



DEMOGRAPHIC RESEARCH

A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 55, ARTICLE 8, PAGES 275–306

PUBLISHED 5 AUGUST 2026

<https://www.demographic-research.org/Volumes/Vol55/8/>

DOI: 10.4054/DemRes.2026.55.8

Research Article

The intergenerational association between migration and early childhood development in Germany: A comparative cross-sectional study of forced and voluntary migrant families (2004–2021)

Valeriia Heidemann

Louise Biddle

Sabine Zinn

This publication is part of the Special Collection on “Families’ resilience and the well-being of children and youth in contexts of global socioeconomic crises,” organized by Guest Editors Anna Baranowska-Rataj, Wiebke Schulz, and Pablo Gracia.

© 2026 Valeriia Heidemann, Louise Biddle & Sabine Zinn.

*This open-access work is published under the terms of the Creative Commons Attribution 3.0 Germany (CC BY 3.0 DE), which permits use, reproduction, and distribution in any medium, provided the original author(s) and source are given credit.
See <https://creativecommons.org/licenses/by/3.0/de/legalcode>.*

Contents

1	Introduction	276
2	Theory and literature	279
3	Data, measures, and methods	283
3.1	Data	283
3.2	Dependent variables	284
3.3	Independent variables and covariates	285
3.4	Statistical approach	286
4	Results	287
4.1	Descriptive statistics	287
4.2	Multivariate analyses	288
5	Strengths and limitations	291
6	Conclusion and discussion	292
7	Acknowledgments	294
	References	295
	Appendix	302

The intergenerational association between migration and early childhood development in Germany: A comparative cross-sectional study of forced and voluntary migrant families (2004–2021)

Valeriia Heidemann¹

Louise Biddle¹

Sabine Zinn¹

Abstract

BACKGROUND

Family migration shapes early childhood development (ECD), but the link between parental voluntary versus forced migration experiences and ECD remains underexplored. Germany, with its diverse migration streams, offers an opportunity to investigate this interrelation.

OBJECTIVE

This study examines the link between parental migration status and ECD of children aged 2–4 and investigates whether the association between parental mental health and ECD differs by migration background.

METHODS

Using the German Socio-Economic Panel (2004–2021; $N = 1,826$), we fit multivariate linear regression models, comparing ECD between children of voluntary and forced migrants. ECD is measured using an adapted version of the Vineland Adaptive Behaviour Scales. Further models account for maternal and paternal mental health scores, using the Mental Component Summary (MCS).

RESULTS

Children of forced migrants showed lower early childhood development across all domains compared to children of voluntary migrants, with the largest gaps observed in gross motor skills ($\beta = -0.354$, 95% CI: $-0.472, -0.237$) and social relations ($\beta = -0.239$, 95% CI: $-0.356, -0.122$). Adjustment for parental mental health attenuated these differences but did not eliminate them. Interaction analyses provided no evidence that the association between parental mental health and ECD differed by migration background.

¹ Socio-Economic Panel (SOEP), German Institute for Economic Research (DIW Berlin), Berlin, Germany. Corresponding author: Valeriia Heidemann. Email: heidemann.91@gmx.de.

CONCLUSIONS

Developmental disparities associated with a forced migration background emerge early and persist beyond parental mental health, indicating that individual family resources do not fully explain these inequalities.

CONTRIBUTION

This study demonstrates that early developmental inequalities among children of forced migrants are not primarily driven by parental mental health, highlighting the importance of broader structural conditions.

1. Introduction

International migration has emerged as a defining phenomenon of the 21st century, representing both an individual and a collective response to crises such as economic instability, political conflicts, environmental disasters, and immediate threats to safety. At a societal level, migration reshapes demographic landscapes, influencing population size, age structure, and cultural diversity (Amran et al. 2019). Within this process, families are central to migration processes and children experience many of migration's consequences within the family context (Czaika, Bijak, and Prike 2021; de Haas 2021). To enable the migration of individual members or entire households, families must mobilise and reallocate financial, social, and emotional resources. These reallocations shape family structures, caregiving capacities, and resource distributions beyond the migration event. They are strongly linked to the conditions under which children of migrant families are later born and raised. They thus reveal families' adaptive capacities to respond to major transitions – a perspective central to family resilience frameworks (Walsh 2016).

Family resilience highlights how families navigate adversity by balancing stressors and disruptions with resources and coping strategies. While migration constitutes a critical life event, the intensity and nature of disruption associated with relocation differs substantially between voluntary and forced migration pathways. Voluntary migrants generally migrate with higher levels of strategic choice regarding the timing, destination, and conditions of their move, whereas the agency of forced migrants is substantially constrained by sudden threats, violence, or persecution. Their decisions are made under urgency and severe structural limitations, often accompanied by exposure to trauma, separation from family members, and prolonged uncertainty during resettlement (de Haas 2021; Owen 2024). Previous research demonstrates forced migrants to be exposed to emotional distress linked to family separation (Löbel and Jacobsen 2021), prolonged legal insecurity, barriers to labour market participation, and limited access to health and

social systems (Söhn 2013). The combination of stressors specific to forced migration and experiences of discrimination – affecting migrant groups more broadly – may undermine the resilience of forced migrant families by increasing cumulative stress and limiting access to resources (Schunck, Reiss, and Razum 2015). In contrast, voluntary migrants may experience fewer post-migration restrictions and can draw upon more stable resources to reorganise family routines. These circumstances create qualitatively different family disruptions between voluntary and forced migrants, which may affect future generations born in the country of residence, defined as second-generation migrants.

Early childhood is recognised as a crucial developmental period in life-course epidemiology, laying the foundation for future health, skills, and competencies – physical, cognitive, and emotional (Black et al. 2017). Early childhood interventions are widely recognised as effective tools for reducing developmental inequalities and promoting long-term health and human capital formation (Black et al. 2017; Richter et al. 2019). Early childhood development (ECD) encompasses the acquisition of core cognitive, socio-emotional, motor, and daily functioning skills during the first years of life.² These developmental processes are shaped by the quality of early environments, parent–child interactions, and exposure to stress, and they have long-term implications for health, educational attainment, and well-being across the life course (Daelmans et al. 2017). Prior studies show that parental migration experience is linked to children’s early development and educational attainment (Ceri et al. 2017; Führer et al. 2019; Gries, Redlin, and Zehra 2022; Gutmann et al. 2019). Given young children’s high dependence on caregivers, ECD reflects migrant families’ capacity to adapt to hardship and protect children’s well-being under conditions of structural adversity (Masten 2018; Walsh 2016).

Within migrant families, resilience involves mobilising material, social, and psychological resources, reorganising routines and roles in a new social context, and creating a sense of stability and continuity for children (Walsh 2016). Crucially, parental mental health functions as a key resource within this process (Conger and Donnellan 2007). When parents maintain good mental health, they are better able to provide nurturing care, sustain consistent parenting practices, and buffer children from stress (Conger and Donnellan 2007; Pierce et al. 2020). Conversely, impaired parental mental health can weaken resilience by reducing parents’ capacity to respond flexibly to challenges and undermining their ability to protect children’s developmental trajectories. In this study, parental mental health is primarily conceptualised as a family-level resource linking parental migration experiences to children’s early developmental outcomes. We examine whether the association between parental mental health and ECD differs

² Daily functioning skills are age-appropriate self-care and everyday competencies in areas such as dressing, feeding, and toileting, and basic autonomy in daily routines.

between forced and voluntary migrant families, reflecting potential conditioning by structural constraints.

Despite a growing body of research on the children of migrants, the implications of forced migration for ECD remain comparatively underexplored. Existing studies have examined how parental migration experiences are associated with the health and educational outcomes of children born in the country of residence across various stages of the life course (Loi et al. 2021; Mancenido, Williams, and Hajat 2020; Wallace, Hiam, and Aldridge 2023). While prior research has established that migration background is linked to ECD and later educational attainment (Ceri et al. 2017; Führer et al. 2019; Gries, Redlin, and Zehra 2022; Gutmann et al. 2019), relatively few studies have explicitly distinguished between voluntary and forced migration when examining developmental outcomes among the second generation.

Germany provides a notable case in point. More than one-fourth of its population has a migration background, whereas around 19% have their own migration experience (Statistisches Bundesamt 2024). Germany has a long-standing history of migration, including the recruitment of so-called guest workers from southern Europe and Turkey from the 1950s onward, repatriation from former Soviet Union countries, refugee migration from the former Yugoslavia and Romania in the 1990s, and skilled migration patterns associated with the expansion of the European Union. The country experienced a historically high influx of forced migrants in 2015 when it became the primary destination in the European Union for asylum seekers from the Middle East, especially Syria. More recently, Germany has hosted more than 1.2 million individuals fleeing the war in Ukraine since 2022 (Destatis 2024). These continuous and diverse migration streams shape Germany's demographic profile and offer an opportunity to examine how the migration experience – and the contexts in which it unfolds – affects family dynamics, parental well-being, and children's developmental outcomes (Spallek, Zeeb, and Razum 2011). In Germany, differential access to health and social systems between voluntary and involuntary migrants is enshrined in law: Asylum seekers are subject to the Asylum Seekers' Benefit Act for the first 36 months after arrival or until a positive asylum decision. This law restricts access to health services, social security provisions, and freedom of movement. Asylum seekers are initially housed in large, centralised reception centres and then dispersed into regions on a quota-based system. They are obliged to reside in the region in which the asylum application was lodged for up to three years following a positive decision. Such restrictions do not apply to migrants entering Germany with a visa or to forced migrants from Ukraine.

Our study aims to contribute to the existing research on children of voluntary and forced migrants in several ways. First, we strive to explore ECD outcomes in second-generation forced migrants compared to voluntary migrants, focusing on the ages 2–4, which fall into the toddlerhood and preschool stages. Second, we describe the ECD in

second-generation migrant groups using language, motor skills, daily skills, and socio-emotional development domains. Third, we conceptualise parental mental health as a key family-level resource within family resilience frameworks and examine whether differences in parental mental health help account for the associations between parental migration background and children's developmental outcomes. In addition, we assess whether the association between parental mental health and ECD differs between forced and voluntary migrant families, using migration background as an indicator of differing structural conditions under which family resources are mobilised. By examining both attenuation and effect heterogeneity, this study sheds light on how parental experiences of forced migration may be linked to young children's developmental trajectories beyond migration background alone.

Taken as a whole, this research situates ECD within a family resilience perspective, emphasising how parental migration experiences, mental health, and structural contexts jointly create opportunities and constraints for children's early development.

The remainder of this article is structured as follows: Section 2 reviews the theoretical frameworks and literature on ECD with a focus on forced and voluntary migrant families. Section 3 details the data, measures, and statistical approach used for the analysis. Section 4 presents the results, highlighting developmental differences and the role of parental mental health. Section 5 discusses the strengths and limitations of the study. Section 6 presents conclusions by connecting the findings to existing research, outlining policy implications and recommendations.

2. Theory and literature

Numerous empirical studies document strong associations between ECD and parental socioeconomic conditions as well as parental mental health (Mensah and Kiernan 2010; Pierce et al. 2020; Poulain, Vogel, and Kiess 2020). In addition, research on ECD among children of migrants suggests that migration background is associated with developmental outcomes. Findings indicate that children of migrant parents often exhibit delays in communication skills (Urquia et al. 2024; Washbrook et al. 2012) and face a higher risk of emotional and behavioural problems (Belhadj Kouider et al. 2014; Muggli et al. 2021) compared to their peers with native-born parents. At the same time, this literature emphasises substantial heterogeneity within migrant populations, suggesting that developmental outcomes vary according to families' available resources, migration experiences, and post-migration contexts.

In Germany, several studies have examined the well-being of children from migrant backgrounds (Kaiser and Bauer 2019; Nauck and Clauss 2009; Reimers et al. 2019; Stich et al. 2012; Will, Zeeb, and Baune 2005). Some research has placed a specific focus on

the health of refugee children in Germany (Buchmüller et al. 2020; Busch and Leyendecker 2019; Wenner et al. 2016), documenting higher rates of developmental delays and socio-emotional problems in this population. Wenner et al. (2016), for instance, report poorer general health, a higher prevalence of mental health challenges, incomplete vaccination status, and increased reliance on emergency medical care among refugee children. However, research explicitly examining ECD among children born in Germany to parents with a forced migration background remains scarce. As a result, little is known about whether and how migration-related disadvantages are transmitted intergenerationally during early childhood, a developmental phase that is particularly sensitive to family resources and caregiving conditions.

This study draws on two complementary theoretical frameworks to understand differences in ECD between children of forced and voluntary migrants: the life-course perspective on migrant health, and theories of parent–child interaction and development. From a life-course perspective, early exposures and conditions accumulate and interact over time to shape later health and developmental trajectories (Ben-Shlomo and Kuh 2002). The life-course perspective on migrant health (Spallek, Zeeb, and Razum 2011) emphasises that health and developmental outcomes are shaped by exposures accumulated across different stages of the life course, including experiences prior to migration, during migration, and throughout resettlement. Within this framework, the timing, duration, and context of migration-related stressors are central to understanding long-term health trajectories and developmental inequalities.

Importantly, the life-course perspective highlights that migration-related exposures do not end with the migrant generation but extend to their offspring. ECD among children of migrants is therefore shaped not only by post-migration conditions but also by parents' prior experiences of stress, adversity, and resource deprivation. The framework further underscores how unequal access to health care, systemic discrimination, family socioeconomic position, and parental health can structure children's developmental environments, providing a basis for understanding intergenerational inequalities linked to migration.

As a second theoretical perspective, this study draws on attachment theory (Ainsworth and Bowlby 1991) and family systems theory (Bowen 1978) to examine the role of parental mental health in shaping ECD among children of migrants. Together, these perspectives specify how family-level resources – particularly parental mental health – may shape the ways in which broader structural conditions are reflected in children's everyday developmental experiences. They therefore complement the life-course perspective by explaining within-family processes of adaptation, stress transmission, and caregiving under conditions of adversity.

Attachment theory underscores the importance of secure relationships between children and their primary caregivers for emotional stability, resilience, and cognitive

development. A large body of research demonstrates that the quality of parent–child interactions shapes multiple aspects of children’s development (Cooke et al. 2022; Kiernan and Huerta 2008). For example, when parents respond sensitively to children’s verbal cues and attempt to engage, they create a secure base that supports exploration and learning, thereby fostering the development of communication and socio-emotional skills. Such caregiving behaviours – characterised by responsiveness, emotional availability, and consistency – are associated with favourable developmental outcomes across diverse contexts (Cabral de Mello 2006; Madigan et al. 2019). A recent systematic review further indicates that parental mental health plays a central role in shaping attachment relationships between adults and children (Risi, Pickard, and Bird 2021).

Family systems theory highlights how parental mental health is embedded within broader family functioning and stress processes. The theory emphasises the interconnectedness of family members, suggesting that parental psychological strain can disrupt family routines, increase overall stress, and thereby hinder children’s development. This perspective aligns with evidence highlighting the relevance of both maternal and paternal mental health for children’s developmental outcomes (Irwin, Siddiqi, and Hertzman 2007). Empirical studies drawing on this perspective show that socioeconomic disadvantage and chronic stress can undermine parental sensitivity and reduce the provision of cognitive and emotional stimulation (Conger and Donnellan 2007; Kalil and Ryan 2020; Mesman, van IJzendoorn, and Bakermans-Kranenburg 2012). Complementing family stress perspectives, family investment models emphasise how parents’ psychological and socioeconomic resources shape children’s early learning environments and developmental opportunities (Magnuson and Duncan 2016). Evidence further suggests that poor socioeconomic conditions may amplify the developmental consequences of reduced parental sensitivity, as children in more constrained environments are exposed to additional stressors that heighten their reliance on supportive caregiving (Cooke et al. 2022).

Applied to migrant families, attachment and family systems theories suggest that migration-related stressors may influence ECD indirectly through their impact on parental mental health and family functioning. These mechanisms are particularly relevant in the context of forced migration, where cumulative stress exposures and structural constraints may challenge parents’ capacity to sustain emotionally supportive and developmentally enriching caregiving environments. As a result, parental mental health functions as a key family-level resource within resilience processes, shaping how families respond to adversity and support children’s early development.

Children’s age strongly shapes their vulnerability and resilience to disruptive life events. Early childhood is characterised by high dependency on parents and rapid developmental change, rendering children particularly sensitive to parental resources and

stress exposure. This heightened dependency underscores the importance of parental circumstances for children's developmental outcomes.

We therefore hypothesise:

H1: *Children aged 2–4 born to forced migrant parents exhibit lower levels of ECD across communication, daily functioning, motor, and socio-emotional domains compared to children of voluntary migrants.*

Within family resilience frameworks, parental mental health constitutes a central psychological resource that shapes a family's capacity to respond to stress, maintain caregiving routines, and provide emotionally supportive environments for young children. Building on the life-course perspective as well as attachment and family systems theories, parental mental health is conceptualised as a family-level resource that may partially account for the association between parental migration background and ECD.

We therefore hypothesise:

H2: *Parental mental health partially accounts for the association between parental migration background (forced vs. voluntary) and ECD.*

While parental mental health represents an important family-level resource, family resilience frameworks emphasise that the effectiveness of such resources depends on the broader structural context in which families operate. Parental mental health does not automatically translate into equivalent caregiving practices or developmental support across social groups if families face differing levels of institutional access, economic security, and social support.

In the context of forced migration, structural constraints – such as insecure housing, restricted access to the labour market, and reliance on public services – may limit families' opportunities to act on parental mental health, thereby constraining the extent to which psychological well-being can be translated into stable caregiving routines and sustained developmental investments for children. By contrast, families with greater economic autonomy and institutional access may be better positioned to convert parental mental health into developmentally supportive environments.

Moreover, the association between parental mental health and ECD may not be linear. Higher levels of parental mental health may function as a buffering resource that supports coping, routine maintenance, and engagement with available resources under conditions of adversity. Conversely, low levels of parental mental health may constitute an additional barrier by limiting parents' capacity to seek support, navigate institutional systems, or maintain consistent caregiving practices – particularly in contexts where alternative private or social resources are scarce.

Based on this perspective, we test whether the association between parental mental health and ECD varies by migration background and whether potential asymmetries exist across different levels of parental mental health:

H3a: *The association between parental mental health and ECD differs between children of forced migrants and voluntary migrants.*

H3b: *Low levels of parental mental health are more strongly associated with adverse ECD outcomes than higher levels of parental mental health, particularly among children of forced migrants.*

3. Data, measures, and methods

3.1 Data

The empirical analysis is based on the German Socio-Economic Panel (SOEP), an ongoing, nationally representative longitudinal study of private households in Germany since 1984 (Goebel et al. 2019). To ensure cross-sectional representativeness amidst migration influxes to Germany, the SOEP was supplemented with additional migration-focused samples, including the IAB-SOEP Migration Samples and the IAB-BAMF-SOEP Survey of Refugees. The IAB-SOEP Migration Samples draw on register information from the German Federal Employment Agency and include individuals who immigrated to Germany after 1995 and second-generation immigrants (Brücker et al. 2014). The IAB-BAMF-SOEP Survey of Refugees is an annual survey that targets individuals who entered Germany between January 2013 and September 2022 and applied for asylum, regardless of the outcome of their applications (Brücker et al. 2016). The target population was sampled using the Central Register of Foreigners, in which refugees and asylum seekers residing in Germany are recorded. In the initial survey wave, conducted in 2016, researchers collected data from 3,336 households, resulting in 4,527 face-to-face interviews with individual adult respondents.

Each household participant answered a personal questionnaire. This questionnaire provided information on a wide range of topics, including individuals' health and migration history. Additionally, respondents filled in the children's questionnaire, providing information on children living in the household. The combination of these two questionnaires provides a unique opportunity to study the impact of parental characteristics on children's well-being. Detailed information on children is available from 2004 onward.

The ECD for each child was measured only once between ages 2 and 4. The models are built on a pooled cross-sectional sample. The sample utilises all available waves (2004–2021) and contains 1,826 observations. We included only children born in Germany to maintain consistency in the developmental environment. This selection ensured that external factors related to birthplace and the process of migration did not confound the results. Furthermore, we included only children with at least one parent with migration experience and divided them into two groups: children of voluntary migrants and children of forced migrants.

3.2 Dependent variables

There is no single framework to assert ECD. Studies employ various metrics to assess distinct facets of children's development. Here we adopt an adaptive behaviour model, encompassing a broad range of developmental indicators reflecting personal and social functioning (Price, Morris, and Costello 2018).

We use 20 items derived from the Vineland Adaptive Behaviour Scales (VABS) (Schmiade, Spieß, and Tietze 2008), based on parental assessments of children's behaviour, to measure five key domains:

- **Communication Skills:** a child's ability to understand and express language, including both verbal and nonverbal communication
- **Daily Living Skills:** a child's ability to perform routine tasks, such as eating, dressing, and attending to personal hygiene
- **Gross Motor Skills:** a child's physical coordination and movement abilities, including activities such as walking, running, and climbing
- **Fine Motor Skills:** a child's precision and coordination in small movements, such as grasping objects, drawing, or manipulating small items
- **Social Relations:** a child's ability to interact effectively and build relationships with peers and adults

Within each domain, variables were originally coded on a three-point scale: 1 = yes, 2 = to some extent, 3 = no. To enhance interpretability, these scores were reversed so that higher values indicate stronger abilities (3 = strongest, 1 = weakest). For each domain, we included only items consistently asked across all respondents and survey waves. A detailed overview of the items and their grouping is provided in Table A-1. We then calculated a composite score for each domain by summing the recoded item scores and dividing that sum by the total number of items in the domain (Dunnette and Hoggatt

1957). This approach yields five domain-specific indices that serve as our dependent variables.

3.3 Independent variables and covariates

Our primary independent variable distinguishes between children of voluntary and forced migrants. The children of forced and voluntary migrants were identified through SOEP-generated variables that define the voluntary or forced migration background based on a question about the reason for migration in the questionnaire and on records of the Central Register of Foreigners. Forced migrants are individuals who migrated to Germany to apply for asylum and were registered as asylum seekers, irrespective of whether refugee status was later granted.

Parental mental health was measured using the Mental Component Summary (MCS) scale, which is assessed biennially (2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, and 2020). The scale is derived from the Short Form-12 (SF-12) questionnaire (Andersen et al. 2007). The MCS is a standardised scale ranging from 0 to 100, with a mean of 50 and a standard deviation of 10, where higher scores reflect better mental health. To address missing MCS values for specific years, we employed interpolation using values from the surrounding observation years for each individual. Recognising that child development unfolds over time, we used the MCS value from the year preceding the child's assessment to better capture the temporal relationship between parental mental health and ECD. We included both maternal and paternal MCS scores to assess potential differences in their relative influences on ECD.

Parental education was classified using the ISCED11 scale, dividing participants into three groups: those with a primary education (low); those with a lower secondary, upper secondary, or postsecondary education (middle); and those with a short-cycle tertiary education or a bachelor's, master's, or doctoral degree (high). Education is used as the main indicator of socioeconomic status because it reflects long-term resources and remains stable over the life course, while occupational status among migrant parents – particularly forced migrants – is often unstable or weakly informative due to structural barriers to labour market participation (Cutler and Lleras-Muney 2010).

We also included a measure of child health, captured through parental responses to the statement "I'm worried about my child's health," rated on a four-point scale (1 = agree completely to 4 = disagree completely). Child health serves as a moderating factor, influencing the extent to which parental factors impact various aspects of child development.

Additional controls included the child's age (in months), the child's sex (male/female), and the survey year to account for changes in survey conditions and measurement context across waves

3.4 Statistical approach

Our first hypothesis (H1) proposed that children of forced migrant parents aged 2–4 experience lower levels of ECD compared to children of voluntary migrants. To test this hypothesis, we analysed five developmental domains – communication skills, daily living skills, gross and fine motor skills, and social skills – while adjusting for child age, sex, and survey year. We employed multiple linear regression models to estimate the association between parental forced migration background and each developmental index, with 95% confidence intervals used to assess differences between groups. Early childhood development indices and continuous predictors (e.g., parental mental health and child age) were standardised to facilitate comparability across domains. Binary variables were included as unstandardised indicator variables.

To test the second and third hypotheses, we included maternal and paternal mental health scores as family-level variables in separate models for each of the five developmental outcomes, examining changes in the association between parental migration background and early childhood development and testing for effect heterogeneity by migration background. All models were adjusted respectively for maternal and paternal education and child health. Maternal and paternal mental health were analysed in separate models to account for differences in sample composition and to avoid collinearity while maintaining conceptual clarity regarding parental mental health as a family-level resource. In addition, we formally tested differences in parental mental health between children of forced and voluntary migrants using adjusted linear regression models with 95% confidence intervals. To assess whether associations between parental mental health and ECD differed by migration background, we estimated interaction terms between parental mental health and migration status. In additional exploratory analyses, piecewise linear specifications were used to examine potential asymmetries across lower versus higher levels of parental mental health.

Before finalising the models, diagnostic tests were conducted to check for multicollinearity (using variance inflation factors) and to verify that residual distributions met the assumptions of linear regression (via residual plots). Missing data were handled using multiple imputations by chained equations (MICE), generating 30 imputations. Continuous variables with missing values were imputed using linear regression, while ordinal and categorical variables were imputed using ordered and multinomial logistic regression models, respectively. Key predictors, including child age, sex, and parental

migration background, were included in the imputation models to preserve relationships between variables. The proportion of missingness is detailed in Table A-2.

After imputation, the final analytical sample consisted of 1,826 child–mother dyads and 1,506 child–father dyads. All analyses were conducted using STATA 17.

4. Results

4.1 Descriptive statistics

Descriptive characteristics of the analytical sample by parental migration background are presented in Table 1. Children of forced and voluntary migrants differed markedly in several parental characteristics. Forced migrant parents exhibited substantially lower levels of educational attainment, with a higher proportion in the lowest education category and fewer parents with tertiary education compared to voluntary migrants. The gender composition of children was comparable between groups, while forced migrant families were slightly more likely to report poorer child health. Average levels of maternal and paternal mental health were broadly similar across groups, with overlapping distributions. These descriptive patterns highlight differences in parental resources between forced and voluntary migrant families at the descriptive level.

Table 1: Descriptive statistics by group

Variable	Voluntary migrants				Forced migrants			
	Mean	SD	min	max	Mean	SD	min	max
Communication skills	2.46	0.46	1.0	3.0	2.45	0.49	1.0	3.0
Daily living skills	2.38	0.47	1.0	3.0	2.39	0.51	1.0	3.0
Social relations	2.56	0.41	1.0	3.0	2.51	0.43	1.0	3.0
Gross motor skills	2.82	0.39	1.0	3.0	2.68	0.48	1.0	3.0
Fine motor skills	2.34	0.56	1.0	3.0	2.34	0.57	1.0	3.0
Age of child (months)	34.86	3.94	25.0	44.0	39.13	4.38	27.0	49.0
Health concerns	3.27	1.01	1.0	4.0	3.18	1.17	1.0	4.0
Maternal mental health	49.94	8.63	15.76	67.4	48.8	9.65	15.86	77.0
Paternal mental health	52.53	7.61	24.56	72.17	51.18	9.86	16.93	73.44

Table 1a: Descriptive statistics: Categorical variable by group

Variable	Voluntary migrants		Forced migrants		Total	
	%	N	%	N	%	N
<i>Child's sex</i>						
Male	50.8	604	54.9	350	52.3	954
Female	49.2	585	45.1	287	47.7	872
<i>Mother's education</i>						
Primary	5.5	56	44.1	274	20.1	330
Secondary	62.0	632	41.2	256	54.1	888
Tertiary	32.5	331	14.7	91	25.7	422
<i>Father's education</i>						
Primary	5.38	36	38.48	259	21.98	295
Secondary	67.71	453	47.40	319	57.53	772
Tertiary	26.91	180	14.12	95	20.49	275

Note: In the dataset for child–father dyads, the values for all child characteristics differ marginally from those provided in this table, which is based on child–mother dyads.

4.2 Multivariate analyses

Detailed results for all developmental domains are presented in Table 2. Children of forced migrants demonstrated lower performance than children of voluntary migrants across all developmental domains after adjustment for child age, sex, and survey year.

In communication skills, children of forced migrants scored on average 0.198 standard deviations lower than children of voluntary migrants (95% CI: -0.313 , -0.083 ; Table 2). In social relations, developmental scores were 0.239 standard deviations lower among children of forced migrants (95% CI: -0.356 , -0.122). Daily living skills were likewise lower, with an estimated difference of -0.225 standard deviations (95% CI: -0.337 , -0.113).

The largest difference was observed for gross motor skills. Children of forced migrants scored 0.354 standard deviations lower than children of voluntary migrants (95% CI: -0.472 , -0.237). In fine motor skills, the estimated difference amounted to -0.168 standard deviations (95% CI: -0.283 , -0.054).

Across all developmental domains, child age was positively associated with developmental outcomes, while girls scored higher than boys in communication skills, social relations, daily living skills, and fine motor skills. No clear sex differences were observed for gross motor skills.

Table 2: Standardised beta coefficients for predicting ECD by parental migration experience

	Communication skills	Social relations	Daily living skills	Gross motor skills	Fine motor skills
Forced migrants (ref. voluntary migrants)	-0.198 [-0.313, -0.083]	-0.239 [-0.356, -0.122]	-0.225 [-0.337, -0.113]	-0.354 [-0.472, -0.237]	-0.168 [-0.283, -0.054]
Age (months)	0.266 [0.216, 0.316]	0.205 [0.155, 0.256]	0.331 [0.283, 0.379]	0.104 [0.053, 0.155]	0.295 [0.246, 0.345]
Female (ref. male)	0.270 [0.181, 0.360]	0.200 [0.109, 0.291]	0.388 [0.302, 0.475]	-0.065 [-0.156, 0.026]	0.242 [0.153, 0.331]
Constant	45.453 [18.184, 72.722]	39.767 [13.282, 66.253]	22.961 [-2.166, 48.088]	37.024 [10.631, 63.417]	44.642 [18.202, 71.082]
Observations	1,826	1,826	1,826	1,826	1,826

To assess the role of parental mental health, we first examined differences in average maternal mental health between forced and voluntary migrant parents using adjusted linear regression models controlling for child age, sex, and survey year. Forced migrant parents reported, on average, 0.13 standard deviations lower maternal mental health than voluntary migrants (95% CI: -0.28 to 0.01), indicating a small difference estimated with considerable uncertainty. Against this background, subsequent analyses examined whether parental mental health constitutes a relevant family-level resource for early childhood development and whether its association varies by migration background.

Table 3 presents associations between maternal mental health and ECD. Higher levels of maternal mental health were positively associated with selected developmental domains.

A 1.0 standard deviation increase in maternal mental health was associated with a 0.082 standard deviation higher score in communication skills (95% CI: 0.024, 0.139) and a 0.109 standard deviation higher score in daily skills (95% CI: 0.059, 0.159). Associations for social relations, gross motor skills, and fine motor skills were smaller in magnitude, with confidence intervals including or closely approaching zero.

After adjustment for maternal mental health, differences in early childhood development between children of forced and voluntary migrants were reduced in magnitude but remained evident for several domains. For communication skills, children of forced migrants scored 0.132 standard deviations lower than children of voluntary migrants (95% CI: -0.256, -0.008). For daily living skills, the estimated difference was -0.189 standard deviations (95% CI: -0.309, -0.068), and for gross motor skills it was -0.255 standard deviations (95% CI: -0.382, -0.128). For social relations and fine motor skills, confidence intervals included zero.

Corresponding models for paternal mental health showed positive associations with several developmental domains, with effect sizes generally comparable in magnitude to those observed for maternal mental health, although patterns varied across domains (see Table A-3).

Table 3: Standardised beta coefficients for predicting ECD by maternal characteristics

	Communication skills	Social relations	Daily living skills	Gross motor skills	Fine motor skills
Forced migrants (ref. voluntary migrants)	−0.132	−0.113	−0.189	−0.255	−0.092
	[−0.256, −0.008]	[−0.240, 0.014]	[−0.309, −0.068]	[−0.382, −0.128]	[−0.216, 0.032]
Age (months)	0.274	0.212	0.338	0.112	0.301
	[0.224, 0.323]	[0.161, 0.262]	[0.290, 0.386]	[0.062, 0.163]	[0.252, 0.351]
Female (ref. male)	0.267	0.199	0.382	−0.069	0.233
	[0.178, 0.357]	[0.109, 0.289]	[0.296, 0.468]	[−0.160, 0.021]	[0.145, 0.322]
Maternal mental health (standardised)	0.082	0.045	0.109	0.064	0.046
	[0.024, 0.139]	[−0.016, 0.106]	[0.059, 0.159]	[0.014, 0.114]	[−0.013, 0.105]
Constant	47.207	39.682	21.606	37.335	39.919
	[20.087, 74.328]	[13.102, 66.263]	[−3.505, 46.718]	[10.936, 63.733]	[13.304, 66.534]
Observations	1,826	1,826	1,826	1,826	1,826

Notes: Adjusted for maternal education, child health, and survey year; 95% confidence intervals in brackets.

To assess whether associations between parental mental health and ECD differed by migration background, we estimated interaction terms between forced migration status and maternal mental health (see Table A-4).

Across all developmental domains, interaction coefficients between maternal mental health and forced migration background were small in magnitude and showed no consistent pattern. Confidence intervals for all interaction terms spanned zero, providing no evidence that the association between maternal mental health and early childhood development differed between children of forced and voluntary migrants.

Additional exploratory analyses examined whether associations between maternal mental health and ECD differed at lower versus higher levels of mental health using piecewise linear specifications (Table A-5).

For maternal mental health below the sample mean, estimated associations ranged from 0.081 for communication skills (95% CI: −0.050, 0.211) to 0.159 for daily living skills (95% CI: 0.041, 0.277). Although maternal mental health below the mean was positively associated with daily skills, interaction terms consistently included zero, indicating no evidence of differential effects by migration background.

For maternal mental health above the sample mean, associations ranged from 0.042 to 0.113 standard deviations across domains, with confidence intervals again including

zero. Interaction terms between forced migration background and higher levels of maternal mental health also consistently included zero.

These analyses provide no evidence that low levels of parental mental health are disproportionately detrimental for ECD among children of forced migrants. Nor do they provide evidence of asymmetric effects across the mental health distribution.

Finally, a formal mediation analysis provided no evidence that parental mental health mediates the association between forced migration background and early childhood development. Indirect effects were small across all developmental domains for both maternal and paternal mental health, with Sobel *z*-values below 1.96 and *p*-values ranging from 0.10 to 0.79.

5. Strengths and limitations

This study has several notable strengths. The study combines children's developmental characteristics with parental migration experiences and mental health, explicitly distinguishing between children of forced and voluntary migrants. Hence it enables a nuanced understanding of how qualitatively different migration pathways shape early developmental outcomes. The study utilises a nationally representative sample, ensuring robust and generalisable findings. It offers a detailed assessment of children's skills across multiple developmental domains, including communication, daily living, social, gross motor, and fine motor skills. It provides valuable insights into skill development in second-generation children of forced migrants.

Despite its strengths, this study has some limitations. First, the assessment of children's development relies on parental reports, which may introduce subjectivity and bias in evaluating children's skills. Similarly, the child health control variable is based on parental responses regarding worries about a child's health rather than an objective measure of health status. These responses may reflect parental tendencies to worry rather than the actual health status of their children. As parental worries may be associated with parental mental health, parents with poorer mental health may systematically underestimate their child's health, which could lead to an overestimation of the association between parental mental health and ECD outcomes, potentially limiting its effectiveness as a control variable. Second, the data on parental mental health are available only on a biennial basis. The interpolation of data does not capture year-to-year variations in parental mental health, potentially affecting the precision of our estimates and limiting our ability to analyse trends or changes that may occur within the intervening years. Also, in our analysis we were only able to account for parents who lived in the same household as the child, as data on absent parents, such as those residing in another country, were not available. Given that family separation is more prevalent among forced

migrants (Löbel and Jacobsen 2021), this may introduce differential selectivity between the two groups, which should be considered when interpreting the results. While the absence of parents is presumably relevant to children's health, exploring this aspect requires additional data and is left for future research. Another limitation is the cross-sectional nature of the data, which does not allow for a longitudinal perspective. This limits the causal interpretation of the role of parental mental health in children's development, as we cannot establish that mental health directly impacts development but can only identify an existing association. Furthermore, the design limits the ability to examine critical indicators at birth, such as low birth weight, preterm birth, or other adverse pregnancy outcomes, which can have a strong impact on children's early development.

6. Conclusion and discussion

This paper advances our understanding of early childhood development among second-generation migrants in Germany by explicitly distinguishing between children of forced and voluntary migrants and by conceptualising parental mental health as a family-level resource within a resilience framework. Using population-based data, we document developmental disadvantages among children of forced migrants across five key developmental domains.

The magnitude of these developmental gaps – on the order of roughly 0.17 to 0.35 standard deviations across domains – is commonly considered substantively meaningful in population-based developmental research (Black et al. 2017; Duncan et al. 2012). The largest differences were observed in gross motor skills and social relations, domains that are closely linked to children's physical engagement with their environment and early social integration (Daelmans et al. 2017). These findings indicate that developmental inequalities associated with a forced migration background emerge already in toddlerhood and early preschool age, well before formal schooling begins. In this respect, the results extend prior evidence on early developmental disadvantages among children with migration backgrounds by highlighting additional disparities linked specifically to forced migration experiences (Washbrook et al. 2012; Urquia et al. 2024).

Accounting for parental mental health attenuated some of the estimated differences in early childhood development by migration background, indicating that parental mental health constitutes one relevant family-level correlate of early development. Consistent with previous research, better parental mental health – particularly maternal mental health – was associated with more favourable outcomes in selected developmental domains, notably communication and daily living skills. These domains depend strongly on sustained parental engagement, emotional availability, and everyday interaction, which

are known to be sensitive to parents' psychological well-being (Conger and Donnellan 2007; Pierce et al. 2020). However, developmental gaps – especially in gross motor skills and daily living skills – remained evident after accounting for parental mental health. Moreover, given that differences in average parental mental health between forced and voluntary migrant parents were small, the observed disparities in early childhood development cannot be explained by parental mental health levels alone. This pattern aligns with family stress and family investment models, which emphasise that parental psychological resources matter for child development but operate alongside broader socioeconomic and structural constraints (Conger and Donnellan 2007; Magnuson and Duncan 2016).

The persistence of developmental inequalities after adjustment for parental mental health underscores the importance of broader structural conditions associated with forced migration. Families with a forced migration background are often exposed to cumulative disadvantages in the country of residence, including housing instability, restricted access to early child care, limited opportunities for parental labour market integration, and barriers to health and social services (Ambrosetti et al. 2021; Kosyakova and Brenzel 2020; Walther et al. 2020). From a life-course perspective, such contextual factors may shape children's developmental opportunities from birth onward by constraining families' ability to translate individual resources – such as parental mental health – into developmental advantages for their children (Ben-Shlomo and Kuh 2002).

Motivated by these theoretical considerations, we examined whether the association between parental mental health and early childhood development differs between children of forced and voluntary migrants and whether low levels of parental mental health are particularly detrimental under conditions of forced migration. Neither hypothesis was supported by the data. Interaction analyses provided no evidence that associations between parental mental health and early childhood development vary systematically by migration background, and piecewise models revealed no asymmetric associations across lower versus higher levels of parental mental health. These null findings are substantively informative, suggesting that parental mental health operates in a broadly similar manner across migration groups and does not amplify or buffer migration-related developmental inequalities in a group-specific way.

Rather than indicating differential “returns” to parental mental health, these findings point to the presence of additional structural and contextual factors associated with forced migration that shape children's early developmental environments independently of parental psychological well-being (Beiser and Hou 2001; Schunck, Reiss, and Razum 2015). In this sense, parental mental health appears to function as a general family-level resource rather than a migration-specific protective factor.

Maternal and paternal mental health were examined in parallel in this study as family-level resources relevant to early childhood development, without the aim of

directly comparing their relative importance. The findings indicate that both maternal and paternal mental health are associated with selected developmental domains, underscoring the relevance of considering the mental health of both parents when studying early childhood development. This perspective aligns with research emphasising that early developmental environments are shaped by multiple caregivers and family processes even though patterns of involvement and available measures may differ across parents (Irwin, Siddiqi, and Hertzman 2007).

Taken together, the findings suggest that while parental mental health constitutes an important family-level resource for early childhood development, it does not fully account for developmental inequalities between children of forced and voluntary migrants. Policies aimed at reducing early developmental disparities should therefore combine mental health support for parents with measures addressing the broader structural conditions faced by forced migrant families. In particular, early access to high-quality child care, stable housing, and integrated family support services may be critical for mitigating developmental gaps that emerge in early childhood (Black et al. 2017; Richter et al. 2019).

7. Acknowledgments

This research was supported in part by the German Research Foundation in the scope of the research project SUARE (grant ZI 1535/4-1).

References

- Ainsworth, M.D.S. and Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist* 46(4): 331–341. doi:10.1037/0003-066X.46.4.333.
- Ambrosetti, E., Dietrich, H., Kosyakova, Y., and Patzina, A. (2021). The impact of pre- and postarrival mechanisms on self-rated health and life satisfaction among refugees in Germany. *Frontiers in Sociology* 6: 693518. doi:10.3389/fsoc.2021.693518.
- Amran, G., Bélanger, A., Conte, A., Gailey, N., Ghio, D., Grapsa, E., Jensen, K., Loichinger, E., Marois, G., Muttarak, R., Potančoková, M., Sabourin, P., and Stonawski, M. (2019). *Demographic scenarios for the EU: Migration, population and education*. Luxembourg: Publications Office. doi:10.2760/590301.
- Andersen, H.H., Mühlbacher, A., Nübling, M., Schupp, J., and Wagner, G.G. (2007). Computation of standard values for physical and mental health scale scores using the SOEP version of SF-12v2. *Schmollers Jahrbuch - Journal of Applied Social Science Studies* 127(1): 171–182. doi:10.3790/schm.127.1.171.
- Beiser, M. and Hou, F. (2001). Language acquisition, unemployment and depressive disorder among Southeast Asian refugees: A 10-year study. *Social Science and Medicine* 53(10): 1321–1334. doi:10.1016/S0277-9536(00)00412-3.
- Belhadj Kouider, E., Koglin, U., and Petermann, F. (2014). Emotional and behavioral problems in migrant children and adolescents in Europe: A systematic review. *European Child and Adolescent Psychiatry* 23(6): 373–391. doi:10.1007/s00787-013-0485-8.
- Ben-Shlomo, Y. and Kuh, D. (2002). A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology* 31(2): 285–293. doi:10.1093/ije/31.2.285.
- Black, M.M., Walker, S.P., Fernald, L.C.H., Andersen, C.T., DiGirolamo, A.M., Lu, C., McCoy, D.C., Fink, G., Shawar, Y.R., Shiffman, J., Devercelli, A.E., Wodon, Q.T., Vargas-Barón, E., and Grantham-McGregor, S. (2017). Early childhood development coming of age: Science through the life course. *The Lancet* 389(10064): 77–90. doi:10.1016/S0140-6736(16)31389-7.
- Bowen, M. (1978). *Family therapy in clinical practice*. New York: Jason Aronson, Inc.

- Brücker, H., Kroh, M., Bartsch, S., Goebel, J., Kühne, S., Liebau, E., Trübswetter, P., Tucci, I., and Schupp, J. (2014). The new IAB-SOEP migration sample: An introduction into the methodology and the contents. (SOEP Survey Papers. Series C 216: Series C - Data Documentations). Berlin: IAB.
- Brücker, H., Rother, N., Schupp, J., von Gostomski, C.B., Böhm, A., Fendel, T., Friedrich, M., Giesselmann, M., Kosyakova, Y., Kroh, M., Kühne, S., Liebau, E., Richter, D., Romiti, A., Schacht, D., Scheible, J.A., Schmelzer, P., Siegert, M., Sirries, S., ... Vallizadeh, E. (2016). IAB-BAMF-SOEP refugee survey: Forced migration, arrival in Germany, and first steps toward integration. (Edition 5|2016 of the Brief Analyses of the Migration, Integration and Asylum Research Centre of the Federal Office for Migration and Refugees). Nuremberg: BAMF.
- Buchmüller, T., Lembcke, H., Ialuna, F., Busch, J., and Leyendecker, B. (2020). Mental health needs of refugee children in specialized early education and care programs in Germany. *Journal of Immigrant and Minority Health* 22(1): 22–33. doi:10.1007/s10903-019-00896-4.
- Busch, J. and Leyendecker, B. (2019). Socialization and development of refugee children: Chances of childcare. In: Tulviste, T., Best, D.L., and Gibbons, J.L. (eds.). *Children's social worlds in cultural context*. Cham: Springer International Publishing: 187–200. doi:10.1007/978-3-030-27033-9_14.
- Cabral de Mello, M. (2006). Responsive parenting: Interventions and outcomes. *Bulletin of the World Health Organization* 84(12): 991–998. doi:10.2471/BLT.06.030163.
- Ceri, V., Özlü-Erkilic, Z., Özer, Ü., Kadak, T., Winkler, D., Dogangün, B., and Akkaya-Kalayci, T. (2017). Mental health problems of second generation children and adolescents with migration background. *International Journal of Psychiatry in Clinical Practice* 21(2): 142–147. doi:10.1080/13651501.2017.1291820.
- Conger, R.D. and Donnellan, M.B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology* 58(1): 175–199. doi:10.1146/annurev.psych.58.110405.085551.
- Cooke, J.E., Deneault, A., Devereux, C., Eirich, R., Fearon, R.M.P., and Madigan, S. (2022). Parental sensitivity and child behavioral problems: A meta-analytic review. *Child Development* 93(5): 1231–1248. doi:10.1111/cdev.13764.
- Cutler, D.M., and Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *Journal of Health Economics* 29(1): 1–28. doi:10.1016/j.jhealeco.2009.10.003.

- Czaika, M., Bijak, J., and Prike, T. (2021). Migration decision-making and its key dimensions. *The ANNALS of the American Academy of Political and Social Science* 697(1): 15–31. doi:10.1177/00027162211052233.
- Daelmans, B., Darmstadt, G. L., Lombardi, J., Black, M. M., Britto, P. R., Lye, S., Dua, T., Bhutta, Z. A., and Richter, L. M. (2017). Early childhood development: the foundation of sustainable development. *The Lancet* 389(10064): 9–11. doi:10.1016/S0140-6736(16)31659-2.
- de Haas, H. (2021). A theory of migration: The aspirations-capabilities framework. *Comparative Migration Studies* 9(1): 8. doi:10.1186/s40878-020-00210-4.
- Destatis (2024). Starker Zuwachs an ukrainischen Staatsbürgern seit Ende Februar 2022. <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/ukraine.html>.
- Duncan, G.J., Magnuson, K., Kalil, A., and Ziol-Guest, K. (2012). The importance of early childhood poverty. *Social Indicators Research* 108(1): 87–98. doi:10.1007/s11205-011-9867-9.
- Dunnette, M.D. and Hoggatt, A.C. (1957). Deriving a composite score from several measures of the same attribute. *Educational and Psychological Measurement* 17(3): 423–434. doi:10.1177/001316445701700309.
- Führer, A., Tiller, D., Brzoska, P., Korn, M., Gröger, C., and Wienke, A. (2019). Health-related disparities among migrant children at school entry in Germany. How does the definition of migration status matter? *International Journal of Environmental Research and Public Health* 17(1): 212. doi:10.3390/ijerph17010212.
- Goebel, J., Grabka, M.M., Liebig, S., Kroh, M., Richter, D., Schröder, C., and Schupp, J. (2019). The German Socio-Economic Panel (SOEP). *Jahrbücher Für Nationalökonomie und Statistik* 239(2): 345–360. doi:10.1515/jbnst-2018-0022.
- Gries, T., Redlin, M., and Zehra, M. (2022). Educational assimilation of first-generation and second-generation immigrants in Germany. *Journal of International Migration and Integration* 23(2): 815–845. doi:10.1007/s12134-021-00863-9.
- Gutmann, M.T., Aysel, M., Özlü-Erkilic, Z., Popow, C., and Akkaya-Kalayci, T. (2019). Mental health problems of children and adolescents, with and without migration background, living in Vienna, Austria. *Child and Adolescent Psychiatry and Mental Health* 13(1): 35. doi:10.1186/s13034-019-0295-y.

- Irwin, L.G., Siddiqi, A., and Hertzman, C. (2007). *Early child development: A powerful equalizer. Final report for the World Health Organization's Commission on the Social Determinants of Health*. Geneva: World Health Organization.
- Kaiser, M. and Bauer, J.M. (2019). Preschool child care and child well-being in Germany: Does the migrant experience differ? *Social Indicators Research* 144(3): 1367–1390. doi:10.1007/s11205-019-02064-5.
- Kalil, A. and Ryan, R. (2020). Parenting practices and socioeconomic gaps in childhood outcomes. *The Future of Children* 30(1): 29–54. doi:10.1353/foc.2020.0004.
- Kiernan, K.E. and Huerta, M.C. (2008). Economic deprivation, maternal depression, parenting and children's cognitive and emotional development in early childhood. *The British Journal of Sociology* 59(4): 783–806. doi:10.1111/j.1468-4446.2008.00219.x.
- Kosyakova, Y. and Brenzel, H. (2020). The role of length of asylum procedure and legal status in the labour market integration of refugees in Germany. *Soziale Welt* 71(1–2): 123–159. doi:10.5771/0038-6073-2020-1-2-123.
- Löbel, L.M. and Jacobsen, J. (2021). Waiting for kin: A longitudinal study of family reunification and refugee mental health in Germany. *Journal of Ethnic and Migration Studies* 47(13): 2916–2937. doi:10.1080/1369183X.2021.1884538.
- Loi, S., Pitkänen, J., Moustgaard, H., Myrskylä, M., and Martikainen, P. (2021). Health of immigrant children: The role of immigrant generation, exogamous family setting, and family material and social resources. *Demography* 58(5): 1655–1685. doi:10.1215/00703370-9411326.
- Madigan, S., Prime, H., Graham, S.A., Rodrigues, M., Anderson, N., Khoury, J., and Jenkins, J.M. (2019). Parenting behavior and child language: A meta-analysis. *Pediatrics* 144(4). doi:10.1542/peds.2018-3556.
- Magnuson, K. and Duncan, G.J. (2016). Can early childhood interventions decrease inequality of economic opportunity? *RSF: The Russell Sage Foundation Journal of the Social Sciences* 2(2): 123–141. doi:10.7758/rsf.2016.2.2.05.
- Mancenido, A., Williams, E.C., and Hajat, A. (2020). Examining psychological distress across intersections of immigrant generational status, race, poverty, and gender. *Community Mental Health Journal* 56(7): 1269–1274. doi:10.1007/s10597-020-00584-w.

- Masten, A.S. (2018). Resilience theory and research on children and families: Past, present, and promise. *Journal of Family Theory and Review* 10(1): 12–31. doi:10.1111/jftr.12255.
- Mensah, F.K. and Kiernan, K.E. (2010). Parents' mental health and children's cognitive and social development. *Social Psychiatry and Psychiatric Epidemiology* 45(11): 1023–1035. doi:10.1007/s00127-009-0137-y.
- Mesman, J., van IJzendoorn, M.H., and Bakermans-Kranenburg, M.J. (2012). Unequal in opportunity, equal in process: Parental sensitivity promotes positive child development in ethnic minority families. *Child Development Perspectives* 6(3): 239–250. doi:10.1111/j.1750-8606.2011.00223.x.
- Muggli, Z., Mertens, T., -Sá, S., Amado, R., Teixeira, A.L., Vaz, D., and Martins, M.R.O. (2021). Migration as a determinant in the development of children emotional and behavior problems: A quantitative study for Lisbon Region, Portugal. *International Journal of Environmental Research and Public Health* 18(2): 375. doi:10.3390/ijerph18020375.
- Nauck, B. and Clauss, S. (2009). The situation among children of migrant origin in Germany. (UNICEF Innocenti Research Centre, Innocenti Working Papers: Vol. 2009/14). Florence: IRC. doi:10.18356/9edebcac-en.
- Owen, D. (2024). From forced migration to displacement? *Refugee Survey Quarterly* 43(3): 272–279. doi:10.1093/rsq/hdae016.
- Pierce, M., Hope, H.F., Kolade, A., Gellatly, J., Osam, C.S., Perchard, R., Kosidou, K., Dalman, C., Morgan, V., Di Prinzio, P., and Abel, K.M. (2020). Effects of parental mental illness on children's physical health: Systematic review and meta-analysis. *The British Journal of Psychiatry* 217(1): 354–363. doi:10.1192/bjp.2019.216.
- Poulain, T., Vogel, M., and Kiess, W. (2020). Review on the role of socioeconomic status in child health and development. *Current Opinion in Pediatrics* 32(2): 308–314. doi:10.1097/MOP.0000000000000876.
- Price, J., Morris, Z., and Costello, S. (2018). The application of adaptive behaviour models: A systematic review. *Behavioral Sciences* 8(1): 11. doi:10.3390/bs8010011.
- Reimers, A.K., Brzoska, P., Niessner, C., Schmidt, S.C.E., Worth, A., and Woll, A. (2019). Are there disparities in different domains of physical activity between school-aged migrant and non-migrant children and adolescents? Insights from Germany. *PLOS ONE* 14(3): e0214022. doi:10.1371/journal.pone.0214022.

- Richter, L., Black, M., Britto, P., Daelmans, B., Desmond, C., Devercelli, A., Dua, T., Fink, G., Heymann, J., Lombardi, J., Lu, C., Naicker, S., and Vargas-Barón, E. (2019). Early childhood development: an imperative for action and measurement at scale. *BMJ Global Health* 4(Suppl 4): e001302. doi:10.1136/bmjgh-2018-001302.
- Risi, A., Pickard, J.A., and Bird, A.L. (2021). The implications of parent mental health and wellbeing for parent-child attachment: A systematic review. *PLOS ONE* 16(12): e0260891. doi:10.1371/journal.pone.0260891.
- Schmiade, N., Spieß, C.K., and Tietze, W. (2008). Zur Erhebung des adaptiven Verhaltens von zwei- und dreijährigen Kindern im Sozioökonomischen Panel (SOEP). (SOEP Papers 116). Berlin: Deutsches Institut Für Wirtschaftsforschung.
- Schunck, R., Reiss, K., and Razum, O. (2015). Pathways between perceived discrimination and health among immigrants: Evidence from a large national panel survey in Germany. *Ethnicity and Health* 20(5): 493–510. doi:10.1080/13557858.2014.932756.
- Söhn, J. (2013). Unequal welcome and unequal life chances: How the state shapes integration opportunities of immigrants. *European Journal of Sociology / Archives Européennes de Sociologie* 54(2): 295–326. doi:10.1017/S0003975613000155.
- Spallek, J., Zeeb, H., and Razum, O. (2011). What do we have to know from migrants' past exposures to understand their health status? A life course approach. *Emerging Themes in Epidemiology* 8(1): 6. doi:10.1186/1742-7622-8-6.
- Statistisches Bundesamt (2024). Bevölkerung nach Migrationshintergrund und Geschlecht – Statistisches Bundesamt. <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Tabellen/liste-migrationshintergrund-geschlecht.html#116670>.
- Stich, H.L., Baune, B.T., Caniato, R.N., Mikolajczyk, R.T., and Krämer, A. (2012). Individual development of preschool children-prevalences and determinants of delays in Germany: A cross-sectional study in Southern Bavaria. *BMC Pediatrics* 12(1): 188. doi:10.1186/1471-2431-12-188.
- Urquia, M.L., St-Germain, A.-A.F., Godoy, M., Brownell, M., and Janus, M. (2024). Disparities in child development by maternal birthplace and child sex among kindergarten children in Manitoba, Canada: A population-based data linkage study. *Journal of Immigrant and Minority Health* 27: 94–103. doi:10.1007/s10903-024-01638-x.

- Wallace, M., Hiam, L., and Aldridge, R. (2023). Elevated mortality among the second-generation (children of migrants) in Europe: What is going wrong? A review. *British Medical Bulletin* 148(1): 5–21. doi:[10.1093/bmb/ldad027](https://doi.org/10.1093/bmb/ldad027).
- Walsh, F. (2016). *Strengthening family resilience, 3rd ed.* New York, NY: The Guilford Press.
- Walther, L., Fuchs, L. M., Schupp, J., and von Scheve, C. (2020). Living conditions and the mental health and well-being of refugees: Evidence from a large-scale German survey. *Journal of Immigrant and Minority Health* 22(5), 903–913. doi:[10.1007/s10903-019-00968-5](https://doi.org/10.1007/s10903-019-00968-5).
- Washbrook, E., Waldfogel, J., Bradbury, B., Corak, M., and Ghangro, A.A. (2012). The development of young children of immigrants in Australia, Canada, the United Kingdom, and the United States. *Child Development* 83(5): 1591–1607. doi:[10.1111/j.1467-8624.2012.01796.x](https://doi.org/10.1111/j.1467-8624.2012.01796.x).
- Wenner, J., Razum, O., Schenk, L., Ellert, U., and Bozorgmehr, K. (2016). Gesundheit von Kindern und Jugendlichen aus Familien mit ungesichertem Aufenthaltsstatus im Vergleich zu Kindern mit und ohne Migrationshintergrund: Auswertung der KiGGS-Daten 2003–06. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz* 59(5): 627–635. doi:[10.1007/s00103-016-2338-3](https://doi.org/10.1007/s00103-016-2338-3).
- Will, B., Zeeb, H., and Baune, B.T. (2005). Overweight and obesity at school entry among migrant and German children: A cross-sectional study. *BMC Public Health* 5(1): 45. doi:[10.1186/1471-2458-5-45](https://doi.org/10.1186/1471-2458-5-45).

Appendix

Table A-1: Developmental domains and indicators based on the Vineland Adaptive Behaviour Scales (VABS)

Domains	Indicators
Communication	Speaks in full sentences (with four or more words)
	Passes on simple messages, such as "Dinner is ready"
	Follows instructions (heard five minutes before)
	Tells their first and last name when asked for it
	Listens attentively to stories for at least 15 minutes
Daily living skills	Uses a spoon to eat without assistance and without dripping
	Blows their nose without assistance
	Uses the toilet to defecate
	Puts on pants and underpants the right way around
	Brushes their teeth without assistance
Social relations	Participates in games with other children
	Gets involved in role-playing games ("playing pretend")
	Shows a special liking for particular playmates or friends
	Calls their own feelings by name, for example, "sad," "happy," "scared"
	Takes turns with other children when playing without being asked to do so
Gross motor skills	Walks forward down the stairs
	Climbs up playground climbing equipment and other high playground structures
Fine motor skills	Cuts paper with scissors
	Paints/draws recognisable shapes on paper
	Holds pen the right way (not fist grip) when drawing

Table A-2a: Proportion of missing data by variable in the mother–child dyads dataset

Variable	Label	Obs=.	Obs>.	Obs<.	Unique values	Obs<.	
						Min	Max
spch3	Speaks in full sentences (with four or more words)	15		1,811	3	1	3
spch5	Passes on simple messages, such as "Dinner is ready"	21		1,805	3	1	3
spch6	Follows instructions (heard five minutes before)	210		1,616	3	1	3
spch7	Tells their first and last name when asked for it	205		1,621	3	1	3
spch8	Listens attentively to stories for at least 15 minutes	207		1,619	3	1	3
skil1	Uses a spoon to eat without assistance and without dripping	13		1,813	3	1	3
skil2	Blows their nose without assistance	13		1,813	3	1	3
skil3	Uses the toilet to defecate	17		1,809	3	1	3
skil4	Puts on pants and underpants the right way around	15		1,811	3	1	3
skil5	Brushes their teeth without assistance	13		1,813	3	1	3
mvnm1	Walks forward down the stairs	13		1,813	3	1	3
mvnm3	Climbs up playground climbing equipment and other high playground structures	13		1,813	3	1	3
mvnm4	Cuts paper with scissors	22		1,804	3	1	3
mvnm5	Paints/draws recognisable shapes on paper	17		1,809	3	1	3
mvnm6	Holds pen the right way (not fist grip) when drawing	205		1,621	3	1	3
sclr2	Participates in games with other children	15		1,811	3	1	3
sclr3	Gets involved in role-playing games ("playing pretend")	25		1,801	3	1	3
sclr4	Shows a special liking for playmates or friends	28		1,798	3	1	3
sclr5	Calls their own feelings by name, for example, "sad," "happy," "scared"	17		1,809	3	1	3
sclr6	Takes turns with other children when playing without being asked to do so	226		1,600	3	1	3
health	Parental concerns about health	382		1,444	4	1	4
mcsmom	MCS score mother	648		1,178	>500	15,763	76,996
mom_edu	Mother's education	186		1,640	3	1	3

Notes: Obs=. = missing; Obs<. = valid observations; Obs>. = extended missing; Unique values = number of categories; Min = minimum of non-missing values; Max = maximum of non-missing values.

Table A-2b: Proportion of missing data by variable in the father–child dyads dataset

Variable	Label	Obs=.	Obs>.	Obs<.	Unique values	Obs<.	
						Min	Max
spch3	Speaks in full sentences (with four or more words)	9		1,497	3	1	3
spch5	Passes on simple messages, such as "Dinner is ready"	14		1,492	3	1	3
spch6	Follows instructions (heard five minutes before)	171		1,335	3	1	3
spch7	Tells their first and last name when asked for it	163		1,343	3	1	3
spch8	Listens attentively to stories for at least 15 minutes	168		1,338	3	1	3
skll1	Uses a spoon to eat without assistance and without dripping	10		1,496	3	1	3
skll2	Blows their nose without assistance	11		1,495	3	1	3
skll3	Uses the toilet to defecate	14		1,492	3	1	3
skll4	Puts on pants and underpants the right way around	11		1,495	3	1	3
skll5	Brushes their teeth without assistance	10		1,496	3	1	3
mvnm1	Walks forward down the stairs	11		1,495	3	1	3
mvnm3	Climbs up playground climbing equipment and other high playground structures	13		1,493	3	1	3
mvnm4	Cuts paper with scissors	17		1,489	3	1	3
mvnm5	Paints/draws recognisable shapes on paper	13		1,493	3	1	3
mvnm6	Holds pen the right way (not fist grip) when drawing	164		1,342	3	1	3
sclr2	Participates in games with other children	12		1,494	3	1	3
sclr3	Gets involved in role-playing games ("playing pretend")	26		1,480	3	1	3
sclr4	Shows a special liking for playmates or friends	25		1,481	3	1	3
sclr5	Calls their own feelings by name, for example, "sad," "happy," "scared"	14		1,492	3	1	3
sclr6	Takes turns with other children when playing without being asked to do so	181		1,325	3	1	3
health	Parental concerns about health	429		1,077	4	1	4
mcsdad	MCS score father	439		1,067	>500	16,932	73,448
dad_edu	Father's education	164		1,342	3	1	3

Notes: Obs=. = missing; Obs<. = valid observations; Obs>. = extended missing; Unique values = number of categories; Min = minimum of non-missing values; Max = maximum of non-missing values.

Table A-3: Standardised beta coefficients for predicting ECD by paternal characteristics

	Communication skills	Social relations	Daily living skills	Gross motor skills	Fine motor skills
Refugees (ref. migrants)	-0.107 [-0.238, 0.025]	-0.158 [-0.291, -0.024]	-0.155 [-0.281, -0.029]	-0.216 [-0.349, -0.083]	-0.127 [-0.258, 0.005]
Age (months)	0.277 [0.220, 0.333]	0.157 [0.100, 0.214]	0.335 [0.280, 0.389]	0.088 [0.032, 0.145]	0.277 [0.221, 0.333]
Female (ref. male)	0.247 [0.147, 0.347]	0.170 [0.069, 0.271]	0.343 [0.247, 0.439]	-0.041 [-0.142, 0.059]	0.233 [0.134, 0.332]
Paternal mental health (standardised)	0.088 [0.022, 0.153]	-0.008 [-0.069, 0.053]	0.108 [0.053, 0.163]	0.058 [0.001, 0.114]	0.079 [0.012, 0.145]
Constant	12.528 [-17.744, 42.801]	17.289 [-13.355, 47.933]	2.033 [-26.255, 30.322]	29.698 [0.043, 59.353]	23.954 [-6.244, 54.151]
Observations	1,506	1,506	1,506	1,506	1,506

Notes: Adjusted for paternal education, child health, and survey year; 95% confidence intervals in brackets.

Table A-4: Standardised regression coefficients for ECD: interaction between maternal mental health and migration background

	Communication skills	Social relations	Daily living skills	Gross motor skills	Fine motor skills
Standardised values of mcsmom	0.095 [0.021, 0.170]	0.055 [-0.022, 0.133]	0.125 [0.062, 0.187]	0.031 [-0.035, 0.097]	0.048 [-0.025, 0.121]
Refugees	-0.134 [-0.258, -0.010]	-0.114 [-0.241, 0.012]	-0.191 [-0.311, -0.070]	-0.252 [-0.379, -0.124]	-0.092 [-0.217, 0.032]
refugees # Standardised values of mcsmom	-0.036 [-0.144, 0.073]	-0.028 [-0.135, 0.079]	-0.042 [-0.142, 0.058]	0.088 [-0.018, 0.193]	-0.004 [-0.109, 0.101]
Age (in months)	0.274 [0.224, 0.324]	0.212 [0.162, 0.263]	0.339 [0.291, 0.387]	0.111 [0.060, 0.161]	0.302 [0.252, 0.351]
Female	0.268 [0.178, 0.357]	0.199 [0.109, 0.289]	0.382 [0.296, 0.469]	-0.071 [-0.161, 0.019]	0.233 [0.145, 0.322]
Constant	47.474 [20.359, 74.588]	39.882 [13.269, 66.494]	21.912 [-3.202, 47.027]	36.640 [10.238, 63.042]	39.915 [13.248, 66.582]
Observations	1,826	1,826	1,826	1,826	1,826

Notes: Adjusted for paternal education, child health, and survey year; 95% confidence intervals in brackets.

Table A-5: Piecewise maternal mental health (MH) effects (below vs. above mean) by migration background

Predictor	Communication skills		Social relations		Daily living skills		Gross motor skills		Fine motor skills	
	b	95% CI	b	95% CI	b	95% CI	b	95% CI	b	95% CI
Maternal MH (below mean)	0.081	-0.050, 0.211	0.066	-0.068, 0.201	0.159	0.041, 0.277	-0.021	-0.141, 0.100	0.009	-0.121, 0.140
Refugee × maternal MH (below mean)	-0.141	-0.336, 0.054	-0.018	-0.212, 0.175	-0.155	-0.332, 0.022	0.102	-0.084, 0.289	0.035	-0.159, 0.230
Maternal MH (above mean)	0.113	-0.036, 0.262	0.042	-0.106, 0.190	0.085	-0.044, 0.213	0.092	-0.050, 0.234	0.093	-0.055, 0.240
Refugee × maternal MH (above mean)	0.095	-0.129, 0.319	-0.041	-0.267, 0.186	0.095	-0.103, 0.293	0.073	-0.137, 0.282	-0.051	-0.268, 0.166
N	1,826		1,826		1,826		1,826		1,826	

Note: Adjusted for children's age, sex, health, maternal education, and survey year.

Table A-6: Adjusted differences in maternal mental health by migration background

	Coefficient	CI lower	CI upper
Migrants	0.000	.	.
Refugees	-0.134	-0.277	0.009
Standardised values of age	-0.039	-0.104	0.026
Male	0.000	.	.
Female	-0.005	-0.115	0.106
Survey year	0.013	-0.002	0.028
Constant	-25.616	-55.544	4.312
Observations	1,826		