

Children's mental health: The role of multiple risks and child care quality

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ABSTRACT

The benefit of universal access to Early Childhood Education and Care (ECEC) for children's development can depend on the ECEC quality and children's early childhood risks. This study utilised data from the Norwegian Mother, Father and Child Cohort Study (MoBa; $N = 7355$, 50.2% boys) to investigate the relative contribution of children's early childhood risk accumulated up to three years of age and five separate dimensions of ECEC quality on children's mental health (externalising and internalising problems) at five years of age rated by mothers and teachers. Results from the hierarchical regression models indicated that lower ECEC quality added to, and higher ECEC quality counteracted, the risk of mental health problems. Relationship quality was the strongest contributor. Total ECEC quality and relationship quality interacted significantly with early childhood risk, indicating that higher ECEC quality protected against, while lower ECEC quality exacerbated, the detrimental effects of early childhood risk on mental health problems.

Introduction

Children establish the foundation for their mental health development during their first years of life. Mental health issues in early childhood most commonly include externalising problems such as aggression, attention problems and hyperactivity, although there is also substantial prevalence of internalising problems such as anxiety and depression (Vasileva, Graf, Reinelt, Petermann, & Petermann, 2021). Studies indicate that some children grow out of their mental health problems, while others exhibit prolonged problems throughout childhood and adolescence (Kjeldsen et al., 2016; Kjeldsen, Janson, Stoolmiller, Torgersen, & Mathiesen, 2014). In efforts to prevent this development of mental health problems among children, knowledge of early risk factors and experiences associated with mental health is key.

Socioecological models of development presume that children develop through continuous interplay with their environments, where the proximal family environment, the more distant social environment, and their interactions are important (Bronfenbrenner, 1979). The family environment has to a large extent been in focus in research on risk and childhood adversities as this is seen as the most salient environment in

children's early life. Over the past decades, however, the time children spend in out-of-home care during early childhood has increased considerably. Enrolment into ECEC before formal schooling is above 90% in many OECD countries (UNICEF Office of Research, 2018), and 97% in Norway (Statistics Norway, 2021). Some studies indicate that attending ECEC centres can be associated with increased mental health problems (NICHD ECCRN, 2003), while others find that attendance can compensate for risk and vulnerabilities to detrimental mental health development in early childhood (Paquin et al., 2020; Zachrisson & Dearing, 2015). Hence, the effect of attendance seems to depend on the quality provided by the ECEC centres, even in universal ECEC programmes (van Huizen & Plantenga, 2018).

There are some indications of inequality in the access to high quality ECEC in universal contexts based on the family's socioeconomic status (Alexandersen, Zachrisson, Wilhelmsen, Wang, & Brandlistuen, 2021). As a result, children who might benefit more from compensatory effects due to early risks could be less likely to experience the necessary high quality ECEC. Norway and other Western societies encourage universal access to ECEC with the aim of reducing social inequalities (Ministry of Health and Care Services, 2006-2007; UNICEF Office of Research,

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2018). In line with the socioecological view, researchers call for improved understanding of risks from separate domains, including main effects and potential interactive effects on child mental health (Evans, Li, & Whipple, 2013). Knowledge of these domains of risk may contribute to policy aims such as reducing social inequality and forming interventions for children in particular need.

This study will investigate children's mental health problems and the relative contribution of multiple risk factors from two domains: family and biological risks, and ECEC experiences. Further, we explore the potential interactions between these two domains, to better understand whether an ECEC environment of higher or lower quality can buffer or exacerbate family and biological risk in a context with near universal access to ECEC. We also contribute to the field by exploring five different dimensions of ECEC quality and their separate and combined associations with risk and mental health development.

Childhood risks and mental health development

In early childhood, the family environment is of particular importance. Research has identified childhood adversities that are associated with poorer mental health development, such as poverty and low socioeconomic status, poor parenting, parental mental health issues, harmful experiences, and children's temperament (Appleyard, Egeland, Dulmen, & Alan Sroufe, 2005; Evans et al., 2013; Kjeldsen, Nes, Sanson, Ystrom, & Karevold, 2021; Wolf & Suntheimer, 2019). The concept of risks does not necessarily imply a direct causality but detecting these associations and mechanisms may guide the development and targeting of interventions for children in need. Models of multiple risks suggest that the accumulation of several childhood adversities increases the likelihood of overwhelming children's adaptive responses to further adversities, thereby leaving some children at a considerably higher risk of developing mental health problems (Evans et al., 2013; Sameroff, 2000).

For example, in the USA, the accumulation of several family risk factors predicted more externalising problems and lower social skills for children at five years of age (Wolf & Suntheimer, 2019). The research included 18 different risk factors of both deprivation of positive stimulation and threat of harmful experiences, related to the children's family environment. Similar results have also been found for mental health issues in adolescence (Appleyard et al., 2005), where support for linear effects from the number of adversities, rather than threshold effects, was evident. This means that any reduction in the number of risks can improve children's development, or conversely, any increase in the number of risks can impair their mental health development.

Multiple risk models, combining several risks into risk indices, can be a powerful approach to detect children's overall vulnerability and identify children who might need more support (Evans et al., 2013). Yet, to identify where and how to best intervene, it is meaningful to distinguish different domains of risks. Based on this dimensional approach, this study distinguishes risks based on family and child characteristics from those based on ECEC characteristics.

ECEC quality and mental health development

With the increased use of out-of-home care, the question arises of what ECEC attendance might mean for children's development, and which factors within ECEC matter for these effects. In the USA, attending ECEC was associated with an increase in children's likelihood of developing externalising problems (NICHD ECCRN, 2003). However, later research suggests that this association depends on the quality of the centres and children's individual differences (e.g. Dearing & Zachrisson, 2017; McCartney et al., 2010; van Huizen & Plantenga, 2018). Over the past two decades, the number of studies to identify important quality factors in ECEC have increased. Reviews and summaries of research indicate that the process quality dimensions (e.g. curriculum, practice and interactions with teachers and peers) closest to the child in ECEC have more direct associations with child development, compared to

more distal dimensions of structural quality (e.g. group sizes, child-staff ratio, teachers' competence and education) (Burchinal, 2018; Melhuish et al., 2015; Sabol & Pianta, 2012; Sabol, Soliday Hong, Pianta, & Burchinal, 2013).

Nevertheless, this does not mean that structural quality should be disregarded. van Huizen and Plantenga (2018) conducted a meta-analysis of studies from contexts of universal ECEC programmes and concluded that lower child-teacher ratio and level of teacher education do matter for a variety of children's outcomes, more so for cognitive than for social-emotional outcomes. Investigating singular ECEC quality dimensions with children's social or emotional outcomes tends to yield small or inconsistent results (Burchinal, 2018). This suggests that the different quality dimensions may not matter equally for all children (Phillips, Fox, & Gunnar, 2011), or that they are interdependent. Structural dimensions could both interact with, or operate indirectly through, process quality (Burchinal, 2018). This is indicated in several other studies, such as interplays between the teacher-child relationship and teacher-characteristics (McGrath & Van Bergen, 2019; NICHD ECCRN, 2002a) and group size (Skalická, Belsky, Stenseng, & Wichstrøm, 2015), and between different teacher practices (Goble et al., 2016; Wilhelmsen, Lekhal, Alexandersen, Brandlistuen, & Wang, 2021).

Consistent with the multiple risk approach, it is also likely that the accumulation of several of these dimensions of higher or lower quality, together impose a positive or negative influence respectively on child development. Indeed, in a meta-analysis of the effects of ECEC quality, Brunsek et al. (2017) found stronger effects of the total quality score on socio-emotional outcomes, compared to the effects of individual subscales separately. Keeping with the meso-system of the socioecological theory (Bronfenbrenner, 1979), the two environmental domains, or micro-systems, of family and biological factors and ECEC quality are likely to interact in their contribution to children's development.

Interplay between early childhood risks and ECEC environments

Two of many goals for universal access to high quality ECEC for all children are to ensure equity between children from different backgrounds at school entry (UNICEF Office of Research, 2018) and, to be able to prevent developmental problems through early investments in children's ECEC environment (Ministry of Education and Research, 2019). For instance, high quality ECEC may compensate for the presence of children's early risks. Conversely, ECEC of lower quality may amplify children's early risks on children's mental health development (Wata-mura, Phillips, Morrissey, McCartney, & Bub, 2011). These are descriptions of interactions between the home and ECEC environment suggesting that their effects on children's development are interdependent.

Previous attempts to uncover such interactions have yielded somewhat inconsistent results. A study of two- and three-year-olds in the USA, found that the family risks were more strongly associated with child social behaviours than were child care risks, but found no evidence of interactions between the environments (NICHD ECCRN, 2002b). Building on these results, McCartney, Dearing, Taylor, and Bub (2007) compared children in different quality ECEC centres with children cared for only at home, and found evidence of a protective effect of child care quality on children's language development, but no evidence of a dual risk. For externalising problems, they did not find any moderation effects, but described the relation between the quality of the home environment and hours spent in ECEC as additive (McCartney et al., 2010). Further extension of these analyses compared mental health outcomes between groups of children with the lowest and highest quality in both parental and non-parental care (low and top third) (Wata-mura et al., 2011). They found evidence that children with poor home care who also had poor non-parental care were at increased risk of social-emotional problems at four years of age. That is, in contrast to the previous study, they found a dual risk of mental health problems from lower quality non-parental care for children with poor home care.

Results from other American and Canadian samples of children also indicate that high quality non-parental care can reduce the detrimental effect of maternal depression on children's mental health and behaviour (Charrois et al., 2017; Charrois et al., 2020; Goelman, Zdaniuk, Boyce, Armstrong, & Essex, 2014). Regarding the effects of the ECEC environment, however, the results are limited by a large variety in hours of use and types of non-parental care, and in many cases small sample sizes. In their samples, only about 50% of the children attended formal centre care, and the effect of added risk was reduced by controlling for children's attendance in centre care or other family-based or home-based care (Watamura et al., 2011). With the increased use of ECEC centres in Western countries (UNICEF Office of Research, 2018), and the fact that ECEC centres have a more formalised position in society today (European Commission, 2021; Gulbrandsen, 2018), we need more knowledge of the quality of ECEC centres specifically.

More recently, Suntheimer and Wolf (2020) investigated interactions between the ECEC quality at five years of age and cumulative risk of childhood adversities among a nationally representative sample of children in the USA. They found that teacher-child closeness protected children with several family adversities from developing poorer reading and memory skills. Children's development of academic learning is highly associated with their mental health development, but we lack knowledge of how this interplay between the family and ECEC environment may be associated with development of mental health issues. The current study will address this by investigating multiple childhood risks associated with mental health outcomes, and their potential moderation by several dimensions of ECEC quality in a context of universal, full-time access to ECEC centres.

The Norwegian ECEC context

All children in Norway have the right to attend ECEC centres in their municipality of residence from the age of one year until they start school at six years of age (The Kindergarten Act, 2006). Currently 97% of children attend ECEC full time before school age (Statistics Norway, 2021), and the Norwegian government aims to achieve full coverage and universal access to high quality ECEC for all children as a means to reduce social inequality in public health (Ministry of Health and Care Services, 2006-2007). Both public and private centres are heavily subsidized by the government, and are obliged to follow the national regulations for quality standards (The Kindergarten Act, 2006). These regulations include capped prices (depending on family income), standards for staff-child ratios (one adult per six children above the age of three years) and teachers' education level.

In addition to these structural standards, each centre should implement the National Framework Plan for Kindergartens (Ministry of Education and Research, 2006-2007; The Norwegian Directorate for Education and Training, 2017), which includes guidelines on the roles and responsibilities of the staff, work methods and curriculum, and the overall aim of the daily work. These regulations aim to ensure relatively homogenous provision of ECEC in Norway. However, even under these regulated conditions, the ECEC quality varies between centres (Gulbrandsen & Eliassen, 2013; Lekhal et al., 2013; Rege, Solli, Størksen, & Votruba, 2018).

Furthermore, there are indications of inequality in access to high quality centres depending on the family's socioeconomic status (Alexandersen et al., 2021). Hence, some vulnerable children might be more likely to attend low quality ECEC, which might add to the multiple risks of mental health problems. At the same time, we need to better understand the potential for several high quality ECEC dimensions to mitigate risks of mental health problems for vulnerable children.

Aims of the current study

In this study, we investigate the role of multiple ECEC qualities for children's mental health problems, and the potential interplay with

early childhood risk based on family and child characteristics. As outlined above, there is general agreement that multiple family adversities increase the risk of mental health problems, but it is less clear how the quality of the ECEC environment can add to and moderate this risk. While the results from the NICHD sample in the USA were mixed, the children attended different types of non-parental care, which could limit the results regarding centre care. This study will resolve this limitation by using prospective longitudinal data from a sample of children from a Norwegian context with universal access to ECEC centres.

First, we explore the relative contributions of early childhood risk and several dimensions of ECEC quality to children's mental health development. Second, we test whether these dimensions of ECEC quality, and a total quality score, can moderate the early childhood risks of mental health problems. Based on the evidence that a total score of ECEC quality had stronger effects on child development than each separate subscale (Brunsek et al., 2017), we hypothesize that the multiple advantages of several ECEC dimensions of higher quality can provide protective effects for children at risk. Simultaneously, based on the dual risk results found in the USA (Watamura et al., 2011), we also hypothesize that the multiple risks of several ECEC dimensions of lower quality can exacerbate children's risk.

Method

Participants and procedure

The study is based on data from a sample of $N = 7481$ children born between 2006 and 2009 within the Norwegian Mother, Father and Child Cohort Study (MoBa). MoBa is a prospective population-based pregnancy cohort study conducted by the Norwegian Institute of Public Health (Magnus et al., 2016). Participants were recruited from across Norway from 1999 to 2008, and women consented to participation in 41% of the pregnancies. The cohort now includes 114,500 children, 95,200 mothers and 75,200 fathers. Follow-up questionnaires were administered at regular intervals during pregnancy and when the children were six months, 18 months, three years, and five years. The establishment of MoBa and initial data collection was based on a licence from the Norwegian Data Protection agency and approval from The Regional Committee for Medical Research Ethics (REC). The MoBa cohort is regulated by the Norwegian Health Registry Act. The current study was approved by REC (2018/1918/REK sør-øst).

We used the tenth version of the quality-assured dataset, which was released for research in 2017 (Norwegian Institute of Public Health, 2019). These data are linked to the Medical Birth Registry (MBRN), which is a national health registry containing information about all births in Norway (Irgens, 2000). When the children turned five years, mothers of the children born between 2006 and 2009 were invited to obtain information from the children's ECEC teachers. With mothers' consent, the teachers assessed the children's development and behaviour, and the ECEC quality in an ECEC-questionnaire (Q-Cc).

The sample of children used in this study derives from the MoBa children whose teachers returned the Q-Cc (response rate 40%, 50.2% boys, mean age 5.5 years). Children were dispersed across 2738 different ECEC centres and attended on average 36 h per week. Units within the centres had a mean of 21 children (SD 6.79) per unit. Within these units, 93% of the pedagogical leaders (head teachers) had formal ECEC-teacher education, which is representative of the national population (Statistics Norway, 2021). Teachers considered about 6.3% of the children to have special needs such as developmental delays or learning disabilities. However, most of these children (86%) received fewer than ten hours of assistance per week.

Measures

Early childhood risk indices

The multiple risk indices were computed from the MoBa

questionnaires reported by the parents, prenatally through to age three years. As there is no agreed set of adversities that define childhood risks the selection was based on factors found in previous research on risks for mental health problems (e.g. Appleyard et al., 2005; Evans et al., 2013; McLaughlin & Sheridan, 2016; Wolf & Suntheimer, 2019). We examined a large set of 24 potential factors (such as mothers' and fathers' education and income, mothers' depressive symptoms, older siblings, children's birthweight, and temperament), several of which were measured at multiple times, resulting in 54 risk variables. These variables were drawn from five questionnaires in MoBa and from the MBRN (Supplementary Material, Table S2). Each variable had different amounts of missing data (range: 0.3–19.0%, mean: 7%). We allowed all children with valid data on at least half of the risk variables (27) to be given risk index scores (98.3%, $N = 7355$), and performed imputation of the remaining missing scores by Expectation-Maximisation (EM) based on all 54 variables. Excluded children did not differ significantly from remaining children on any mental health outcome (externalising problems: $t = 0.77, p = .439, d = 0.07$; internalising problems: $t = 1.70, p = .090, d = 0.16$; total mental health problems: $t = 1.48, p = .139, d = 0.14$).

The multiple risk indices were estimated by entering all 54 variables into ordinary least squares (OLS) linear regression analyses with externalising, internalising and total mental health problems respectively as outcomes. This approach resembles that of Environmental Wide Association Studies (Amiri et al., 2020), assuming that the outcomes are not a consequence of one risk alone. Using stepwise backward entry method, we minimised the risk of suppressor effects as similar factors may have cancelled each other out (Field, 2013). All variables were used to estimate the predicted scores, but 23 variables remained significant for externalising problems, 15 for internalising problems and 21 for the total mental health problem score. Overall, the most prominent factors were being first born, mothers' depressive symptoms, mothers' adverse life events and children's early temperament (Table 1). By saving these standardised predicted scores, we created a weighted multiple early childhood risk index for externalising, internalising and total mental health problems for each child, explaining 13%, 7% and 12% of the variance in their respective outcomes.

ECEC-quality dimensions

We created five dimensions of ECEC qualities from the Q-Cc, reported by the ECEC teachers when the children were five years of age. The *teacher-child relationship* was measured by the Student-Teacher Relationship Scale – Short Form (Pianta, 2001), including 15 items measuring the teacher's perception of closeness and conflict in their relationship with the children on a five-point scale. Both subscales had high internal consistency (Cronbach's $\alpha = 0.76$ for closeness and $\alpha = 0.81$ for conflict). This scale is extensively used, and has been validated in international and Norwegian samples (Cadima, Doumen, Verschueren, & Leal, 2015; Solheim, Berg-Nielsen, & Wichstrøm, 2012). Teachers' ratings on this scale also correspond well with observations of their interactions with children (Hartz, Williford, & Koomen, 2017). The *teacher-child relationship* comprised the sum of the closeness and the reversed conflict score, where high scores indicated high quality of the relationship (mean = 8.9, range 2–10).

The *curriculum score* comprised the amount of time that was spent in planned activities and systematic work within five topics. The planned activities with creative and physical play ($\alpha = 0.76$) and with numeracy and literacy activities ($\alpha = 0.80$) were measured using eleven items based on the Program Structure subscale of the Early Childhood Environment Rating Scale-Revised (Harms, Clifford, & Cryer, 1998) and the Norwegian Framework Plan (The Norwegian Directorate for Education and Training, 2017). Another question asked how much time was spent on systematic work within the topics of care and upbringing, play, learning, social competence, and language competence ($\alpha = 0.97$). A composite of these three scales (creative and physical activities, numeracy and literacy activities, and systematic work) constituted the

Table 1

Factors remaining in the risk indices for externalising, internalising and total mental health problems, by age of measurement and contribution to the respective risk index.

Factors	Child's Age	Risk indices		
		Externalising	Internalising	Total
Father's education	17th week	-0.05		-0.04
Single Mother	17th week		-0.03	
Older siblings in the family	MBRN	-0.10	-0.07	-0.11
Father's income level	17th week	-0.02		
Mother's alcohol problems	17th week	0.03		
Mother's drinking problems	17th week	0.02		
Mother's life satisfaction	30th week	0.04		0.03
Mother's life satisfaction	6 months	-0.06		-0.04
Mother's relationship dissatisfaction	17th week			0.02
Mother's relationship dissatisfaction	30th week	0.04		
Mother's relationship dissatisfaction	3 years		0.04	0.03
Mother's loneliness	6 months		0.03	
Mother's loneliness	3 years			0.03
Mother's depression	17th week		0.04	
Mother's depression	18 months	0.04		0.04
Mother's depression	3 years	0.05	0.06	0.07
Mother's self-esteem	30th week			-0.04
Mother's self-esteem	18 months	-0.03		
Mother's self-esteem	3 years	-0.04		
Financial problems	6 months		0.04	0.03
Financial hardship	18 months	0.04		0.03
Mother's adverse life events	6 months	0.05		0.04
Mother's adverse life events	18 months		0.03	0.02
Mother's adverse life events	3 years	0.03	0.04	0.04
Child's low birthweight (<2500 g)	MBRN		0.04	
Child prematurely born (<week37)	MBRN	0.03		0.04
Child temperament – emotionality	18 months	0.05	0.03	0.05
Child temperament – activity	18 months	0.05		0.02
Child temperament – shy	18 months	-0.05	0.03	
Child temperament – emotionality	3 years	0.13	0.07	0.12
Child temperament – activity	3 years	0.10	-0.02	0.05
Child temperament – social	3 years	-0.07		-0.04
Child temperament – shy	3 years	-0.07	0.11	

Note. All estimates are standardised beta coefficients and significant at $p < .050$. 17th week and 30th week refer to week of gestation. All other ages refer to the child's age. MBRN = the Medical Birth Registry Norway.

curriculum score where high scores indicated more time spent in planned activities (mean = 9.6, range 3–15).

Practice was measured by 13 items, which were developed based on the Framework Plan for Kindergartens (The Norwegian Directorate for Education and Training, 2017) together with practitioners, policy makers and researchers for the purpose of the Q-Cc. These items measured how typical the practices of free play, scaffolding and child

involvement were, and the mean of these three constituted the *practice score*, where high scores indicated more typical practice (mean = 13.7, range = 3–18, $\alpha = 0.78$).

Group size was measured by the number of boys and girls attending the child’s unit (mean = 21, range = 3–41+). Due to few scores at the high end of the distribution, and the fact that these values were deemed less likely (up to 90 children), we top scored the group size variable at 41 ($N = 149$). Higher scores thus meant more children in the unit.

We measured *staff quality* through three factors. First, the staff competence, where the teacher evaluated how much they agreed that the staff group had sufficient competence in children’s behaviour problems, language, social competence, bullying and shyness ($\alpha = 0.85$). Second, the staff stability, where they evaluated staff stability in the past six months, involving both absences and replacements of staff. Finally, the teacher evaluated the work environment and support within the unit on five items concerning support, clear work roles, decision making, enthusiasm and working in accordance with their preferred values ($\alpha = 0.85$). As these questions had different types of response categories, the three scales were standardised with a mean of zero, and the composite score of these three indicated the *staff quality*, where high scores meant a stable, competent, and supportive and collaborative staff.

To ensure that our quality dimensions, selected a priori, fitted the data well, we entered all scales into a principal component analysis. Results indicated five dimensions of quality corresponding to the factors described above, which explained 62.3% of the total variance. Staff quality and group size can be categorised as structural quality, whereas curriculum, practice and relationship can be categorised as process quality. All qualities, except group size, correlated positively with each other (Table 2). In order to examine the potential combined effect of multiple ECEC quality dimensions, a *total quality* score was created by standardising the five individual dimensions and computing the mean of these standardised scores. We did not reverse any qualities, based on the direction of correlations each quality had with the outcomes (Table 2).

Mental health problems

When the children were five years old, mothers and ECEC-teachers rated the children on their behavioural and emotional difficulties

using recognised questionnaires for externalising and internalising problems (Supplementary Material, Table S1). We combined mothers’ and teacher’ reports because multiple sources reduce the reporter-specific error. Mothers and teachers might report different behaviours for the same child (Berg-Nielsen, Solheim, Belsky, & Wichstrom, 2012), however, considering that children might behave differently across contexts, a combined score can better capture their overall behaviour, rather than suggesting that one reporter is more right than the other.

For externalising problems, mothers rated children on ten items from the Child Behaviour Checklist (CBCL) aggression and inattention subscales (Achenbach & Ruffle, 2000), and seven items from the Conner’s Parent Rating Scale Revised (CPRS-R) measuring children’s hyperactivity/impulsivity and inattention (Conners, Sitarenios, Parker, & Epstein, 1998). The CBCL has been validated in Norwegian samples (Nøvik, 1999). The teachers rated children on the same seven items from the CPRS-R and five of the items from the CBCL. As the CBCL was rated on a 3-point scale, and the CPRS-R was rated on a 4-point scale, all items were standardised into z-scores, and the externalising problem score at five years of age was created by the mean of all these 29 standardised items ($\alpha = 0.90$).

Similarly, both mothers and teachers each rated the children on five items from the CBCL anxiety subscale (Achenbach & Ruffle, 2000). These ten items were standardised and the mean of all ten items constituted the internalising problems score at five years ($\alpha = 0.62$).

Finally, a total score was computed by standardising both the externalising and internalising problems scores (which correlated $r = 0.33$). The mean of these two was labelled total mental health problems at five years ($\alpha = 0.89$). Considering the different number of items and variance between the externalising and internalising scores, standardisation ensured equal weights from both scales on the total score.

Covariates

All estimates were adjusted for gender differences because boys are found to experience more mental health problems in early years than girls (e.g. Brandlistuen, Flatø, Stoltenberg, Helland, & Wang, 2020; Vasileva et al., 2021), and boys had somewhat higher risk scores for externalising problems and total mental health problems, but lower scores for internalising problems (Table 2). Research finds some

Table 2
Correlation matrix of all variables included in the analyses.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender (1 = boys, 2 = girls)												
<i>Risk indices</i>												
2. Externalising risk index	-0.08***											
3. Internalising risk index	0.03*	0.56***										
4. Total mental health risk index	-0.04**	0.92***	0.81***									
<i>ECEC qualities</i>												
5. Teacher-child relationship	0.18***	-0.13***	-0.07***	-0.12***								
6. Curriculum	0.01	0.01	-0.01	0.00	0.08***							
7. Practice	0.02*	-0.02	-0.01	-0.02	0.20***	0.25***						
8. Group size	-0.01	0.00	0.01	0.00	-0.01	0.01	-0.03*					
9. Staff characteristics	0.01	-0.02	-0.01	-0.02	0.20***	0.21***	0.33***	-0.04**				
10. Total score	0.08***	-0.06***	-0.03**	-0.06***	0.54***	0.57***	0.65***	0.35***	0.63***			
<i>Mental health outcomes</i>												
11. Externalising problems	-0.20***	0.37***	0.21***	0.34***	-0.46***	-0.02*	-0.05***	-0.03**	-0.08***	-0.24***		
12. Internalising problems	-0.02*	0.15***	0.27***	0.23***	-0.24***	-0.02	-0.03*	0.00	-0.05***	-0.12***	0.33***	
13. Total mental health problems	-0.13***	0.32***	0.30***	0.35***	-0.42***	-0.02	-0.05***	-0.02	-0.08***	-0.22***	0.82***	0.82***

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

indications that boys and girls might experience the ECEC environment differently (Bornstein, Hahn, Gist, & Haynes, 2006), and gender differences in multiple risk studies are called for (Evans et al., 2013). Sensitivity analyses stratified by gender showed similar patterns of results for both boys and girls, but with tendencies for somewhat stronger effects for boys (Supplementary Material, Table S3). We decided therefore to report the results for boys and girls together, but control for the gender differences in the analyses. Mothers reported on the child's gender at six months. Where data were missing, we used data from the MBRN.

Analytic approach

We estimated linear hierarchical OLS regression models with externalising, internalising and total problems scores as outcomes, yielding seven models for each outcome. First, we included the risk index for externalising problems and the children's gender as predictors, and externalising problems as the outcome. In step two, we included all five individual ECEC quality dimensions to estimate the contribution of the ECEC quality to the outcome (model 1). In the subsequent models (models 2–6) we tested each quality dimension separately by entering the risk index and gender in the first step, the ECEC quality dimension in the second step, and an interaction term between the risk index and that ECEC quality dimension in the third step. Finally, in model 7, we tested the potential interaction between the risk index and the combined quality score by entering total ECEC quality in step two, and an interaction term in the step three. We estimated all these seven models for externalising, internalising and total mental health outcomes separately. In the case of significant interaction terms, we calculated simple slopes for the association between multiple childhood risk and mental health for three levels of ECEC quality (the mean and 2 SDs above and below the mean), and present these graphically based on the regression equations, as suggested by Aiken and West (1991) and Dawson (2014).

Results

The correlation matrix (Table 2) shows that all the three risk indices correlated strongly with each other ($r = 0.56$ to 0.92). Additionally, the

risk indices correlated weakly with the relationship quality ($r = -0.07$ to -0.13) and total quality scores ($r = -0.03$ to -0.06), but not with the other qualities. The quality scores all correlated with each other, except for group size, which only indicated weak negative correlations with practice and staff quality.

The relative contribution of early childhood risk and ECEC quality

The early childhood risks and children's gender explained 16.4%, 7.4% and 13.7% of the variance in externalising, internalising and total mental health problems (Table 3, model 1a). Adding the ECEC quality dimensions into the model almost doubled the amount of explained variance for each outcome, to 32.0%, 12.0% and 27.6% for externalising, internalising and total mental health problems (Table 3, model 1b). When all quality dimensions were included, thereby adjusted for each other, practice, group size and relationship quality made unique significant contributions to the externalising problems and total mental health problems, while curriculum and staff quality did not. For internalising problems, only the relationship quality remained significant when adjusting for the other qualities. Individually, relationship quality and staff quality added significant explained variance to all three outcomes (Table 3, models 2a and 6a), while curriculum, practice and group size added small but significant contributions only to externalising problems and total problems (Table 3, models 3a, 4a and 5a). The total quality score (combined effect of all quality dimensions) also contributed to the mental health development at five years of age in an additive manner for all outcomes (Table 3, model 7a). These models show that ECEC quality had significant additive effects on children's mental health outcomes.

The interplay between early childhood risks and ECEC quality

The total quality score interacted significantly with early childhood risk in predicting externalising problems and total mental health problems, but not internalising problems (Table 3, model 7b). Fig. 1 shows the predictive effect of early childhood risk on mental health problems, for different levels of total ECEC quality. All slopes were significantly

Table 3
Results from the hierarchical OLS regression models predicting mental health outcomes from Early Childhood Risk (Risk Index) and ECEC qualities.

Model		Externalising problems				Internalising problems				Total mental health problems			
		b	sig.	R ²	R ² Δ	b	sig.	R ²	R ² Δ	b	sig.	R ²	R ² Δ
1a	Risk index	0.36	0.000	0.164	0.000	0.27	0.000	0.074	0.000	0.35	0.000	0.137	0.000
1b	Risk index	0.31	0.000			0.26	0.000			0.30	0.000		
	Qrelationship	-0.41	0.000			-0.22	0.000			-0.38	0.000		
	Qcurriculum	-0.00	0.977			0.00	0.974			0.00	0.888		
	Qpractice	0.04	0.000			0.02	0.086			0.03	0.002		
	Qgroupsize	-0.04	0.000			-0.01	0.569			-0.03	0.009		
	Qstaff	-0.01	0.409	0.320	0.000	-0.00	0.777	0.120	0.000	-0.01	0.548	0.276	0.000
2a	Risk index	0.31	0.000			0.26	0.000			0.30	0.000		
	Qrelationship	-0.40	0.000	0.316	0.000	-0.22	0.000	0.120	0.000	-0.38	0.000	0.274	0.000
2b	Qrelationship*risk index	-0.08	0.000	0.322	0.000	-0.05	0.000	0.122	0.000	-0.07	0.000	0.279	0.000
3a	Risk index	0.36	0.000			0.27	0.000			0.35	0.000		
	Qcurriculum	-0.03	0.024	0.165	0.024	-0.01	0.279	0.074	0.279	-0.02	0.047	0.138	0.047
3b	Qcurriculum*risk index	-0.01	0.364	0.165	0.364	-0.00	0.787	0.074	0.787	0.00	0.903	0.138	0.903
4a	Risk index	0.36	0.000			0.27	0.000			0.35	0.000		
	Qpractice	-0.04	0.000	0.166	0.000	-0.02	0.054	0.074	0.054	-0.04	0.000	0.139	0.000
4b	Qpractice*risk index	-0.00	0.991	0.166	0.991	0.03	0.027	0.075	0.027	0.01	0.288	0.139	0.288
5a	Risk index	0.36	0.000			0.27	0.000			0.35	0.000		
	Qgroupsize	-0.04	0.001	0.165	0.001	-0.01	0.598	0.072	0.598	-0.03	0.021	0.138	0.021
5b	Qgroupsize*risk index	-0.01	0.334	0.165	0.334	-0.01	0.310	0.072	0.310	-0.02	0.073	0.138	0.073
6a	Risk index	0.35	0.000			0.27	0.000			0.34	0.000		
	Qstaff	-0.07	0.000	0.170	0.000	-0.04	0.000	0.075	0.000	-0.07	0.000	0.142	0.000
6b	Qstaff*risk index	-0.02	0.087	0.170	0.087	-0.00	0.694	0.075	0.694	-0.01	0.206	0.142	0.206
7a	Risk index	0.35	0.000			0.27	0.000			0.34	0.000		
	Qttotal	-0.21	0.000	0.206	0.000	-0.11	0.000	0.085	0.000	-0.19	0.000	0.174	0.000
7b	Qttotal*risk index	-0.06	0.000	0.209	0.000	-0.02	0.096	0.085	0.096	-0.04	0.000	0.176	0.000

Note. All analyses are adjusted for gender differences. **Bold** = $p < .050$. R² in model 1a refers to explained variance of the risk index adjusted for gender differences. In the subsequent models, significant changes in R² in a models are relative to model 1a, and b models relative to their respective a models.

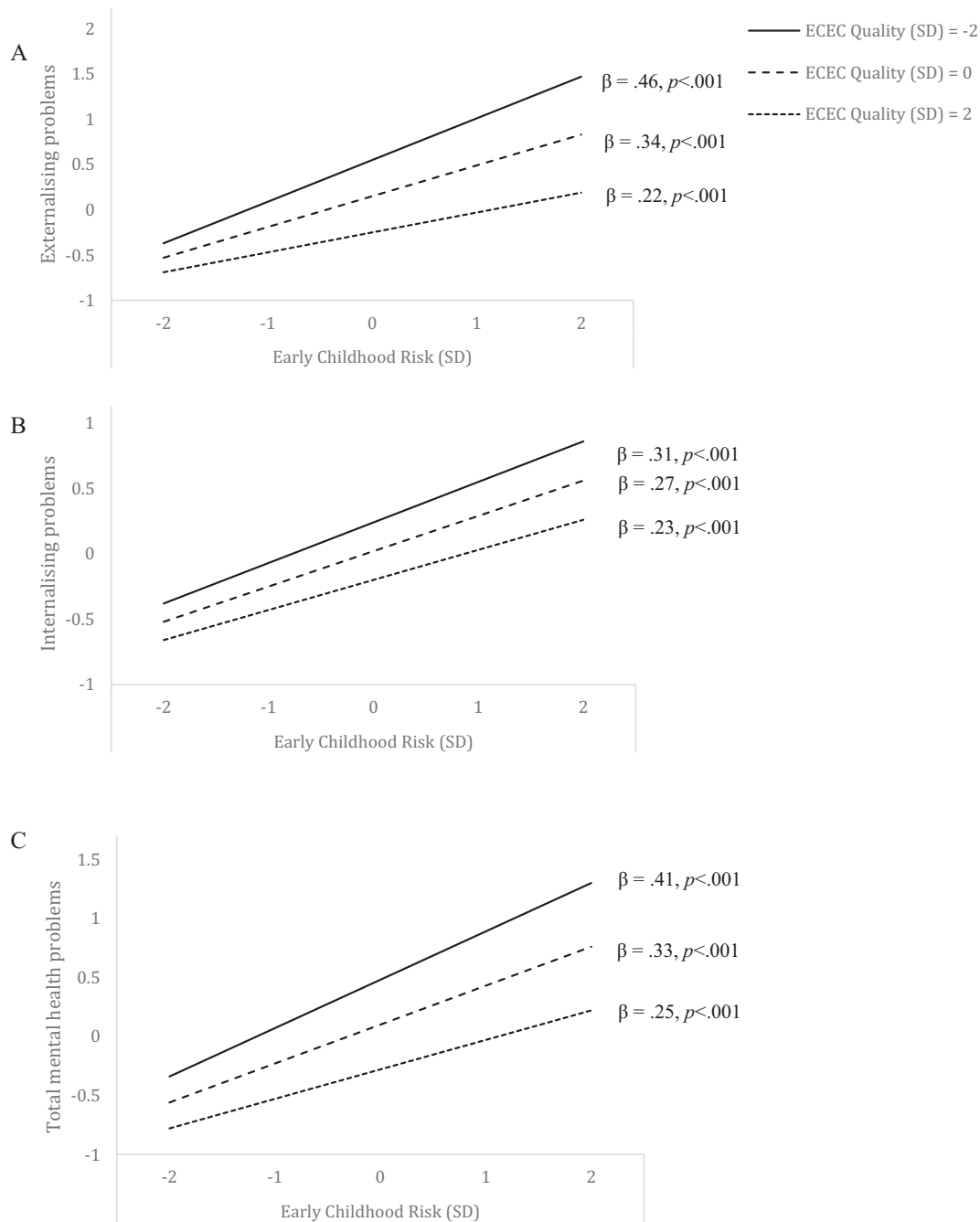


Fig. 1. Standardised predicted values of externalising (A), internalising (B) and total mental health (C) problems as a function of Early Childhood Risk and Total ECEC quality (in SDs). Interaction effects were significant at $p < .05$ for model A and C.

Note: Slopes are adjusted for gender differences.

different from zero, but become increasingly steep with lower total ECEC quality for externalising problems and total mental health problems. The negative interactions suggest a protective effect of higher quality ECEC, and an exacerbated risk for children in lower quality ECEC.

Individually, the relationship quality interacted significantly with early childhood risk for all three outcomes. Similarly to total ECEC quality, the negative interactions for relationship quality indicated that, for children who attend ECEC with higher quality teacher-child relationships, the effect of the early childhood risk was reduced. Conversely, for children who attend ECEC with lower quality teacher-

child relationships, the effect of their early childhood risk increased. Simple slopes for the mean and ± 2 SDs of relationship quality indicated that the associations between multiple childhood risks and mental health problems (externalising, internalising and total problems) were significantly different from zero for all levels of relationship quality (Fig. S1). Still, with increased relationship quality, the multiple childhood risks were reduced.

Practice quality interacted with early childhood risk in association with internalising problems. The positive interaction suggests that early childhood risk is exacerbated with more free play, scaffolding and child involvement, and reduced with fewer of these practices.

Discussion

In this study, we investigated the role of multiple early childhood risks and ECEC quality for children's mental health in a context of universal access to ECEC. The results show that early childhood risk from the family and child factors, and gender explained between 7% and 16% of the variance in children's mental health problems at five years of age, rated by both mothers and ECEC teachers. Including the ECEC quality dimensions in the model doubled the explained variance for each outcome. The total ECEC quality score added to and moderated the association between early childhood risk and mental health problems at five years of age, whereby higher quality reduced, and lower quality exacerbated, the detrimental effect of risks on externalising problems and total mental health problems. The quality of the relationship between the teacher and child in ECEC was the strongest individual contributor to mental health problems, over and above that of early childhood risk.

Moreover, the teacher-child relationship moderated the association between early childhood risk and mental health outcomes, in a protective manner. Practice quality also moderated the early childhood risk in association with internalising problems, but in the opposite direction. The dimensions of staff quality, group size and curriculum did not show this moderation individually. The following discussion will first attend to the additive and interactive effects of total quality on children's mental health. Second, we will discuss the unique contribution of the individual domains of ECEC quality, and finally the differences between externalising, internalising and total mental health problems.

Total quality: the combined effect of several ECEC quality dimensions

Lower total quality score added to the risk of mental health problems at five years of age from early childhood risk, and conversely higher total quality score promoted better mental health after accounting for early childhood risk. These results are in line with the systematic review by Brunsek et al. (2017) which concluded that the total ECERS-R score had stronger associations with children's outcomes, than each individual quality subscale. Further, the results imply that a total quality score compiled of several aspects of quality can aid understanding of the full ECEC experience. Nevertheless, research on individual aspects, such as structure and process quality, is still necessary as these aspects could be interdependent (Burchinal, 2018).

The total quality score also interacted significantly with early childhood risk for externalising problems and total mental health problems. Thus, even though each individual quality dimension (except relationship quality and, to some extent, practice quality) did not have unique interaction effects, the accumulation of many qualities did. These interactions suggest that total quality can moderate the effect of early childhood risk, or conversely, that total quality is especially beneficial for vulnerable children. van Huizen and Plantenga (2018) concluded that the structural ECEC quality mattered for developmental outcomes mainly for children from lower socioeconomic backgrounds. Our results extend theirs by including several relevant ECEC qualities, which, in combination, create an ECEC experience for children that either adds or subtracts risks for mental health problems, and even reduce or increase the effects of early childhood risks. This implies that in order for ECEC to reduce social inequality (Ministry of Health and Care Services, 2006-2007), relying simply on universal access to ECEC centres is insufficient, and high quality needs to be ensured, especially in areas with more at-risk children. This involves recruitment of competent teachers, who can provide close and non-conflictual relationships and engage in practices and activities adapted to children's needs. In a report on European ECEC teachers, the authors argue that teachers who are valued in society and are aware of their potential impact on children seem more likely to provide high quality teaching (European Commission, 2021). This aligns with the macro-level in the socioecological models of development in that the society and its values may interact

with teaching quality, and further with the meso-level as it underlines the need for communication between researchers and practitioners.

Relationship quality: additive and interaction effects

Relationship quality in ECEC was uniquely associated with children's mental health, over and above that of early childhood risk. When considering relationship quality alone, adding this to the models almost doubled the explained variance for each outcome, whereby relationship quality explained relatively more variance of externalising problems and total mental health problems, compared to early childhood risk. Considering that children's mental health in this study was a composite score of both mothers' and teachers' ratings of the children, this relative difference in strength of associations was less likely due to shared variance from the same respondent. Rather, it emphasizes the benefit of safe, warm, and non-conflictual relationships with caregivers across environmental contexts. The timing of measurements could play a role in the relative difference, considering that ECEC relationship quality was measured closer in time to mental health outcomes at age five years, while the early childhood risk compiled risk factors up to the age of three years. However, if this was the sole explanation, the same should have been true for internalising problems, which was not the case. Other studies on mental health development through childhood and adolescence find that the timing of risks does matter (Kjeldsen et al., 2021), and it is not necessarily the latest risks that matter most (Appleyard et al., 2005).

Relationship quality also interacted significantly with early childhood risk in association with all mental health outcomes. The additive and the interaction effects together indicate that children who attend ECEC centres with lower relationship quality are not only subject to an extra risk factor for mental health problems, but the impact of their early childhood risk is exacerbated. The results are in line with previous research concluding that higher quality teacher-child relationships can protect vulnerable children from deviant development in language, play and cognitive skills (Baardstu, Wang, & Brandlistuen, 2021; McCartney et al., 2007; Schmitt, Mihalec-Adkins, Pratt, & Lipscomb, 2018; Suntheimer & Wolf, 2020). Few focus on the other side of the coin, however, which implies that lower quality teacher-child relationships can increase the detrimental associations of early childhood risk on mental health development. This view of dual risk supports the results from the research on children in the American child care arrangements (Wata-mura et al., 2011).

Additive effects of different ECEC quality dimensions

Investigating the different dimensions of ECEC quality independently, our results show that mental health problems, and particularly externalising problems, were associated with lower levels of all quality dimensions and smaller group sizes. Relationship quality and staff quality had consistently stronger effect sizes than curriculum quality, practice quality and group size. These two quality dimensions were also significantly associated with internalising problems. Overall, this pattern is consistent with the notion that staff are the most highly valued resource in the ECEC environment (European Commission, 2021; Sabol & Pianta, 2012). A highly competent and stable staff group, whose members support each other well, and provide close and non-conflictual relationships with the children, is associated with fewer mental health problems among children.

Staff quality did not remain significant when all quality dimensions were entered at the same time, which could be due to staff quality being relatively highly correlated with the other ECEC quality dimensions. This may suggest that competent, stable, collaborative, and supportive staff are necessary for the realisation of other qualities, and is thereby associated with mental health in a more indirect manner. Indeed, results from other studies suggest that staff quality such as education level and competence are linked to children's social development indirectly

through relationship quality and better practices (e.g. Jensen, Jensen, & Rasmussen, 2017; Manning, Wong, Fleming, & Garvis, 2019; NICHD ECCRN, 2002a; Spilt, Koomen, Thijs, & Van der Leij, 2012).

Practice quality also had small associations with mental health after accounting for early childhood risk. Curiously, the effect changed from negative in isolation, to positive when controlling for the other quality dimensions. Practice also interacted with early childhood risk for internalising problems, suggesting that more free play, scaffolding and child involvement seem to exacerbate risks of internalising problems. Few studies link practices with mental health issues, instead favouring learning outcomes (Fulgini, Howes, Huang, Hong, & Lara-Cinisomo, 2012; Goble et al., 2016; Ulferts, Wolf, & Anders, 2019). But those that do, find that the association between practices and mental health depends on other factors such as children's early temperaments (Wilhelmsen et al., 2021), and teacher-child interactions within these practices (Goble & Pianta, 2017). There also seems to be interactions between free play and scaffolding (Wilhelmsen et al., 2021). Such dependencies may explain the effect change for practice quality when we adjust for other quality dimensions. Hence, the results concerning the associations between practice quality and mental health seem inconsistent and would need further investigations in order to understand how these practices might be linked to mental health outcomes.

Larger group size had small but significant associations with fewer externalising problems and total mental health problems, but not with internalising problems. This supports studies finding that larger groups are associated with improved child outcomes (Hong et al., 2019). In contrast, other studies conclude that larger groups are associated with more externalising problems (McCartney et al., 2010). Theoretically, smaller groups are proposed to be beneficial for children, but empirically this is predominantly supported by indirect associations with child outcomes through improved process quality (Skalická, Belsky, et al., 2015; Slot, 2018). However, larger groups could increase the opportunities of learning social skills and making friends with peers. Research on group size should include different aspects of peer dynamics to fully understand what group size means for children. Additionally, the association between group size and child outcomes is perhaps not linear, but could reflect a balance between enough children for positive peer interactions, but not too many to reduce teachers' management capabilities and provision of quality.

Curriculum quality (planned activities and systematic work) had some but not substantial associations with children's mental health above that of early childhood risk. This is consistent with research indicating that the curriculum might be more domain-specifically related to learning outcomes, rather than to social-emotional outcomes (e.g. Duncan et al., 2015; Ulferts et al., 2019). Our curriculum measure included mostly topics concerning academic skills.

In sum, nuances within each dimension of quality do relate to children's mental health, both externalising and internalising problems. Although effects are small and sometimes inconsistent, as a whole, these quality dimensions contribute to children's experience in ECEC centres. Knowledge of these nuances can aid ECEC centres in how they can improve and ensure high quality, and facilitate development of programmes or interventions to support children in need.

Children's mental health development and risks

Consistently, associations were stronger and explained more variance for externalising problems than for internalising problems. Several reasons can potentially explain this discrepancy. First, internalising problems may be more difficult to observe and measure by mothers or teachers, compared to externalising problems which are, by definition, more outwardly expressed. This is also evident from the lower agreement between mother and teacher reports on internalising than on externalising problems found in this study (Table S1), and supported by previous results from other samples of children (Berg-Nielsen et al., 2012). Second, externalising problems might be more disruptive,

especially for teachers. This could, for example, imply poorer relationship quality (e.g. Rudasill & Rimm-Kaufman, 2009; Skalická, Stenseng, & Wichström, 2015), and thereby stronger associations between ECEC quality and externalising problems compared to internalising problems. Third, estimations of prevalence and onset of mental health problems suggest that, in early childhood, externalising problems are more prevalent than internalising problems, which more typically emerge in early adolescence (Bakken, 2020; Kjeldsen et al., 2016; Vasileva et al., 2021). Consequently, there might be less variability to explain in internalising problems, and thus lower estimates.

At the same time, the use of a weighted multiple risk approach allowed us to compare the strength of the different risk variables. It is interesting how the risk indices for externalising and internalising problems have strong correlations with each other (Table 2), and the factors contributing to each risk index and each outcome resemble each other in content from pregnancy to three years of age (Table 1). This suggests that the same types of risks may be associated with several types of mental health problems. For instance, children's temperament, no siblings, mothers' depression, and adverse life events over time contributed to risk for all outcomes, as did relationship quality and staff quality in ECEC. Accordingly, the distinction between externalising and internalising problems may be a difference in how the difficulties are manifested in the behaviour of each child, perhaps at different ages. The current results of risks associated with mental health problems could support the hypothesis that there might be one underlying factor for children's overall mental health problems which may manifest itself in different behaviours (Caspi & Moffitt, 2018; Martel et al., 2017). From this perspective, reducing risk factors and increasing protective factors through attending high quality ECEC may have universal implications for mental health problems in general, rather than specific categories of mental health problems. Small contributions may reach many children, and thus improve overall mental health.

Notably, children's plasticity is evident from the small effect sizes, which underscores the fact that the presence of these early childhood risks over time do not determine poor mental health for all children. Further developments of the ecological system theories also emphasizes children's own experience and attributions to define childhood adversities as risks (Spencer, Dupree, & Hartmann, 1997). Accordingly, our results may be extended in future research to include children's experiences and measures of resilience.

Strengths and limitations

A major strength of this study is the utilisation of a large sample of children attending ECEC centres in a universal access context. The longitudinal prospective MoBa study allowed us to include a wide variety of potential risk factors from pregnancy through early childhood measured over three years. Creating weighted early childhood risk scores based on these factors countered to some extent for the criticism directed at the cumulative risk approach (Evans et al., 2013), where severity and qualitative differences between risks are ignored. This approach allowed us to compare the different strengths of associations each variable had with the mental health outcomes, and account for the timing of these risks.

On the other hand, the MoBa sample, as with most longitudinal samples, suffered from attrition and non-response. We excluded children who had missing responses to more than half of the risk factors (1.7%). For the remaining children, we used imputation by EM for creating the multiple risk indices. In the OLS regression analyses, we used pairwise deletion of missing data. These less robust methods of handling missing data may contribute to some bias in the result. However, comparisons of risk indices made with the pairwise deletion and EM indicated high correlations ($r = 0.98$ to 0.99) and results and effect sizes did not change.

Furthermore, the current sample was limited by selection into MoBa and the Q-Cc. Simulation studies conclude that estimates of associations

between variables are robust to attrition and self-selection in longitudinal cohort studies, while estimates of prevalence are prone to bias (Gustavson, Røysamb, & Borren, 2019; Gustavson, von Soest, Karevold, & Røysamb, 2012; Nilsen et al., 2009). Other studies report that associations may also be biased (Biele et al., 2019). MoBa is overrepresented by children from high-functioning families (Nilsen et al., 2009), which could make probable an overrepresentation of higher quality ECEC centres. We accounted for a wide range of potential selection factors, but estimates are more likely underestimated compared to the wider population, as they stem from a relatively healthy and high quality ECEC sample. We therefore encourage further studies among potentially more disadvantaged children in Norway, especially considering that minority families are underrepresented in ECEC enrolment (Statistics Norway, 2020). Furthermore, these results are relevant for international contexts as universal access to ECEC is an attractive model. Nevertheless, characteristics of Norway and the other Scandinavian countries, such as relatively low social inequality and high-quality welfare services, could influence the generalisability of results internationally, in particular regarding the relative strength of associations between early childhood risk, ECEC quality and mental health.

Next, we argue that using multiple sources of information on children's mental health problems is a strength of the study. Using either mother-reported or teacher-reported mental health problems could potentially favour either mother-reported risks or teacher-reported ECEC quality, due to shared reporter error. Nevertheless, disagreements between mothers and teachers occur (Berg-Nielsen et al., 2012), and could perhaps account for the lower internal reliability and weaker associations for internalising problems compared to externalising problems. Disagreements between reporters could reflect both the reporters' own view or the children's context specific behaviour in ECEC and at home. Further research can examine the nature of such inter-rater agreement. In the current study, combining these questionnaire data with observational data of ECEC quality and child mental health would be a strength.

Finally, we were able to include a wide range of ECEC quality dimensions, providing the opportunity to investigate a larger picture of ECECs associations with development. The measures were developed in collaboration with practitioners and policy makers, and in accordance with the Norwegian Framework Plan for Kindergartens, thereby increasing the generalisability and relevance of the results to practice. However, we do acknowledge that the range of quality dimensions included is not exhaustive. For example, we did not address peer-interactions, such as friendships, social learning, or bullying. Integrating the current results with research on the dynamics and quality of peer relationships could provide valuable knowledge and nuances of children's ECEC experiences and further development.

Conclusion

In sum, our results suggest that multiple adverse factors from early childhood can increase the risk of mental health problems, while higher quality ECEC centres can act in a protective manner for mental health problems, particularly externalising problems. We show how in a context with near universal access to centre care, the risk of mental health problems can be reduced by attending high quality ECEC. In support of previous studies, relationship quality seems particularly important, however group size, staff qualifications, curriculum and practices can, in combination, also contribute. Moreover, the exacerbated risk for mental health problems from attending lower quality ECEC before school age is worrying considering how some children from lower socioeconomic families might be less likely to attend high quality ECECs.

Still, the effect sizes suggest that children experiencing childhood adversity in the form of personal, family or ECEC factors, are not destined to have more problems. This is valuable knowledge for both policy makers and practitioners to accommodate all children, including

children from high-risk backgrounds. It indicates that policies should not rest on universal access to ECEC attendance alone, but strive to ensure *high quality* ECEC centres. Knowing that each factor may contribute to the overall ECEC experience, either indirectly or as part of the larger picture, ensuring high quality can involve recruitment of competent teachers and strengthen their professional development within the topics of children's development and psychological well-being. In turn, this can facilitate improved teacher-child relationships. Ensuring high quality may also involve an evaluation of group sizes and adjustment of practices such as free play and scaffolding to better accommodate children's individual needs. By achieving this ECEC centres can avoid increasing the risk of mental health problems, and instead act as a universal preventive measure against the development of mental health problems for children.

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Data availability

see authors' note

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appdev.2023.101546>.

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