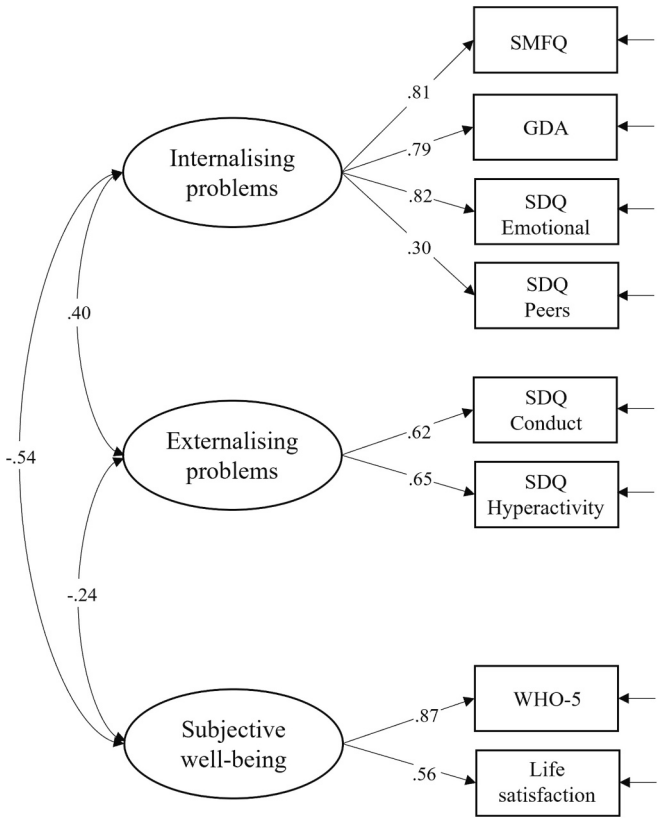


**Fig. 1.** Three-factor CFA model with standardised coefficients (correlations and factor loadings) for mental health of the care-experienced children in the study (N = 264).

**Table 4**
Standardised regression parameters between predictors and latent constructs of internalisation problems, externalisation problems, and subjective well-being (N = 264).

| Predictor variables | Latent constructs | | |
|---|---|---|---|
| | Internalising problems | Externalising problems | Subjective well-being |
| 1. Age | −0.04 | −0.03 | **−0.16** |
| 2. Gender[a] | **0.24** | −0.04 | −0.07 |
| 3. Migration status[b] | **0.14** | 0.00 | −0.06 |
| 4. Intellectual disability[c] | −0.04 | **−0.18** | 0.06 |
| 5. ADHD[c] | −0.01 | **0.27** | −0.01 |
| 6. Language disorder[c] | 0.06 | 0.06 | 0.03 |
| 7. Specific learning disorder[c] | 0.05 | 0.05 | 0.03 |
| 8. Age at entry into care | 0.07 | 0.03 | −0.03 |
| 9. Placement moves or disruptions | −0.03 | −0.03 | **−0.13** |
| 10. EAT experiences | −0.10 | 0.03 | 0.07 |
| 11. PSS-4 | **0.34** | **0.19** | **−0.35** |
| 12. Perceived school pressure | **0.33** | **0.15** | **−0.26** |
| 13. Participation | 0.11 | 0.01 | **0.39** |
| $R^2$ | 0.41 | 0.18 | 0.60 |

*Note.* PSS-4 = Perceived Stress Scale; [a] boy = 0, girl = 1; [b] Luxembourg-born = 0, non-Luxembourg-born = 1; [c] absence of disorder = 0, presence of disorder = 1; Significant regression coefficients are marked in boldface ($p < .05$).

High levels of externalising problems were associated with high levels of perceived stress and school pressure, the presence of ADHD and the absence of an intellectual disability. High subjective well-being was associated with younger age, fewer placement moves or disruptions, lower levels of perceived stress and school pressure, and higher levels of participation. Notably, the predictors accounted for 40 % of the variance in the internalisation construct and 60 % of the variance in the subjective well-being latent factor.

### *3.4. Mental health group classification and multiple logistic regression*

The distribution of the sample according to the dual-factor model of mental health is shown in Table 1. In this sample of care-experienced children, 34 % ($n$ = 89) had moderate to high subjective well-being in the absence of psychopathological symptoms ('complete mental health' in the terminology of the dual-continuum model) and 22 % ($n$ = 59) had symptoms of psychopathology and low well-being ('troubled'). We also identified two subgroups of children with a dissonant pattern of mental health indicators. Specifically, 23 % ($n$ = 60) of the children had symptoms of psychopathology but reported moderate to high subjective well-being ('symptomatic but content') and 21 % ($n$ = 56) had no symptoms of psychopathology but low subjective well-being ('vulnerable').

Table 5 compares the predictor variables among symptomatic children with moderate to high ('symptomatic but content') versus low ('troubled') subjective well-being and lists the variables that emerged from logistic regression analysis as statistically significant predictors of well-being in this group of children with psychopathological symptoms. Symptomatic children with low levels of well-being reported higher levels of perceived school pressure, $t(114) = -2.95$, $p = .004$, and lower levels of participation, $t(117) = 3.29$, $p = .001$, than did those with medium to high levels of subjective well-being. The logistic regression model, omitting all interaction

**Table 5**
Comparison of predictor variables between children with psychopathological symptoms with moderate-high and low subjective well-being (N = 119).

| Predictor variables | Subjective well-being | | | Multiple logistic regression analysis | | | | |
|---|---|---|---|---|---|---|---|---|
| | Moderate-High ('symptomatic but content') n = 60 M (SD)/n (%) | Low ('troubled') n = 59 M (SD)/n (%) | $p$-values | β | SE | $p$-values | OR | 95 % CI |
| Age (years) | 14.56 (2.02) | 14.24 (1.81) | .702[1] | 0.03 | 0.15 | 0.827 | 1.03 | [0.77–1.37] |
| Female gender | 32 (53 %) | 40 (68 %) | .191[2] | 0.10 | 0.60 | 0.867 | 1.11 | [0.34–3.60] |
| Migration status [a] | 12 (20 %) | 19 (32 %) | .174[2] | −0.75 | 0.61 | 0.218 | 0.47 | [0.15–1.55] |
| Intellectual disability | 7 (12 %) | 6 (10 %) | .793[2] | −0.84 | 0.88 | 0.337 | 0.43 | [0.08–2.41] |
| ADHD[c] | 11 (18 %) | 6 (10 %) | .203[2] | 0.80 | 0.78 | 0.306 | 2.22 | [0.48–10.26] |
| Language disorder[c] | 5 (8 %) | 2 (3 %) | .253[2] | 1.12 | 1.28 | 0.350 | 3.32 | [0.27–41.09] |
| Specific learning disorder[c] | 6 (10 %) | 3 (5 %) | .311[2] | 1.76 | 1.16 | 0.130 | 5.79 | [0.60–56.25] |
| Age at entry into care (years) | 9.38 (5.29) | 8.19 (5.10) | .255[1] | −0.01 | 0.01 | 0.317 | 1.00 | [0.99–1.01] |
| Placement moves or disruptions | 0.80 (0.86) | 1.22 (0.94) | .014[1] | 0.56 | 0.30 | 0.060 | 1.75 | [0.98–3.15] |
| EAT experiences | 3.77 (1.82) | 3.86 (1.96) | .778[1] | −0.24 | 0.15 | 0.109 | 0.78 | [0.58–1.06] |
| PSS-4 | 8.68 (2.96) | 9.25 (2.81) | .283[1] | 0.15 | 0.10 | 0.882 | 1.02 | [0.83–1.24] |
| School pressure | 1.25 (0.88) | 1.79 (1.07) | **.004**[1] | −0.47 | 0.28 | 0.096 | 0.63 | [0.36–1.09] |
| Participation | 16.67 (4.66) | 13.61 (5.46) | **.001**[1] | −0.14 | 0.06 | **0.022** | 0.87 | [0.77–0.98] |

*Note.* PSS-4 = Perceived Stress Scale; Data are expressed as *M* (*SD*) aside from gender, migration status, and neurodevelopmental disorder which are expressed as frequencies (n, %); [a] non-Luxembourg-born; [c] absence of disorder = 0, presence of disorder = 1; [1] *t*-test; [2] chi-square test; β standardised regression coefficient; SE standard error; OR odds ratio; CI confidence interval; Significant tests (with Bonferroni correction) are marked in boldface ($p < .05$).

terms, was statistically significant, $\chi^2$ (13, $n$ = 119) = 27.94, $p$ = .009. The model explained 35 % of the variance in well-being (Nagelkerke $R^2$) in this sub-sample of symptomatic care-experienced children. In particular, a higher participation score was significantly associated with an increase in the likelihood of moderate to high well-being (OR = 0.87, 95 % CI [0.77–0.98]).

## 4. Discussion

Using a national sample of children in residential care in Luxembourg, this study showed that subjective well-being, internalising problems, and externalising problems are distinct but related aspects of mental health. This distinction was validated by confirmatory factor analysis, the identification of different mental health subgroups, and the differential associations of individual, contextual, and psychosocial factors with positive and negative mental health outcomes. The findings are broadly consistent with the dual-continuum model of mental health (Keyes, 2005a,Keyes, 2005b; Keyes, 2006) and extend this model to a high-risk population of children in residential care.

In addition to testing the dimensional structure of mental health, a central aim of this study was to investigate concurrent predictors of mental health outcomes in children in residential care. Results from the MIMIC models indicated that the individual, contextual, and psychosocial predictors investigated made different contributions to positive and negative aspects of mental health. The strongest predictors of internalising problems were 'female gender', high levels of 'perceived school pressure' and 'perceived stress'. High levels of 'perceived stress' were also a significant risk factor for externalising problems, together with a 'diagnosis of ADHD'. Subjective well-being was predicted by all psychosocial factors, including 'perceived stress', 'perceived school pressure' and 'participation'. Except for gender, broader child characteristics and contextual factors made no or weak contributions in the MIMIC models. Our findings suggest that symptoms of internalising disorders are more common in girls than in boys and are consistent with previous studies documenting gender differences in internalising problems (Engel de Abreu et al., 2021; Rescorla et al., 2007). The recognition of gender-specific patterns in the manifestation of mental health problems should be taken into account in the development and implementation of support measures.

Cross-classification of positive and negative mental health indicators revealed distinct mental health groups. This is consistent with previous findings in other populations (Suldo & Shaffer, 2008; Teismann et al., 2018). In particular, in this sample of care-experienced children, 23 % were identified as 'symptomatic but content'. Thus, there is a non-negligible proportion of care-experienced children who display symptoms of psychopathology but also report high levels of life satisfaction and predominance of positive affect. Notably, we found that children classified as 'symptomatic but content' reported lower levels of 'perceived school pressure' and greater opportunities to 'participate' compared to children with symptoms of psychopathology and low indices of positive mental health. When all individual, contextual, and psychosocial factors were included in a single model, the only predictor that emerged as significant was 'participation'.

The study is limited by its cross-sectional design, which precludes the possibility of inferring causality. Further studies with a longitudinal approach are needed. In addition, the study was inclusive and therefore permitted caregiver assistance in completing the survey. The study's inclusion of children with additional support needs can be considered a strength. However, it cannot be excluded that if such support was provided, the care worker may have influenced the children's responses. Finally, retrospectively measured historical data (e.g. history of abuse, reason for entry into care, age of entry into care) could not be obtained from the administrative records of the statutory care authority due to legal restrictions on data protection and professional secrecy in Luxembourg. The reliability of caregivers' reports on children's histories is unclear. Strengths of the study include the national sampling frame, the self-reported responses by children, and the high response rates from a hard-to-reach and under-researched population. Although the national sampling frame of this study is a clear strength, it is important to bear in mind that residential care settings and the context of child protection and welfare systems vary between countries. It remains to be seen whether the findings can be generalized to children in care in countries other than Luxembourg.

### 4.1. *Future policy and research implications*

Adverse childhood experiences and trauma can have profound and lasting effects on children's development and increase vulnerability to mental health problems (Kumsta et al., 2015; Tarren-Sweeney & Hazell, 2006). Placement in residential care typically implies traumatic experiences that led to placement, and these children undoubtedly require close attention from health, social care, and education professionals. Our study is consistent with previous work showing that children in alternative care have experienced multiple EATs and are at risk of poor mental health outcomes (Dubois-Comtois et al., 2021; Sonuga-Barke et al., 2017; Tarren-Sweeney, 2008a,Tarren-Sweeney, 2008b, Tarren-Sweeney & Hazell, 2006). Indeed, 48 % of the children in this study reported experiencing more than four categories of EATs, and a large proportion of children had poor mental health based on indicators of negative mental health (56 % based on SMFQ, 54 % based on GAD).

An important finding is that a fine-grained examination of psychological patterns associated with the experience of adversity - including indicators of positive mental health - showed that not all care-experienced children with symptoms of psychopathology also reported low quality of life. This raises the question of why some children in care appear to cope well while others struggle. The ability to adapt positively in the face of adversity has been described as resilience, and there is increasing evidence that characteristics of children's social environments can influence the development of resilience (Luthar, Cicchetti, & Becker, 2000). Although our study did not directly address the question of what makes some children in care more resilient than others, the observed significant associations between several child external factors and positive mental health outcomes are encouraging. In particular, 'participation' and 'school pressure' showed strong associations with positive mental health outcomes and have the potential to be modifiable (e.g. Lundy, 2007).

This represents a promising avenue for the development of high-quality public health interventions for children in care. As in many countries (Gladstone et al., 2021; McCarthy, 2016), the practice of alternative care in Luxembourg has moved in the direction of increasing the participation of children. This is extremely positive, given the strong links between child participation and mental health identified in this study. Further research is needed to investigate how children in care who are given the opportunity to participate in matters that affect them develop higher levels of wellbeing than those who are not regularly given such opportunities.

It is worth noting that the predictors of mental health examined here are traditionally associated with different professional disciplines, including psychiatry and psychology, social work, and education. Our findings suggest that children who have experienced multiple adversities and live in residential care require multidisciplinary interventions at more than one level and across different systems (e.g. health, social care, education). While specialist clinical interventions provided by psychiatrists or psychologists may be able to address symptoms of psychopathology, educational interventions may be needed to reduce the pressures resulting from the demands of schoolwork. Targeted support from social workers may be effective in enhancing aspects of quality of life that contribute to well-being. We would argue that multi-level specialised interventions are more likely to maximise long-term success for children in care. Caring for marginalised and vulnerable children is a shared responsibility (Reupert, Straussner, Weimand, & Maybery, 2022): It takes many different people and professionals within an integrated approach to provide the nurturing and healthy environment these children need to develop and thrive.

Although it is well established that family-based care is preferable to institutional care where children are living together in large groups in an 'institutional culture' (Goldman et al., 2020; van IJzendoorn et al., 2020), there are still debates and gaps in research regarding the function of quality residential care within the range of alternative care services (Giraldi et al., 2022). This study, conducted in residential care settings in Luxembourg, may provide valuable insights into the factors that can facilitate quality care in residential care, particularly during the transition of childcare systems towards community and family-based care, or in certain specific cases where non-family-based care is necessary and in the best interest of a child. Notably, this study is the first of its kind to investigate children in residential care in Luxembourg nationwide. It has the potential to inform national policy, particularly with the country currently undergoing a reform of its child protection system.

## 5. Conclusion

The circumstances of children in care are far from favourable and, as a group, they are at very high risk of developmental and mental health problems. Residential care is a far-reaching social intervention that involves placing children outside their family of origin with the aim of giving them better prospects for positive development. Baseline measures of mental health and the availability of specialised clinical and developmental services, as well as intensive support for caregivers, are important to this goal. In this population of highly vulnerable children, it is particularly important to move towards holistic assessments - including indicators of well-being, neurodevelopment, and learning difficulties - to provide a comprehensive understanding of their often complex psychiatric presentations and specific support needs. Our findings support the position that psychopathology and subjective well-being are not opposite ends of the same construct. The findings suggest that the use of both positive and negative mental health assessments are complementary and likely to be important in planning effective interventions to address the complex needs of highly vulnerable children in care who have experienced multiple EATs.

The strong association between child participation and mental health is important, particularly in light of current debates about the importance of considering children's perspectives and their right to participate, as promoted by the UNCRC (United Nations, 1989). While positive and negative mental health of care-experienced children are related, there appear to be unique predictors. The finding that subjective well-being was uniquely predicted by a modifiable contextual characteristic - child participation - suggests that early support in the context of residential care may have direct benefits for the children's mental health.

## Declaration of competing interest

The authors declare none.

## Data availability

Data will be made available on request.

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