

Strengthening educational processes in early childhood

*The relevance of specific resources in the home learning
environment*

Inaugural dissertation
in the Faculty of Human Sciences
at the University of Bamberg

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Bamberg 2026

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URN: urn:nbn:de:bvb:473-irb-116609x
DOI: <https://doi.org/10.20378/irb-116609>

Acknowledgements

This dissertation marks the end of a formative and insightful period. However, this work could only have been completed thanks to the diverse support of numerous people, both professionally and personally. I want to express my sincere gratitude to all of them.

Special thanks go to my two supervisors, Prof. Dr. Yvonne Anders and Prof. Dr. Katharina Kluczniok, for their expert academic guidance, their trust in my research project and their valuable support throughout the entire period. Their suggestions and feedback have greatly enriched the work and contributed significantly to its quality.

I would also like to thank Dr. Theresia Hummel, Dr. Hande Erdem Möbius, Dr. Fabian Hemmerich and Prof. Dr. Lars Burghardt, whose professional input, critical questions and encouraging support have had a strong influence on me both professionally and personally.

Also, I express my sincere thanks to my colleagues at the Chair of Early Childhood Education and Care for the productive exchange, collegial cooperation and the many shared moments beyond research. I would particularly like to highlight the student assistants at the chair, who supported me with great commitment, care and reliability in various stages of my work.

Outside the university setting, I would like to thank my friends who have accompanied me over the last few years and always cheered me up – whether through conversation, distraction or simply their presence. Without them, I would not have been able to maintain the balance between research and everyday life in this way.

I want to express my heartfelt thanks to my family for their continuous support, understanding and constant encouragement. They have always had my back and supported me throughout my journey – even in the most challenging times.

Lastly, but not least, I would like to extend my special thanks to Stefan Müller. His patience, humour and unwavering confidence were an important source of

support for me – not only during the creation of this work, but also beyond. I am deeply grateful for his support.

Finally, I express my sincere thanks to everyone who contributed to the success of this dissertation.

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Summary

Early childhood education in the home learning environment is influenced by a dynamic interplay between available resources and the everyday challenges families face (Bojczyk et al., 2018; Crnic & Ross, 2017; Gessulat, 2022; Taylor & Conger, 2017). However, it is also clear that the home learning environment can be strengthened through various support systems (Anders et al., 2019) and that digital services are becoming increasingly important in this regard as they offer new opportunities to strengthen parental resources and enhance a stimulating home learning environment (Anders et al., 2023; Prokupek & Cohen, 2020). This dissertation examines specific resources in the home learning environment that contribute to strengthening educational processes in early childhood. Using an interdisciplinary perspective that links (early) education, sociology, and psychology, the dissertation provides deeper insights into the dynamics that influence children's learning and development in a family context. Particular attention is paid to the concepts of the home learning environment, the adaptability of families during crises and challenging situations, and experiences of stress within the family.

Considering previous models of early childhood education and development in a family context, it becomes clear that existing models offer different perspectives on educational processes in early childhood but do not sufficiently address the influence of various parental stressors on interactions between parents and children and on specific educational processes in the home learning environment, especially in light of societal challenges and crises. Furthermore, there is a lack of integration of dynamic model approaches, such as adapting the home learning environment to different familial circumstances. This highlights the necessity of a new model approach that addresses the problem described and conceptualises the dynamic interplay between available resources and the everyday challenges that must be overcome in family life. Therefore, this dissertation aims to contribute new findings on the relevance of specific resources in the home learning environment for strengthening early childhood educational processes through three sub-studies.

Sub-study 1 examined the adaptability of the home learning environment to mild, moderate, and severe global stress, focusing on the provision of learning-stimulating activities in different family settings (single-parent families, two-parent families, and large families) during the first COVID-19 lockdown in Germany and the significance of various pandemic-related parental stressors, such as changes in parental employment and closures of daycare centres. To this end, the double ABC-X model of family adaptation (McCubbin & Patterson, 1983) was applied to the context of child development within the home learning environment. Results showed that, on average, parental employment changed only slightly during the first lockdown in the examined family settings, while the proportion of parents working from home increased. However, all families experienced a significant decline in childcare hours outside the home, with single-parent families and large families being less affected than two-parent families. All examined family settings had comparable stress levels and a moderate level of social support at the start of the lockdown. During the lockdown, the frequency of learning-stimulating activities increased on average, with differences between the observed family settings. Additionally, a negative association was found between parental stress and adaptation of the home learning environment, particularly in large families. Concurrently, social support proved to be a protective factor against parental stress, especially in large families. At the same time, a supportive role distribution within the partnership had no demonstrable influence on the adaptability of the home learning environment.

Using a mixed-method approach, sub-study 2 examined the relationship between parental stress and the home learning environment in single-parent families in Germany. The study aimed to identify specific stressors, risk factors, and protective factors that influenced the learning and development of young children in such families. In addition, Masarik and Conger's (2017) family stress model was used to examine the effects of various stressors on parental behaviour (e.g., interaction and activities with the child). A mixed-methods approach was applied to gain a deeper understanding of the challenges faced by single-parent families and the adaptability

of their home learning environment to everyday stress. Quantitative analyses showed that single-parent families had, on average, a lower socio-economic status than two-parent families and perceived their economic household situation to be significantly worse. Furthermore, in single-parent families, there was a significant positive relation between a better perceived economic household situation and the frequency of learning-stimulating activities. Qualitative analyses identified financial burdens as the main stressor, impairing the quality of parent-child interactions and the ability to provide a variety of learning-stimulating activities for the eleven single-parent families interviewed. This observation was also made for single-parent families whose socio-economic status was not necessarily considered low. Other stressors included time pressure, emotional stress (such as conflicts with the separated parent), and a lack of parental self-efficacy. Lastly, qualitative analysis identified protective factors such as high parental self-efficacy, problem-oriented coping strategies, a positive appraisal of one's own situation, and access to support networks (e.g., emotional support from the family or friends, practical help such as childcare, and flexible forms of employment) as useful.

Sub-study 3 examined the potential of a digital parenting app to support parents, particularly regarding the relationship between the intensity of app use, language-related parental self-efficacy, and early childhood language development in families with toddlers. Results showed that the intensity of app use was positively related to changes in language-related parental self-efficacy. This meant that the more tasks parents completed in the app, the more self-efficacious they felt in promoting their children's early language development. In addition, a threshold analysis revealed a significant increase in language-related self-efficacy, particularly after 10 to 12 completed app tasks. This result provides important insights into the design of effective measures to support parental resources. In addition, changes in language-related parental self-efficacy were associated with changes in language-stimulating activities in toddlers' home learning environments. Finally, the results revealed that the relationship between the intensity of app use and changes in the frequency of

language-stimulating activities was entirely mediated by changes in language-related parental self-efficacy.

In conclusion, the results of the three sub-studies provide valuable insights into the impact of global and individual crises on early childhood educational processes within various family settings, as well as the foundations for developing targeted support services during times of social challenges and crises. Promoting a deeper understanding of the interactions among parental stress, specific resources of the home learning environment, and their adaptability is a key objective. Furthermore, the findings emphasise the potential of digital family support measures, particularly digital parenting apps, by highlighting that these services increase access to information and facilitate low-threshold support without requiring physical presence. These insights are of critical importance for the development of targeted support measures and interventions that address the specific needs of families. The implications of these findings for research and educational practice are discussed in depth.

1 Introduction

Early childhood development is significantly influenced by the social, economic and cultural environment of children's families, making the family the primary and most influential place for education and socialisation (Bronfenbrenner & Morris, 2006; Klemm, 2015). However, amid global crises and social upheaval, more and more families are affected by both global and everyday stress (Bolten, 2024; Fegert et al., 2020; Klemm, 2015). From a systemic perspective, various resources contribute to families' strength and adaptability in the face of social challenges and crises (Boyd-Franklin & Karger, 2012; Walsh, 2021). The stress experienced in families is a significant predictor of the availability and perception of resources (Dunst, 2022; Pereira et al., 2024). High levels of perceived stress, caused, for example, by global crises and social upheaval, can make it difficult for parents to create a stimulating home learning environment and meet the diverse demands of everyday family life (Linberg, 2018; Mills-Koonce et al., 2011). This circumstance requires a differentiated view of the relevance of the home learning environment and the resources available within it. At the same time, digital services to support families are becoming increasingly important, as they offer new opportunities to promote parental abilities and create a stimulating home learning environment (Prokupek & Cohen, 2020). In combination with existing social support, these services can make a decisive contribution to strengthening the home learning environment's resources, promoting child development, and counteracting educational disadvantages (Bendickson, 2020).

Empirical evidence from crisis research confirms that global crises, such as the COVID-19 pandemic (Adams et al., 2021; Fegert et al., 2020; Oppermann et al., 2021), as well as individual crises – such as raising children as a single parent or in families suffering from economic hardship and poverty (Kotchick et al., 2005; Taylor & Conger, 2017) – lead to high emotional stress. Dealing with such crises requires a high degree of adaptability from families (Bolten, 2024; Brakemeier et al., 2020). At the same time, empirical evidence shows that social change processes, such as the increasing digitalisation and diversification of family life, have various effects.

On the one hand, these change processes offer new development opportunities (Masten & Cicchetti, 2016; Trembl, 2000), but on the other hand, they also place increased demands on individuals and their families (Brito et al., 2017; Garriga et al., 2015; Lange, 2020a; Valcárcel Jiménez et al., 2024). The current state of research on the relevance of the home learning environment shows that child development is particularly promoted when parents and children are involved in regular joint educational processes, such as reading and counting together. Such learning-stimulating activities have a direct relation to improved performance in reading, language and mathematics (Lehrl et al., 2020a; Niklas & Schneider, 2017; Seitz & Weinert, 2022). Family structures and parental beliefs also influence educational processes, which, in turn, shape child development (Junge et al., 2021; Kluczniok et al., 2013; NICHD Early Child Care Research Network, 2003). High levels of stress can have a significant negative impact on educational processes in the home learning environment (Gershoff et al., 2007; Löchner et al., 2024; Masarik & Conger, 2017). Therefore, focusing on the resources of the home learning environment offers a promising approach to supporting families in addressing these challenges and strengthening educational processes in early childhood.

This is where the present dissertation sets in, examining specific resources in the home learning environment that strengthen educational processes in early childhood. A particular focus is placed on analysing the home learning environment, the adaptability of families and stress factors that influence them. As part of the dissertation, a proposal for a resource model of the home learning environment will be developed, considering the importance of family and parental resources within the home learning environment, as well as available support systems from a systemic perspective. An interdisciplinary approach will be pursued, linking theories and models from (early) education, sociology, and psychology.

A total of three sub-studies explore how different family structures, financial burdens, and other parental stressors influence educational processes in the home learning environment during crisis situations. Global stress and everyday stress in families are examined in more detail as separate constructs. The sub-studies focus

on key family and parental resources that are integrated into a *resource model of the home learning environment*. In addition, the extent to which certain resources can be developed through family support measures is investigated, with particular attention to digital approaches to family support. Finally, the role of other networks in the family context, which are crucial for supporting the home learning environment, is examined.

The dissertation begins in the second chapter with discussions on the systemic perspective on family interactions, followed by explanations of global crises such as the COVID-19 pandemic, individual crises, and social upheavals and their impact on families. Chapter 3 is devoted to the home learning environment, its relevance and conceptualisation. Here, the roles of parents and children as central actors within the home learning environment are considered. A model of the home learning environment is presented that highlights the relationships between family structures, parental beliefs and educational processes. Chapter 5 discusses the influence of parental stress, adaptability and specific resources within the home learning environment. It examines the extent to which parental self-efficacy, parental coping and appraisal, specific family structures, co-parenting and time resources influence children's learning in the family context. Chapter 6 is devoted to support systems of the home learning environment, including an analysis of the support situation in Germany in an international comparison, as well as the challenges and potential of digital approaches to family support. The chapter also discusses the importance of different types of social support. Based on the theoretical background and the current state of empirical research, Chapter 7 discusses the underlying desiderata, and Chapter 8 addresses the research questions of the present dissertation. Chapter 9 presents explanations of the methodological approach across the three sub-studies that form the basis of the dissertation. These are summarised in Chapters 10 to 12. The manuscripts of the respective sub-studies are available in the dissertation appendix (Appendices A-C). Chapter 13 offers a comprehensive discussion of the empirical contributions of the dissertation project, identifies existing limitations, and outlines areas for further research. The

dissertation concludes with implications for educational policy and practice in Germany.

Finally, it should be noted that this dissertation deliberately does not consider the presence of a migration history to be a key predictor of a stimulating home learning environment. It is argued that this contextual variable is not a cause of a less stimulating learning environment. Rather, factors such as socio-economic status (e.g., family income and parental education) have a decisive influence on the home learning environment. Consequently, the presence of a migration history should not be considered a causal factor but rather a contextual factor in arguments about the home learning environment. Instead, specific conditions and resources in the family environment – regardless of origin – should be considered decisive. This view is also supported by research (Neuenschwander & Garrote, 2024; Niklas & Schneider, 2013).

2 Systemic perspective on interactions in the family context

This chapter highlights the family's crucial role as a formative context for early childhood education. From a systemic perspective, interactions within the family are considered in the context of far-reaching social, cultural and economic influences. Overall, this chapter aims to convey a nuanced understanding of the family's importance in early childhood education and to shed light on the interactions between family determinants and children's educational processes.

Child development in early childhood does not occur in isolation but is significantly influenced by a family's social, economic, and cultural contexts. In this relation, Klemm (2015) emphasises the importance of the family as the primary and most influential place of socialisation. He takes a systemic perspective on the family and posits that 'the family and its members, as an autopoietic and self-referential system¹, adapt to their environment and become a place with an educational

¹ The term 'autopoiesis' originates from biology and describes the characteristics of biological life. Luhmann (2008) uses this term to characterise an autopoietic system as a system that is self-contained and self-

influence’ (p. 484). A systemic perspective on families enables understanding of the various interactions within families in the context of far-reaching social, cultural, and economic influences. The systemic perspective on interactions represents an adaptive and versatile theoretical approach that examines how systems adapt to challenges that threaten their function, viability, or development (Masten, 2018). This approach integrates concepts from various disciplines, such as socio-ecological theory (Bronfenbrenner, 1979) and developmental systems theory (Luhmann, 2008). While many traditional theories, such as behaviourist approaches, view learning as the result of conditioning or consider individual factors in isolation (e.g., Skinner, 1985), the systemic perspective focuses on the interactions and relationships between different elements of a system. It recognises that the overall behaviour of a system is not simply the sum of its parts but is shaped by the relationships and interactions within the system. Furthermore, a systemic approach often highlights the potential resources and strengths of individuals and groups, rather than merely examining problems or deficits. Regarding families, potential resources and the support systems that arise from them can be decisive in how they deal with challenges, social upheavals and crises, and how they manage to adapt to them. Understanding the systemic characteristics of families is also important for ensuring a stimulating home learning environment and enabling effective support for families and children – right from the start.

The socio-ecological theory² developed by developmental psychologist Urie Bronfenbrenner (1917–2005) offers a systemic perspective on how interactions within the family influence child development. According to the model (Figure 1), human development depends on environmental influences that consist of different system levels. From this systemic perspective, the family is the child’s first direct

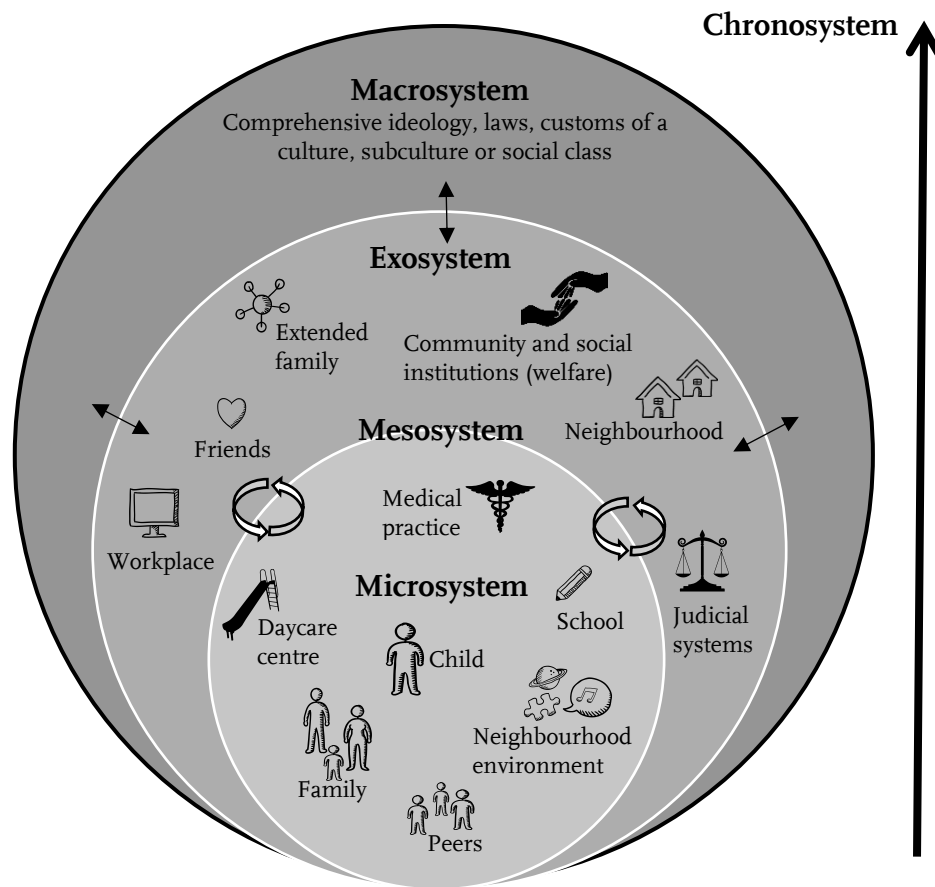
referential, i.e. related to itself. Such systems generate and reproduce their own components, such as communications and interactions. Social systems, such as societies, are therefore regarded as different forms of autopoietic systems.

² As time went on, Bronfenbrenner worked with colleagues to continuously develop his theoretical models of human development. This is why the term ‘bioecological model’ is often used in later works (e.g., Bronfenbrenner & Ceci, 1994).

(learning) environment (microsystem) and therefore a central benchmark for child development (Niklas & Lehl, 2025). In explaining his theory, Bronfenbrenner (1981) paid particular attention to patterns of direct interactions, activities, interpersonal relationships and material characteristics as central elements of the microsystem. The microsystem comprises the child's immediate caregivers with whom they interact regularly. These primarily include the parents, but also – depending on the composition of the family – other people living in the household, such as siblings and grandparents. According to the socio-ecological theory, children move between different microsystems as they develop. For most children, these are the microsystems of *family* and *daycare centre*, followed later by *school*. The various microsystems interact with each other, which is described as mesosystemic interaction. This interaction is just as crucial to children's educational processes as the experiences they have in each microsystem separately (Niklas & Lehl, 2025). Bronfenbrenner (1981) also defined more distant environmental influences that affect the child and their development as the exosystem. This can include, for example, the influence of the parents' profession on interactions in the family context. Bronfenbrenner (1981) defines values, norms, the media environment, and the cultural, legal, and political environment of a society as additional and important system-level (macrosystem). Ultimately, all systems are embedded in the temporal dimension of development (chronosystem).

Figure 1

Model of Bronfenbrenner's socio-ecological theory (Bronfenbrenner, 1981)



Bronfenbrenner's theoretical understanding of human development and learning is widely used across disciplines such as developmental psychology and early childhood education. This approach enables a differentiated view of children's educational processes. At the same time, it places particular emphasis on the processual nature of the family context (Lehrl, 2018).

The theoretical assumptions of the socio-ecological model state that environmental influences have different effects on an individual's development depending on the distance from them. Therefore, a distinction is made between less influential *distal factors* (at greater distance) and influential *proximal factors* (at shorter distance): Characteristics of the family background, such as the socio-economic status (e.g., parents' level of education or employment), can be categorised as distal factors. In contrast, process characteristics, such as regular, direct

interactions and activities between children and parents, can be classified as proximal factors (Niklas & Lehl, 2025). It is hypothesised that proximal factors mediate the influence of distal factors. This assumption refers not only to interactions between individual system levels but also to those within each microsystem (Bronfenbrenner, 1981).

Later, Bronfenbrenner's research shifted from the study of environmental influences to developmental processes individuals experience over time (Bronfenbrenner, 1994). His considerations increasingly focused on permanent and sustainable interaction patterns in the immediate environment. Bronfenbrenner further developed his theoretical assumptions in the so-called process-person-context-time (PPCT) model, emphasising that the interplay of individual characteristics, family processes, contexts and temporal changes shapes children's development. Proximal processes are considered a key factor for successful development in the model (Bronfenbrenner & Morris, 2006).

Based on the systemic perspective described previously, it is important to recognise that child development is not solely shaped by interactions between parents and children and potentially available resources of the home learning environment. Families often face various challenges and crisis situations that have a significant impact on interactions, the availability of resources and, ultimately, the development of children in the family context. The following chapter explains how these challenges and crises influence the systemic characteristics of families.

3 Challenging and crisis situations in the family context

This chapter addresses challenging and crisis situations, as well as social upheavals, which can be perceived as stressful due to the associated feelings of uncertainty and instability. The following section first defines the term 'crisis', explains how crises can manifest in a family context, and shows how they permeate Bronfenbrenner's socio-ecological model.

Crises are a fundamental part of human experience and occur in many forms and contexts. They represent turning points in the development of individual, social, and societal systems and are often associated with profound changes and perceived challenges (Schubert & Klein, 2018). In a family context, a systemic perspective assumes that serious crises and lasting challenges affect the family as a whole, with fundamental dynamics within the family determining how it adapts (or fails to adapt) to crises and perceived challenges (Walsh, 2021). Furthermore, a distinction is usually made between individual and global crises: Individual crises can affect a single person and their environment. In contrast, global crises threaten a significant part of humanity and require collective responses (Bolten, 2024). At this point, it should be emphasised that, due to the diversity of potential crisis issues, this dissertation can only highlight a few aspects of global and individual crises.

Crises are particularly relevant in the family context, as they not only affect the lives of individual family members but also impact fundamental structures and dynamics of the family as a system (Bolten, 2024; Klemm, 2015). According to Bolten (2024), it is also important not only to distinguish between individual and global crises, but also to categorise different types of crises:

1. Event-related (short-term) crises: unexpected events that require immediate responses.
2. Chronic crises: ongoing difficulties that persist over a longer period of time and impair the functioning of a family (e.g., maintaining a stimulating home learning environment).
3. Endogenous crises: internally caused crises that arise from a family's own structures and relationships.
4. Exogenous crises: externally caused crises resulting from external circumstances or events.

The following section presents examples of global and individual crises and major social upheavals in the family context, along with empirical findings on their impact on families.

3.1 Global crises, social upheavals and their impact on families

Understanding crises in the family context is crucial, as the family plays a prominent role in child development as the primary place of socialisation (Bronfenbrenner & Morris, 2006; Klemm, 2015). In times of global crisis, parents face a variety of challenges. Risk factors (e.g., job loss, existential fears, lack of adaptability) that lead to higher stress levels affect how parents fulfil their role and, in turn, the interaction between parents and children (Bolten, 2024). At the same time, dealing with global crises requires families to employ a variety of coping strategies (Fegert et al., 2020). In this relation, Bronfenbrenner's socio-ecological theory can serve as a suitable framework for analysing the interactions between global crises and child development in the family context. Global crises have exogenous effects on families and can have profound consequences. According to Klemm (2015), families have been and continue to be affected by exogenous crises. However, the accelerated and unpredictable manner in which families are confronted with these challenges today is a new phenomenon. These include political instability, economic crises, social changes, and the climate crisis. In response to crises, families can also be increasingly burdened by changing political, social, cultural and economic circumstances (Klemm, 2015). According to this, this can be illustrated by global crises such as pandemics. However, families are also burdened by social upheavals, such as the breakdown of traditional family structures and ways of life, or the rapid digitalisation of many areas of life (Abendroth et al., 2024; Bongaarts et al., 2017; González-Bailón & Lelkes, 2023; Jurczyk, 2014; Kreyenfeld et al., 2015; Kuger et al., 2022; Pierce et al., 2021).

3.1.1 Global crises and family burdens using the example of the COVID-19 pandemic

A prominent example of a global crisis is the COVID-19 pandemic, which was triggered by the SARS-CoV-2 virus in 2020. As the virus spread globally, individual states placed increasing emphasis on controlling and containing the pandemic. The consequences of the pandemic have been and continue to be far-reaching, placing a

considerable strain on global health systems. In retrospect, the COVID-19 pandemic can be seen as a multi-layered global crisis for public and individual physical and mental health.

There is empirical evidence that the COVID-19 pandemic has led to increased stress levels at both the individual and societal levels (Kuger et al., 2022). National and international research also confirms the profound impact of the COVID-19 pandemic on families (Adams et al., 2021; Cénat et al., 2021; Chachar et al., 2021; Fegert et al., 2020; Nicola et al., 2020; OECD, 2020; Oppermann et al., 2021). In Germany, measures to contain the spread of the virus during the first wave of COVID-19 infections (spring 2020) included the closure of daycare centres (and schools) and strict restrictions on general social contact (Oppermann et al., 2021). Due to Germany's federal structure, the exact nature and duration of measures to contain the virus's spread varied greatly across the individual federal states (Rothenberger, 2024). At that time, many parents living in Germany became increasingly concerned about their own economic situation, the well-being of their family and friends, and the well-being of society (Brandstetter et al., 2022). To contain the spread of the virus on the one hand and maintain the functioning of society on the other, some countries introduced emergency childcare in daycare centres (Blum & Dobrotić, 2021; Pardee et al., 2021). In Germany, emergency childcare was primarily available to children of parents in systemically important professions (e.g., in healthcare). Depending on the federal state, entitlement to emergency childcare was extended to children from single-parent families and children from families with special social or educational needs (Schüller & Steinberg, 2022). However, in Germany and other countries, such as the United Kingdom, single parent families and families from socially disadvantaged backgrounds were particularly affected by the double burden of daycare centre closures (and homeschooling) and limited opportunities to pursue their livelihoods, despite being entitled to emergency childcare (Cheng et al., 2021; Kuger et al., 2022; Zinn & Bayer, 2021). Due to different regulations on entitlement to emergency childcare in the federal states of Germany, many single-parent families were unable

to use emergency childcare, or at least not from the outset, because the eligibility requirements were often linked to systemically important professions, especially at the beginning of the pandemic. As a result, many single parents were left without support, even though they had a particularly high need for childcare (Christner et al., 2021; Schüller & Steinberg, 2022). In addition to access restrictions, uncertainties about the regulations and fear of infection also contributed to the low use of emergency childcare (Schüller & Steinberg, 2022). Furthermore, Geissler and colleagues (2022) report that parents' perceptions of helplessness in Germany increased during the early phase of the COVID-19 pandemic (spring to summer 2020), while perceptions of being able to meet their children's needs decreased. These research findings thus illustrate that crises in the family context significantly alter the conditions for socialisation in child development at various levels.

Concerning the COVID-19 pandemic, this crisis has made interactions between Bronfenbrenner's socio-ecological systems even more complex at all levels (Chachar et al., 2021). A look at the family microsystem shows that pandemics in general can trigger a variety of situational anxiety responses in families (Honigsbaum, 2009; OECD, 2020; Ravens-Sieberer et al., 2022). In addition, the COVID-19 pandemic led to a lack of support for parents from extended family members and other social networks, resulting in high emotional stress among parents (Fegert et al., 2020; Nicola et al., 2020; Oppermann et al., 2021). This is particularly critical in terms of early childhood development in the family context, as high parental stress and severe anxiety can have significant negative effects on parental behaviour (Conger et al., 1992; Masarik & Conger, 2017).

However, other systems in Bronfenbrenner's socio-ecological model were also affected by the COVID-19 pandemic. The pandemic led to a change or, in some cases, a disruption in the mesosystemic interactions between different microsystems: During the COVID-19 pandemic, a significant decline in exchange of information and communication between families and daycare centres was observed, with some of this exchange taking place only digitally and less frequently (Cohen et al., 2020a). In addition, many daycare centre employees were exposed to

increasing stress due to tensions with parents and difficulties in implementing pandemic-related requirements (Kuger et al., 2022). In other words, the COVID-19 pandemic put strain on both the individual microsystems of *families* and *daycare centres*, as well as on interactions at the mesosystem level.

Regarding the exosystem, the COVID-19 pandemic led to a disruption of the general economic situation, which in turn triggered fears of an impending economic crisis (Nicola et al., 2020). In addition, government restrictions such as lockdowns and contact restrictions led to reduced leisure activities and reduced access to support resources, such as family and care services (OECD, 2020).

As previously outlined, the macrosystem encompasses social values, norms, laws, political structures, and cultural beliefs that shape the lives of all individuals in a society. The pandemic led to far-reaching changes and challenges at this level by making existing social, economic, and health inequalities more visible and, in some cases, exacerbating them (Chachar et al., 2021). Particularly disadvantaged groups were more severely affected by the negative consequences of measures to contain the virus's spread, which sparked social debates about justice and inclusion (Guzman et al., 2023; Jones, 2022). In addition, the role of the media, public communication and government crisis management became central. Uncertainty, conflicting information and the spread of misinformation influenced the social climate and trust in institutions (Alkhair et al., 2023; Guzman et al., 2023).

Global crises, such as the COVID-19 pandemic, affect all levels of the socio-ecological model and shape the lives of individuals and communities in the long term. As a result, the chronosystem is also indirectly affected by the COVID-19 pandemic: For example, findings on the impact of COVID-19 on children in the United States indicate significant learning losses during the preschool years, as preschoolers had lower competence levels during the pandemic years compared to previous years (National Academies of Sciences, Engineering, and Medicine, 2023). This not only demonstrates the lasting impact of the COVID-19 pandemic on children and their families but also raises questions about family coping

mechanisms and the relevance of family support measures in pandemic management (Feinberg et al., 2022; Shin et al., 2021).

In general, crisis-induced adaptation requirements pose fundamentally different challenges for both society and the family system, necessitating new strategies for coping with and adapting to crises (for an overview: Klemm, 2015). This became particularly clear during the COVID-19 pandemic, which demanded a high degree of adaptability from families due to a completely new type of environmental stress (Bolten, 2024; Brakemeier et al., 2020).

3.1.2 Social upheavals and their impact on families: Digitalisation and diversification of family life

The rapid outbreak of the COVID-19 pandemic and the associated measures to contain its spread (including restrictions on general social contact) have significantly accelerated the process of digitalisation across many areas of life (Abendroth et al., 2023). But even before the COVID-19 pandemic, it was clear that digital media had permeated almost all areas of society in Western industrialised nations: Almost 20 years ago, it was already apparent that digital media had become a meta-structure for human behaviour and dominated all five systems of the socio-ecological theory of child development (Hjarvard, 2008; Johnson & Puplampu, 2008). In recent years, this development has led to media becoming increasingly important as a means of socialisation and early childhood education in the family context (Bolten, 2024; Chaudron, 2015; Cieciora et al., 2019; Klemm, 2015). Generally speaking, digital media have become omnipresent, seamlessly woven into everyday habits, and accessible at all times (Brito et al., 2017; Lange, 2020a; OECD, 2019). This technological and social progress can be classified as a social upheaval, which, on the one hand, is associated with uncertainties. On the other hand, however, advancing digitalisation also offers parents a multitude of opportunities to shape their everyday family life. Digital media can therefore be seen as an important factor in children's socialisation and development and should be considered in the context of interactions within the family (Lehrl et al., 2021; Valcárcel Jiménez et al., 2024).

However, this digital growth also raises new questions and challenges (Bolten, 2024). Among the worrying aspects of increasing digitalisation is the increased duty of care on parents to monitor their children's screen time, ensure their safety online, and regulate both their own and their children's online behaviour (Burns & Gottschalk, 2019). Reports from parents also show that the perceived increased duty to monitor their children's use of digital devices can repeatedly lead to difficulties within the family (Shamir et al., 2012). In addition, new child and youth protection technologies can enable more intensive control of children and, if used excessively and inappropriately for their age and developmental stage, can contribute to 'overprotection' of children (Bolten, 2024).

Contemporary phenomena such as *phubbing* and *sharenting* are also gaining importance in the context of digitalisation in families, particularly regarding interactions between parents and children and children's autonomy: 'Phubbing' means ignoring someone to focus on one's own smartphone. Studies show that phubbing is common in families and is practised by both parents and children (Al-Saggaf & MacCulloch, 2019; Pancani et al., 2021). In parenting, phubbing can disrupt meaningful interactions between parents and children: Research shows that parental smartphone use during family time can devalue these interactions, leading to feelings of neglect in children and negatively affecting the parent-child relationship, increasing the potential for conflict in families, and negatively impacting children's social-emotional abilities (Burns & Gottschalk, 2019; Gu & Zhao, 2025; McDaniel & Coyne, 2016; Zhang & Wang, 2025). It is therefore important for parents to balance digital activities with attention to their children to promote meaningful, appreciative, direct interactions within the family. However, studies on parents' use of digital devices show that some parents critically reflect on their media use behaviour and regulate it in family contexts (Brito et al., 2017; Grané et al., 2023; Paulus et al., 2024).

The aforementioned phenomenon of sharenting is also becoming increasingly common in families (Tosuntaş & Griffiths, 2024). The term 'sharenting' is a combination of the words 'sharing' and 'parenting' and describes the act of parents

sharing information, such as photos or videos of their children on social media. This practice raises significant concerns about children's rights and autonomy, as it can limit their ability to control their own digital identity (Kopecky et al., 2020; Ouvrein & Verswijvel, 2019). In summary, both phubbing and sharenting pose a major challenge to modern parenting and highlight the need to be aware of and critically reflect on the impact of digitalisation on early childhood education in the family context.

Another noticeable change in society is the diversification of family life, which in Western industrialised nations is primarily linked to the breakdown of traditional family structures and lifestyles based on traditional gender norms. The conceptualisation of the family as an autonomous form of relationships and lifestyles, and consequently as a point of reference for research on early childhood education, has undergone various changes throughout history (Bertram, 2020, for an overview). This change is partly due to significant shifts in family structures in response to individualisation processes and broader social changes over the last century (Schierbaum, 2021). Since the late 1960s, significant changes in family structures have been observed in Germany. These include an increasing number of non-marital parenthoods, declining birth rates, rising separation and divorce rates, and higher participation of women in the labour market (Niklas & Lehl, 2025). The decline in the propensity to marry and the increase in non-marital parenthood, coupled with declining birth rates and consistently high separation and divorce rates, paint a picture of a changing family landscape. As a result, there has been an increase in patchwork families and a rise in the number of single-parent families worldwide, including in Western societies (Jurczyk et al., 2009; Jurczyk & Szymenderski, 2012; Simpson & Floud, 2018). The rise in single-parent households is a global phenomenon, with particularly high rates in North America and Europe (Cohen, 2021; Garriga et al., 2015; Låftman, 2010).

These social change processes have various effects, offering new opportunities for development on the one hand, but also placing demands on individuals and their

families on the other. The resulting changes in family life are associated, in part, with increased and ongoing pressure to make decisions and a growing risk of excessive demands (Jurczyk & Szymenderski, 2012). The complexity of modern forms of family life currently observed, therefore, requires a differentiated view of the associated challenges and opportunities for child development in the family context.

3.2 How individual crises affect families

In addition to global crises and social upheavals outlined previously, individual crises also have a significant impact on family life. These crises are often closely linked to global and social upheavals but can vary greatly in their severity and consequences. Individual crises, which are always linked to subjective feelings – i.e. the perception and appraisal of a situation – relate to specific challenges that can arise within a family (endogenous). These include, for example, conflicts between parents and children, separation or divorce, and the unemployment of one parent. Individual crises can manifest themselves in many ways, for example, in the form of mental health problems affecting both parents and children (Bolten, 2024; Klemm, 2015). One example of individual crises is the upbringing of children in single-parent households or in families suffering from economic hardship and poverty. These socio-economic contexts can lead to families finding themselves in disadvantaged situations in which the support and promotion of early childhood development can be severely limited (Klemm, 2015). It should be noted, however, that not all single parents speak of a crisis in relation to their life situation. Studies show that perceptions and appraisal of their own situation vary widely among single parents (Dharani & Balamurugan, 2024; Shorey & Pereira, 2023). Nevertheless, the rising number of divorces and separations is the main reason for the increase in single-parent families in Western societies (D’Onofrio & Emery, 2019; Fadel et al., 2025) and represents a decisive and stressful life event for these parents (Gähler, 2006; Schwarzer & Luszczynska, 2013). In many European countries, including Germany, both marriages and non-marital partnerships are often affected by

instability. Many families experience far-reaching financial and organisational changes after a separation. These include legal adjustments and renegotiations regarding custody, conflicts between parents, changes in social networks, and various psychological challenges experienced by parents and children. These factors can cause considerable stress during the separation process (Bolten, 2024). In addition, the risk of poverty is significantly higher for single parent families than for two-parent families with children: In Germany, the proportion of single parent families living below the poverty line is around 42.9%; in contrast, the value for households with two adults and children is only 8.4% (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2023; OECD, 2018).

There is ample empirical evidence that poverty, precarious income situations and a generally low socio-economic status place a variety of burdens on single-parent families (Federal Statistical Office, 2024; OECD, 2018). According to Hübgen (2020), the increased risk of poverty for single mothers is due to various factors, including difficulties in balancing work and childcare, poorer earning opportunities for women, and low or often non-existent child support payments from the other parent. In addition, there is now growing evidence of factors that exacerbate the experience of crisis situations for single-parent families (Harknett & Hartnett, 2011; Kotchick et al., 2005; Taylor & Conger, 2017). These include, in particular, a low standard of living, the loss of financial stability that came with the partnership or marriage, and ongoing disputes with the former partner (Amato, 2000, 2010; Reim et al., 2024). Single mothers with young children, in particular, have a significantly higher risk of psychological distress and increased stress compared to mothers in two-parent families (Eickhorst et al., 2015). In terms of individual crises, empirical findings show that parents who have suffered from mental illness in the past or who were traumatised in early childhood are considered particularly vulnerable to the stress-related effects of divorce or separation (Sbarra et al., 2015). However, it is important to emphasise that although living in a single-parent family is sometimes associated with a higher risk of poverty and unemployment, it does not necessarily have a negative impact on children's development (Bolten, 2024).

Although crises and profound upheavals pose challenges for families, it is important to recognise that they can also serve as positive life events and opportunities for growth and transformation of the family as an autopoietic and self-referential system (Bolten, 2024). Coping with crises is largely determined by the interplay of respective risk factors, perceived stressors and available resources, which can also vary over time (Fröhlich-Gildhoff & Rönna-Böse, 2021). Overall, the ability to adapt to and recover from disruptive life challenges is becoming increasingly important and is receiving growing attention across various research disciplines, such as the social, health, and psychological sciences (e.g., Bolten, 2024; Lutz, 2012; Schwarzer & Luszczynska, 2013; Walsh, 2021). According to Walsh (2021), the family, as a functional system, can withstand difficult situations and recover from them. A growing body of research is expanding our understanding of adaptation processes as a dynamic interplay of multi-level systemic factors that promote successful adaptation and crisis recovery (Masten & Cicchetti, 2016). This can encourage families to develop new coping strategies and create an adaptable family environment, thereby strengthening the family system in the long term (Trembl, 2000).

Ultimately, taking challenging and crisis situations in the family context into account forms an essential basis for a deeper understanding of the family as the primary learning environment and the home learning environment in which children grow up. The following section will now focus on the significance and conceptualisation of this learning environment.

4 Relevance and conceptualisation of the home learning environment

The home learning environment plays a crucial role in shaping children's cognitive, emotional and social development, especially in early childhood (Anders et al., 2012). Upon closer examination of the home learning environment, it becomes clear that this construct is not based solely on a standardised concept or a clear definition. Rather, the heterogeneity of the theoretical foundations and conceptualisations of

the home learning environment becomes evident, with different aspects coming into focus depending on the primary research interest (Niklas & Lehl, 2025).

To provide a comprehensive understanding of the factors that shape children's educational processes in the home environment, this chapter examines both earlier and current perspectives on the construct of the home learning environment. First, the development of the home learning environment and its conceptual definitions are presented. This is followed by explanations of parents and children as central actors in the home learning environment and of the basic model understanding of the home learning environment. In this regard, the relationships among family structures, parental beliefs, and educational processes within the home learning environment are presented to illustrate their influence on child development. Since the foundations for children's learning are laid from birth, the chapter concludes by highlighting research on educational processes in the home learning environment of infants and toddlers.

4.1 Development and conceptual definitions of the home learning environment

In early childhood development, the family is the most important and formative learning environment, which has a decisive influence on children's educational opportunities (Bronfenbrenner & Morris, 2006). Since the 20th century, empirical research on the role of family in children's cognitive, emotional and social development has become increasingly important. Hunt (1961) and Bloom (1964), in particular, conducted groundbreaking studies on the genetic determination of intelligence and on important principles for defining the environment. Bloom describes the environment as '[...] a formative and reinforcing force that influences people' (p. 187), postulating that the way learning is organised in the family context is crucial for children's development and educational opportunities. He thus also emphasises the relevance of the home learning environment for children's learning and development in today's education system. Influenced by Bloom's work, researchers began to take a more comprehensive view of the family context as a significant factor in (early) childhood development. This view includes a variety of

influences that go beyond genetic determination and social status variables, such as a family's income. As a result, a multifaceted approach to analysing the characteristics of the home learning environment has developed, which sometimes includes a detailed examination of activities and specific interactions in children's early home learning environments (Niklas & Lehl, 2025).

The most comprehensively validated assessment tool in this relation is the Home Observation for Measurement of the Environment (HOME) (Bradley & Caldwell, 1984). The authors of the HOME scale aimed to create an observation instrument that is valid, reliable, and easy to use to assess the quality and quantity of social, emotional, and cognitive stimulation available to children from birth to age three in their home environment (Elardo et al., 1975). In later years, the instrument was also adapted for preschool and school children (Bradley & Caldwell, 1979; Bradley et al., 1988). With the development and use of this instrument, the term 'home learning environment' became increasingly established in early childhood educational research. The application of the HOME scale also served as the basis for numerous comprehensive empirical analyses of the home learning environment (Niklas & Lehl, 2025). In German educational research, the concept of the home learning environment was introduced by Wolf (1980, 1987), who drew on Bloom's understanding of home learning environments (Lehl, 2018, for an overview). However, it was not until the 1990s that the authors of the European Child Care and Education (ECCE) Study Group translated the HOME scale into German (Lehl, 2018). Towards the end of the 1990s, Tietze and colleagues (1998) then examined the relevance of the family (and kindergarten) for the cognitive development of kindergarten-age children from an ecological perspective (Lehl, 2018). In German early childhood educational research, these studies can be considered milestones in the investigation of characteristics of educationally stimulating processes in the family context (Lehl, 2018).

As previously explained, the home learning environment can be examined in more detail using various concepts. A valuable approach to defining the concept of the home learning environment can be found, for example, in Bradley (2015). He

takes a general approach and describes the home learning environment primarily as the quantity and quality of cognitive stimulation, emotional support and elements that structure everyday life (e.g., routines) available to a child in a family context. The focus is on the child as the recipient of these educationally stimulating inputs. Niklas (2015) offers a slightly more specific, yet equally useful, definition: His approach focuses on aspects that help the child develop basic domain-specific abilities in the family context. While Bradley (2015) defines the home learning environment as the totality of inputs in the family context, Niklas (2015) emphasises the targeted support of specific learning abilities. Both definitions emphasise the central role of the stimulating characteristics of the home learning environment in supporting early childhood development.

4.2 Parents and children as central actors in the home learning environment

The discussion of Bronfenbrenner's socio-ecological theory (Chapter 2) illustrates that children regularly interact with their immediate caregivers within the family microsystem. This makes it clear that parents play a central role as actors in the home learning environment, which means they are considered of significant importance to their children's development (Niklas & Schneider, 2017). Interactions between parents and children are characterised by reciprocity: Positive interactions not only promote children's development but also strengthen the relationship between parents and children (Linberg et al., 2020). Bradley (2015) also takes up the understanding of interactions between central actors in the home learning environment by describing the child as a recipient of educationally stimulating inputs: A recipient is someone who receives something. In contrast, there must be a donor who provides something. In the family context, this means that parents provide educationally stimulating inputs (e.g., learning-stimulating activities or materials) that children receive.

Research also clearly shows that parents play a key role in shaping the home learning environment: For example, through their sensitivity and responsiveness, and through activities such as reading together, playing, counting or conducting

scientific experiments, parents create a stimulating home learning environment. The quality and quantity of these activities, as well as the type of interaction (e.g., how sensitively parents respond to their children's signals), are crucial for child development, especially for language acquisition and cognitive development (Attig & Weinert, 2020; Junge et al., 2021; Linberg et al., 2020). At the same time, children as active learners also play a central role in the home learning environment: They contribute their own impulses, arising from their interests and needs, to interactions. The effectiveness of the home learning environment depends on how parents respond to these child-led impulses and transform them into learning opportunities (Linger et al., 2020).

4.3 The model of the home learning environment

One way to examine the relevance of interactions between parents and children for educationally stimulating processes is to embed them within a specific model of the home learning environment. As explained, the home learning environment is a specific construct that focuses on early childhood learning in a family context and is grounded in various concepts and definitions (Niklas & Lehl, 2025). The following considerations on researching specific resources of the home learning environment to strengthen (early) childhood educational processes are initially based on the structural-processual model of the home learning environment (Kluczniok et al., 2013; Lehl, 2018; Melhuish et al., 2008; Tietze et al., 1998) (Figure 2). According to the model, the home learning environment can be understood as a multidimensional construct comprising three dimensions: family structures, parental beliefs, and processes. Together, these dimensions have a partly direct and partly indirect influence on children's development and learning (Kluczniok et al., 2013; Melhuish et al., 2008; Tietze et al., 1998; Tietze et al., 2005).

Family structures refer to permanent, relatively stable aspects of the home learning environment, such as household income, employment, parental education and family setting (composition of adults and children within a family, e.g., number of children; single-parent families versus two-parent families) (Melhuish et al.,

2008). A family's household income, parents' occupational status and level of education are indicative of a family's general socio-economic status (e.g., Linberg & Wenz, 2017; Weinert & Ebert, 2013).

Parental beliefs (e.g., educational aspirations, parenting goals, parental self-efficacy) form another central dimension of the home learning environment. The theoretical assumption of the structural-processual model of the home learning environment is that family structures interact with parental beliefs. They determine the availability of resources for direct interactions and learning-stimulating activities in the family context, thereby influencing the third dimension: the processes of the home learning environment.

Processes arise from the quantity and quality of direct interactions and specific activities (e.g., learning-stimulating activities) between parents and children and must always be considered in a differentiated manner (Lehrl, 2018; Linberg et al., 2020). According to the model, it is these processes that have a direct impact on child development and learning and become the most important determinant of early childhood development in family context (Gershoff et al., 2007; Kluczniok et al., 2013; Linberg, 2017; Melhuish et al., 2008; Niklas & Schneider, 2013; Tietze et al., 1998). Learning-stimulating activities between parents and children, such as reading together (dialogically) or working with numbers together, are considered crucial for promoting specific abilities in young children. Against this background, since the early 2010s, research has increasingly distinguished between global and domain-specific processes, for example, as in the work of Kluczniok and colleagues (2013). This distinction was considered necessary to capture the different mechanisms of action and influencing factors of processes on child development in a more differentiated way (Kluczniok et al., 2013; Lehrl et al., 2020a). Global processes, also referred to as domain-general processes, relate to general aspects of the family climate (e.g., care, warmth, and parental responsiveness) and general stimulation in everyday activities (e.g., shared meals or outings) that do not relate to specific areas

of learning. Domain-specific processes³, on the other hand, address the concrete support of area-specific child abilities. In this regard, particular importance should be attached to supporting the child's language, reading, and numerical abilities (Kluczniok et al., 2013; Kuger & Kluczniok, 2008).

Concerning the structural-processual model of the home learning environment, it should be noted that further domain-specific model approaches have been refined as research into the home learning environment has progressed. Examples of this are the home literacy model (Sénéchal, 2006; Sénéchal & Lefevre, 2002) and the home numeracy model (Niklas & Schneider, 2013), in which educational processes are divided into formal and informal aspects: Formal learning-stimulating activities refer to the intentional teaching and learning of new knowledge, while informal learning-stimulating activities are those in which learning takes place between children and their parents in a casual manner (usually through play or everyday activities) (Niklas & Lehl, 2025).

Other models of the home learning environment focus on the wide range of family activities that influence children's learning. In addition to promoting language and literacy abilities and mathematical abilities, these also include family activities (e.g., visits to the library or museum) and everyday routines (Melhuish et al., 2008).

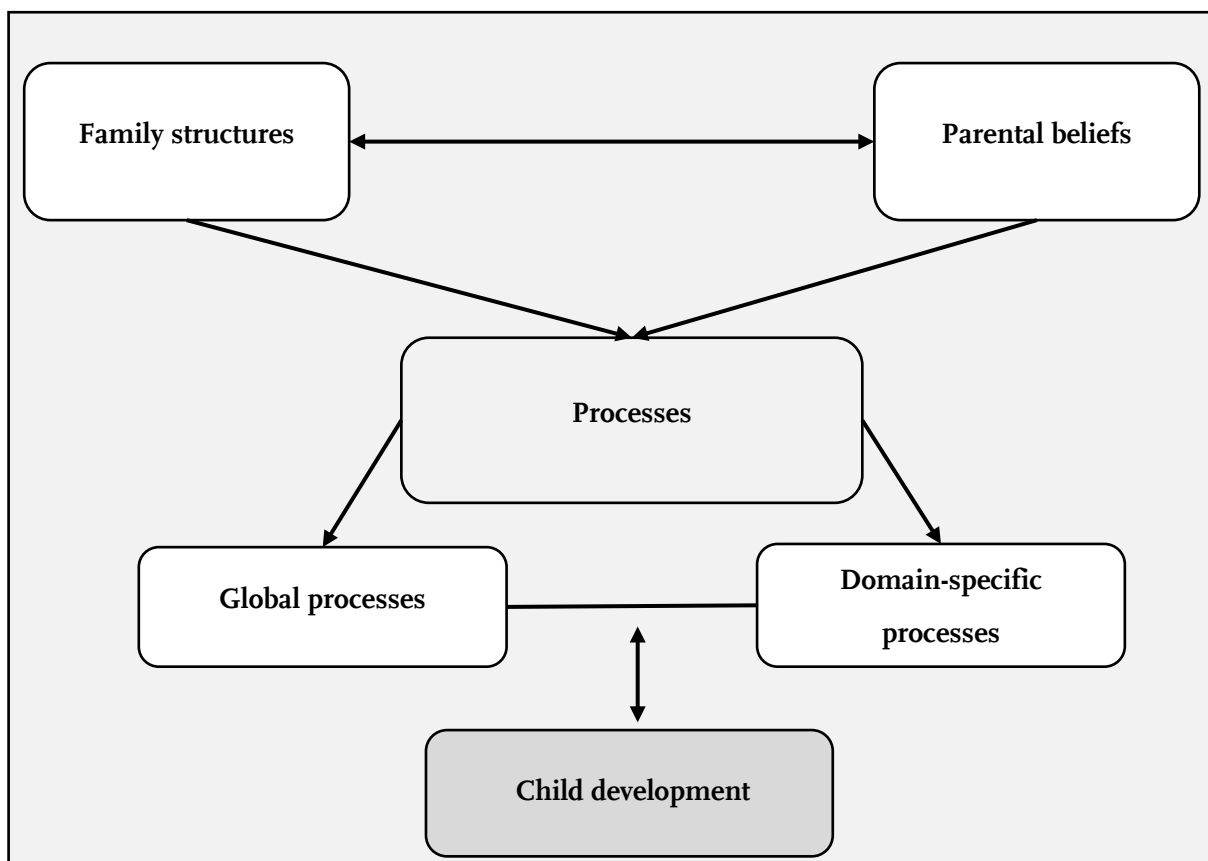
The theoretical assumptions of the structural-processual model of the home learning environment have been comprehensively confirmed by empirical research: Both national and international studies have repeatedly emphasised the importance of the family as a learning environment for early childhood development in recent years (Anders et al., 2012; Foster et al., 2005; Kluczniok et al., 2013; Liang et al., 2019; Melhuish et al., 2008; Sammons et al., 2015). In addition, research findings indicate that the home learning environment plays a primary role in children's

³ Basically, domain-specific support is not only about the child's language, reading or mathematical abilities, but also, for example, about promoting children's abilities in the fields of science, music and art.

developmental outcomes, including social, emotional and cognitive development (Anders et al. 2012; Kluczniok et al., 2013; Lehrl, 2018; Lehrl et al., 2020a; Toth et al., 2020).

Figure 2

The structural-processual model of the home learning environment (adapted from Kluczniok et al., 2013; Lehrl, 2018; Melhuish et al., 2008; Tietze et al., 1998)



4.3.1 Educational processes and child development

In line with the theoretical assumption of Bronfenbrenner and Morris (2006) (Chapter 2), studies show that proximal processes – i.e. regular, direct interactions and activities between children and parents – are key variables for successful development in early childhood. The relationship between educational processes and the social and emotional development of children has been confirmed in many studies (Kluczniok et al., 2025; Li et al., 2023b; Oppermann et al., 2023; Rose et al., 2018). There is also empirical evidence that a lack of appropriate educational

processes is partly associated with educational disadvantages in children, particularly about their cognitive, linguistic and mathematical abilities (King & Purpura, 2021; Lehrl et al., 2020a; Melhuish et al., 2008; Niklas & Schneider, 2017; Sammons et al., 2015).

Specifically, studies indicate that global processes (e.g., emotional support, general stimulation in everyday activities) have an effect independent of socioeconomic factors and parental educational aspirations and are relevant for the development of social and emotional abilities (Li et al., 2023b; Soto-Ramírez et al., 2022). At the same time, there is evidence that child development benefits particularly when parents regularly engage in domain-specific activities such as reading and counting together or exploring scientific questions with children (e.g., experimenting together or answering questions about everyday phenomena). Such activities have a direct relation to improved performance in reading, language, and mathematics (Lehrl et al., 2020a; Niklas & Schneider, 2017; Seitz & Weinert, 2022).

Regarding theoretical assumptions about the relationship between educational processes and early childhood development, studies show that informal learning opportunities in particular, such as reading together, singing songs or reciting rhymes, are important key variables. The positive effects of reading together on children's language and reading abilities have been proven by numerous studies (Raikes et al., 2006; Sénéchal et al., 1996; Sénéchal & Young, 2008; van Steensel et al., 2011) and confirm that educational processes have a direct influence on children's language development. In addition, informal reading experiences, such as reading aloud, singing songs or reciting rhymes, can be particularly important for language development at a very early stage of child development (Baker, 2013; Niklas et al., 2016c). Furthermore, informal activities (e.g., playful counting) show both domain-specific and cross-domain effects, with the strongest effects occurring within the respective domain (Anders et al. 2012; Conica et al., 2023; Daucourt et al., 2021; Dominke et al., 2025; Lehrl et al., 2020a). Finally, domain-specific processes that occur in early childhood have been shown to have long-term effects that extend into secondary school (Anders et al. 2012; Lehrl et al., 2020b).

However, it is also empirically proven that there are significant differences between families in terms of stimulating their children's linguistic and mathematical abilities (Morgan, 2005; Lehl et al., 2020a) and that these differences are already apparent in early childhood (Attig & Weinert, 2020; Ginsborg, 2006; Hayes & Berthelsen, 2020; Hirsh-Pasek et al., 2015). These differences reinforce educational inequalities and create persistent academic performance gaps among children, which are very difficult to close (Duncan et al., 2019).

4.3.2 The relationship between family structures and parental beliefs

As explained previously, the structural-processual model of the home learning environment is based on the theoretical assumption that family structures (e.g., parental educational level, income, family setting) and parental beliefs (e.g., educational aspirations, parenting goals, parental self-efficacy) are interrelated. Eccles (1992) already noted that parents' educational level influences their educational aspirations for their children. Other studies also show that parental beliefs are sometimes closely linked to family structures and influence each other: In a study of 178 American children and their families, DeFlorio & Beliakoff (2015) found that parents with higher socio-economic status have higher expectations of the mathematical abilities their children should possess at the age of five. These parents also have a more accurate understanding of the abilities that can be expected of most children of this age in terms of their development.

Recent studies also indicate that parents with higher levels of socio-economic status tend to have more positive attitudes toward their children's development and education (Becker & McElvany, 2018; Karavida et al., 2024; Niklas et al., 2020). Specifically, Niklas and colleagues (2020) were able to show, about the home literacy environment, that parents with higher socio-economic status have a more positive attitude towards reading together with their children, as evidenced by the fact that, according to the parents surveyed, reading together is considered an important activity in the home environment. Similarly, parents with higher socio-economic status are aware that reading together is fundamentally important for the

development of children's language and reading abilities. In contrast, families with lower socio-economic status show fewer positive attitudes towards reading together on average (Niklas et al., 2020). Niklas and colleagues (2020) also point out that parental beliefs about reading together act as a mediator between socio-economic status and children's language abilities.

4.3.3 The relationship between family structures and educational processes

The theoretically postulated relationship between family structures and educational processes in the home learning environment is well documented empirically (Attig & Weinert, 2020; Kluczniok et al., 2013; Leseman & Van De Boom, 1999). In Germany, the relationship between a child's family background characteristics and their developmental and educational opportunities is particularly evident at a very early age (Attig & Weinert, 2020; John-Ohnesorg & Jungkamp, 2016; Weinert et al., 2010).

Empirical findings have long confirmed that various aspects of family structures, such as socio-economic status, influence child development (Coleman, 1968), mediated by educational processes (e.g., Lehl, 2018; Niklas, 2015; Niklas & Schneider, 2017; Niklas et al., 2020). Family structures are considered significant predictors of a stimulating home learning environment in which diverse, high-quality learning-stimulating activities and interactions occur (Attig & Weinert, 2020; Foster et al., 2005; Walper & Grgic, 2013). In this relation, the educational level of parents is an empirically proven and particularly influential predictor of educational processes in the home learning environment: Studies show that parents with higher levels of education are more likely to create a stimulating home learning environment by specifically promoting cognitive, linguistic and social abilities and offering more high-quality interactions (Junge et al., 2021; Kluczniok et al., 2013).

In detail, it has also been shown that parents with higher incomes, parents who live in stable relationships, and parents in families with few children are more inclined to participate in educational processes with their children (Hart & Risley, 1995; Kluczniok et al., 2013; Leseman & Van Den Boom, 1999; Votruba-Drzal, 2003).

However, an important aspect must be emphasised to contextualise these findings: Children from families with low incomes or low levels of education do not necessarily exhibit poorer academic performance or limited cognitive, mathematical, and linguistic abilities (e.g., Gessulat, 2022). Child development and educational participation⁴ are largely determined by parents' interactions with their children, with parental background characteristics (including income and educational level) playing a secondary role (Sylva et al., 2004). A more in-depth examination of the empirical evidence regarding socio-economic status and family settings is provided in Chapter 5.3.

4.3.4 The relationship between parental beliefs and educational processes

In addition to family structures in the home learning environment, parental beliefs also play a central role in enabling diverse, high-quality educational processes. It is generally accepted in academic discourse that there is a connection between parental beliefs and educational processes, for example in the context of early language development: Studies show that parents with a positive attitude towards reading aloud engage in such activities more frequently and display more active reading behaviour when interacting with their children (Niklas et al., 2020; Weigel et al., 2006). According to Niklas and colleagues (2020), parental beliefs about reading are crucial for the language abilities of three- to four-year-olds, mediated by the home learning environment. This underscores the importance of parental engagement in promoting high-quality language-stimulating activities and, ultimately, children's language development (Sylva et al., 2004). Various studies have also shown that parental beliefs influence the quality and quantity of language-related and mathematical activities in the family (Alam & Dubé, 2023; Bojczyk et al., 2018; Jacobs et al., 2005; Lehl, 2018; Zippert & Rittle-Johnson, 2020).

⁴ Issues relating to children's participation in education concern whether and to what extent children from all social classes have access to educational opportunities and are given the chance to make the most of their educational prospects (Prengel, 2016).

When contextualising empirical findings on parental beliefs, however, it must also be noted that these are embedded in social and cultural contexts: Cultural values and norms determine which educational goals, behaviours, and characteristics parents consider desirable while raising their children, as evidenced by studies focusing on parents with a migration history (Erdem-Möbius et al., 2022a; Erdem-Möbius et al., 2022b). For example, ideas about parental roles, behaviour, and educational goals differ significantly across cultures and even within countries, depending on social class or level of education (Cheah & Chirkov, 2008). Without this contextualisation, there is a risk of misinterpretation or ethnocentrism⁵ (Sümer et al., 2025).

In addition to values, norms and educational aspirations, parental self-efficacy is considered an important construct of parental beliefs. Self-efficacy is understood as confidence in one's own abilities and the belief that one can master a particular challenge (Bandura, 1994). For example, high parental self-efficacy has a positive influence on the frequency of parent-child activities (Peacock-Chambers et al., 2017). It should be noted here that the empirical findings on parental self-efficacy are described in detail in Chapter 5.2.

4.3.5 The interplay between family structures, parental beliefs and educational processes

Family structures and parental beliefs influence each other and shape educational processes in the home learning environment, which, in turn, influence child development (Junge et al., 2021; Kluczniok et al., 2013; NICHD Early Child Care Research Network, 2003; Tietze et al., 2005). This has been empirically confirmed by numerous studies (Lehrl, 2018; Linberg et al., 2020; Niklas, 2015; Niklas et al., 2020; Niklas & Schneider, 2017). Specifically, studies have shown that family structures and parental beliefs are also linked to the quantity and quality of learning-

⁵ Ethnocentrism refers to the evaluation of other cultures from the perspective of one's own culture and the belief in the superiority of one's own group (Summer, 1906)

stimulating activities (Foster et al., 2005; Giallo et al., 2013; Green et al., 2007; Junge et al., 2021; Justice et al., 2020; Lehl et al., 2020a). The differentiation between processes is important because global processes tend to be independent of family structures and parental beliefs, whereas domain-specific processes (e.g., targeted language or mathematics support) are more strongly linked to these factors (Junge et al., 2021; Kluczniok et al., 2013).

However, empirical studies also show that the connection between family structures and educational processes in the home learning environment is usually moderate. They often have an indirect effect by influencing the opportunities and resources available for learning-stimulating activities (Elliot, 2020; Kluczniok et al., 2013). Therefore, family structures have a significant but not solely decisive influence on educational processes. The concrete interactions and learning-stimulating activities in everyday family life are crucial for child development (Sylva et al., 2004).

Educational processes, such as reading, playing, and talking together, are more strongly influenced by parental beliefs (Kluczniok et al., 2013). For example, parental beliefs about reading together act as a mediator between a family's socio-economic status and the language abilities of three- to four-year-old children (Niklas et al., 2020). Ultimately, the strength of the connection between family structures, parental beliefs, and educationally stimulating processes varies across cultural, social, and economic contexts, thus demonstrating the context-dependence of the home learning environment (Elliot, 2020; Kluczniok et al., 2013).

4.4 Research on educational processes in the home learning environment of infants and toddlers

While the multidimensionality of the home learning environment for children between the ages of three and six has been extensively studied, research on children in their early years is relatively limited in this regard (Kluczniok et al., 2025; Linberg et al., 2020). Therefore, the following chapter explicitly summarises the findings on the educational processes of children between the ages of zero and three.

Recent studies illustrate the crucial role of the home learning environment in child development, with many studies focusing on children aged three to six years (Junge et al., 2021; Lehl et al., 2020b; Niklas et al., 2020; Niklas & Schneider, 2017). Nevertheless, it is important to recognise that the foundations for learning are laid much earlier in life. For example, research shows that even newborns are able to distinguish between their first language and a foreign language (Isaacs, 2021; Moon et al., 1993).

Significant and rapid changes in child development can be observed in the first year of life (Linberg et al., 2020; Rodriguez & Tamis-LeMonda, 2011). From this, it can be concluded that the child's brain is geared towards early learning and, to a certain extent, expects new experiences and stimulation, based on which development in infancy and early childhood can take place. In addition, research has shown that the period of rapid brain growth in infancy and early childhood – especially from birth to age three years – is critical for cognitive, social and emotional development (e.g., Rodriguez & Tamis-LeMonda, 2011; Siegler et al., 2016). During this period, different aspects of the home learning environment are important, depending on the child's age (Niklas & Lehl, 2025). Not only do basic interactions between parents and children change during this period, but also, in particular, learning-stimulating activities between the two actors (e.g., Brophy-Herb et al., 2018; Linberg, 2018). Therefore, research should focus more on the quality and quantity of direct interactions and learning-stimulating activities during these formative early years (Hall et al., 2021; Linberg et al., 2020).

The World Health Organisation (WHO) also emphasises the importance of parental involvement in early learning during the first three years of life (the first 1,000 days) and considers this period to be crucial for educational processes in early childhood (WHO, 2020). In addition, parents are usually the first interaction partners for children during this phase of life and thus promote child development across various educational domains (Dinkel & Snyder, 2020; Posner et al., 2014). Nevertheless, there are still significant gaps in our knowledge regarding the home

learning environment of children under the age of three, and in particular during the first year of life (Burghardt et al., 2020; Dodici et al., 2003; Klucznik et al., 2025; Linberg et al., 2020), as this age group is studied less frequently than children aged three years and older (Hall et al., 2021). An in-depth investigation of parental practices in relation to the development of children under the age of three can therefore significantly expand our understanding of the home learning environment of young children.

Empirical findings indicate that in early stages of the home learning environment, it is beneficial for parents to provide learning-stimulating activities such as shared reading or picture book interactions, which enrich children's language development through high-quality verbal interactions (Hayes & Berthelsen, 2020) and promote the development of early literacy abilities (NICHD Study of Early Child Care, 1999; Rodriguez & Tamis-LeMonda, 2011; Attig & Weinert, 2019; Klucznik et al., 2025). Empirical evidence consistently supports the assumption that (informal) learning experiences play a significant role in early development, with (pre-)reading activities being particularly effective when initiated at an early stage (Niklas et al., 2016c; Sénéchal et al., 1996). Specifically, it is empirically proven that looking at picture books together with children under the age of three is associated with improved reading and language abilities (Attig & Weinert, 2020; Karrass & Braungart-Rieker, 2005; Rodriguez & Tamis-LeMonda, 2011), with parents playing a crucial role in this process (Goldstein & Schwade, 2008; Tamis-LeMonda et al., 2014). Furthermore, research shows that both the quantity of shared reading and the timing of the first reading aloud are important factors (Attig & Weinert, 2020; Rodriguez & Tamis-LeMonda, 2011; Wirth et al., 2020). According to Niklas and colleagues (2016c), many parents begin reading to their children around 6 months of age. At the same time, a study by Linberg and colleagues (2020) shows that children are exposed to different qualities and quantities of learning-stimulating activities as early as seven months of age. Therefore, understanding the early home learning environment is just as important as investigating its effects in later life stages. Although previous research findings on the addition or mediation

of the effects of sequential home learning environments are mixed (Burghardt et al., 2020), certain research findings suggest that educational processes within the home learning environment of infants are related to the vocabulary of children aged two, three and four (Brushe et al., 2025; Kluczniok et al., 2025; Linberg et al., 2020) and that the quality of interactions and learning-stimulating activities between the ages of one and three is related to later language abilities and academic achievements (Brushe et al., 2025; Tamis-LeMonda et al., 2019). It cannot be denied, therefore, that the study of children's early home learning environments is a promising area of research, as this formative phase provides important insights into early developmental processes of cognitive, emotional and social abilities (Rodriguez & Tamis-LeMonda, 2011; Siegler et al., 2016).

The preceding explanations indicate that research has slowly begun to examine the home learning environment of one-, two- and three-year-old children (e.g., Burghardt et al., 2020; Brushe et al., 2025; Hall et al., 2021; Kluczniok et al., 2025; Linberg et al., 2020). Apart from studies on early picture book interactions (Ganea et al., 2009; Horst et al., 2011; Karrass & Braungart-Rieker, 2005; Montag et al., 2015; Weisleder & Fernald, 2013), learning-stimulating activities within the home learning environment continue to be rarely considered, especially for children under twelve months of age (Hall et al., 2021; Linberg et al., 2020). As explained at the outset, the foundations for children's learning are laid from birth, and significant and rapid changes in child development occur within the first year of life. Therefore, the insufficient research on educational processes within the home learning environment represents a significant research gap.

5 Parental stress, adaptation, and important specific resources in the home learning environment

From a systemic perspective, different resources contribute to the strength and adaptability of families (Boyd-Franklin & Karger, 2012; Kirmayer et al., 2011; McCubbin & McCubbin, 2013; Walsh, 2021). Furthermore, transformative adaptation processes within the home learning environment can neutralise factors

that lead to increased perceptions of stress and mobilise resources in the home learning environment (Ungar, 2010). The perspective of successful adaptation underlying this dissertation aims to maintain a stimulating home learning environment.

The importance of educational processes in the home learning environment has already been discussed in the previous sections. Based on the structural-processual model of the home learning environment (Chapter 4.3), the following section provides a detailed overview of the importance of parental stress, specific parental resources and resources of the family system in the context of the home learning environment.

5.1 Stress in families and its impact on child development

Stress in families is closely linked to the availability and perception of resources. If material, social or emotional resources are lacking or are perceived as insufficient by family members, stress levels rise significantly (Dunst, 2022; Slopen et al., 2022). This is particularly true for parents in socio-economically disadvantaged situations, as they often feel that their resources are insufficient to meet their children's needs. There is often a lack of time, money, emotional support and access to helpful services (Brody et al., 1999; McManus & Suizzo, 2021; Pereira et al., 2024).

The constructs underlying stress research for investigating parental stress⁶ were originally described by Lazarus and Folkman (1984). According to them, stress is 'a particular relationship between a person and their environment that is evaluated by the person as significant and in which the demands exceed their own coping resources' (p. 19). According to Lazarus and Folkman (1984), parental stress arises when parents perceive that the demands of parenthood exceed their resources and coping mechanisms. However, other potential stresses (e.g., low socio-economic

⁶ The transactional stress theory developed by Lazarus and Folkman serves as the basis for much research and many models dealing with stress in parents. They define stress as an overarching term that describes a stressor perceived by parents. While 'parenting stress' refers to the specific stressors that arise from the role of being a parent, the term 'parental stress' is broader and encompasses all potential stresses to which a parent is exposed (Lisanti, 2018).

status or mental health problems) to which parents are exposed can also cause increased parental stress (Lisanti, 2018). Parental stress not only affects the well-being of parents but also has a relation to lower cognitive development in children and an increased incidence of socio-emotional behavioural problems (Jones et al., 2021; Ward & Lee, 2020). In this regard, stress-induced increased potential for conflict within the family can moderate the effect in some cases (Löchner et al., 2024).

More recent approaches to parental stress also focus on the distinction between everyday stress and stressful life events, conceptualised more as global stress: Everyday stress describes daily, recurring stresses such as time pressure, parenting tasks that are perceived as overwhelming, or conflicts in everyday family life (Gauthier-Légaré et al., 2022; Tein et al., 2000). Traumatic life events, on the other hand, describe extraordinary, rare and drastic events such as divorce or separation, loss of employment or illness of a family member. This type of stress also leads to increased feelings of stress in families but has a less significant impact on mental well-being and parental behaviour than everyday stress (Gauthier-Légaré et al., 2022; Tein et al., 2000).

It is also essential to consider the determinants that influence parents' perception of stress: Whether and how parents experience stress also depends on their individual perception of the situation, their assessment of available coping strategies and the resulting adaptation. For example, if parents perceive parenting situations as challenging or even overwhelming and feel that their coping abilities are inadequate, their perception of parental stress increases (Fang et al., 2024; Levy-Shiff et al., 1998; Nazaré & Fonseca, 2021; Pisula, 2011). Parental stress is therefore not an objective state. Still, it arises from the subjective assessment of the parenting situation and results from the interaction of parental factors, child-related factors and environmental circumstances (Lazarus & Folkman, 1984).

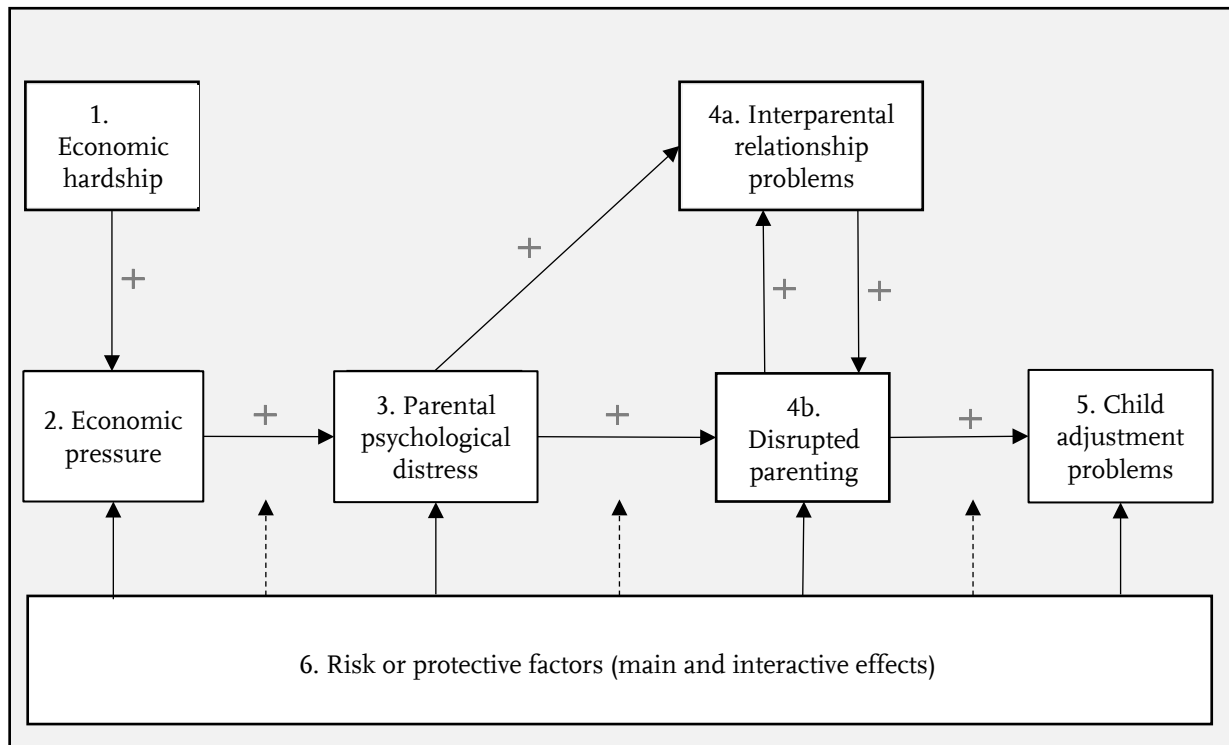
Research dealing with parental stress in the context of child development often refers to the family stress model (Conger et al., 1992; Masarik & Conger, 2017) (Figure 3). This model is widely used as a framework for understanding how certain

stressors affect families and child development. It also serves as an important basis for prevention and intervention measures to support families who are particularly exposed to stress. In detail, it illustrates how certain stressors (e.g., financial burdens) increase parents' perception of stress. Perceived stress can, in turn, affect parental relationships and parenting behaviours (e.g., parent-child interaction, provision of learning-stimulating activities), which can ultimately have a negative impact on children's adjustment and development (e.g., children's learning, behaviour, and psychological well-being). The model emphasises indirect effects, whereby children are primarily affected by changes in parental well-being and parent-child interactions rather than by the direct impact of a specific stressor itself (Masarik & Conger, 2017). The family stress model also considers both risk factors (e.g., low socio-economic status or mental health problems) and protective factors (e.g., the availability of social support) within a family's environment.

In more recent approaches, the family stress model has been expanded to account for additional culturally specific stressors and crises (e.g., the COVID-19 pandemic) (Oppermann et al., 2021; Prime et al., 2020; Taylor et al., 2024).

Figure 3

The family stress model (Conger et al., 1992; Masarik & Conger, 2017)



Research findings show that high parental stress is associated with lower quality parent-child interactions and less cognitive stimulation and emotional warmth in interactions between parents and children (Field, 2010; Linberg, 2018; Mills-Koonce et al., 2011). In addition, parental stress experiences influence the extent to which parents offer their children learning-stimulating activities, which in turn are considered a key variable in strengthening child development (Gershoff et al., 2007; Löchner et al., 2024).

Although the family stress model identifies financial burdens and employment-related problems as the main stressors (Algarvio et al., 2018; Conger, 2025; Pearce & Kiel, 2025), there is empirical evidence that other factors can also cause parental stress, such as lack of time and conflicts between work and family (work-family conflicts). According to this, parents who work long hours, do shift work or have inflexible working hours experience more work-family conflicts and thus higher levels of stress (Leach et al., 2021; Li et al., 2020; Moreira et al., 2019; Yang & Kim,

2021) and tend to find parenting tasks more challenging (Harknett & Hartnett, 2011; Taylor & Conger, 2017).

Furthermore, research shows that the perception of stress in stressful life situations and how it is coped with are influenced by expectations of one's own self-efficacy: Parents who have less confidence in their own parenting abilities experience more stress and uncertainty in everyday family life (Crnic & Ross, 2017; Gessulat, 2022). In addition to child-related factors (e.g., child temperament, chronic illness) and mental illness of the mother, single parenthood (Menon et al., 2020; Williford et al., 2007) is considered to be a contributing factor to increased parental stress. In terms of Germany, current statistics show that the vast majority of single parents are mothers. According to these statistics, in 2024, there were approximately 2.3 million single mothers and around 496,000 single fathers in Germany (Federal Statistical Office, 2025). Single parents, and single mothers in particular, experience significantly more stress and psychological strain than parents in partnerships (Hallerbäck et al., 2025; Liang et al., 2019). Particular financial burdens, less social support from friends and family, and sole responsibility for raising children are key causes of increased parental stress among single parents, with financial burdens in particular accounting for much of the difference in stress levels between single parents and parents in partnerships (Hallerbäck et al., 2025; Liang et al., 2019; Shorey & Pereira, 2023). Despite higher stress levels, however, many single parents show a comparable quality of parent-child relationship to parents in partnerships, provided that sufficient financial and social resources are available (Golombok et al., 2016; Weinraub & Wolf, 1983). However, parents in large families, i.e. parents who live together as a couple with four or more children in a shared household (Toth et al., 2020), also experience more stress on average, especially when there is a lack of support and high levels of stress, which was particularly evident during the COVID-19 pandemic (Calvano et al., 2022; Jensen et al., 2022; Johnson et al., 2022).

However, in addition to the type and accumulation of stressors, the ratio of resources to stressors is also decisive for the extent of perceived stress in families: Empirical studies show that parents who are exposed to high levels of stress and

have few resources available to them score higher on measures of depressive and anxiety symptoms as well as sleep problems. Conversely, having many resources can reduce stress levels even when multiple stressors are present (Dunst, 2022; Slopen et al., 2022).

The extent of perceived social support and parental coping strategies, i.e. strategies for adapting to challenging life circumstances, have proven to be essential resources and helpful protective factors against stress (Goreis et al., 2020; Halstead et al., 2018; Oppermann et al., 2021): Social support, i.e. the sense of belonging to a social network that offers support in challenging situations and/or stress management Cohen (2004), can reduce parental stress and act as a buffer – especially in times of crisis such as the COVID-19 pandemic (Oppermann et al., 2021). Social support can also promote positive parent-child interactions and protect against the negative effects of stress (McConnell et al., 2011). In addition, social support can act as a protective factor both directly and indirectly, particularly through emotional aspects of support and stable support networks (e.g., individuals or institutions that offer support in stressful situations) (Halstead et al., 2018). The combination of coping and social support is also particularly effective (Goreis et al., 2020; Taylor & Conger, 2017). Finally, recent research has found that high self-efficacy beliefs are associated with lower stress reactions and faster coping in crisis situations (Bojczyk et al., 2018; Gessulat, 2022; McConnell et al., 2011; Taylor & Conger, 2014). Detailed descriptions of how parental coping and appraisal, parental self-efficacy beliefs, and social support can be located as resources and support systems for the home learning environment are provided in chapters 5.2.1, 5.2.2, and 6.2.3.

5.2 Parental resources: Parental beliefs and abilities

As already explained in Chapter 4.3, Melhuish and colleagues (2008) point out that family structures, such as family income and parents' educational level, are important for educational processes but also represent relatively stable aspects of the home learning environment that are difficult to change. To improve the quantity

and quality of educational processes, it therefore makes sense to focus on specific parental beliefs, such as self-efficacy and to look at methods for strengthening them. In addition to parental beliefs, parental coping abilities are also an important resource in the home learning environment.

5.2.1 Parental adaptation abilities: Coping and appraisal

The adaptability of families in the face of crises and challenging situations can be described using the concept of *coping* (DeHaan et al., 2013). Coping is understood as a context-related construct and encompasses a broader spectrum of goal-oriented strategies (e.g., cognitive and behavioural actions) used to manage stress, challenges, and burdens. As Folkman and Moskowitz (2004) emphasise, coping is a complex and dynamic process that encompasses individual and environmental factors as well as their interactions. Consequently, the effectiveness of coping strategies is highly dependent on the respective stress-inducing context and may be effective in one situation but not in another (Folkman & Moskowitz, 2004).

Cognitive and behavioural coping strategies generally aim to reduce or manage situational demands that exceed one's own resources (VandenBos, 2007). Parents use a wide range of coping strategies in challenging and stressful situations. The choice and effectiveness of these strategies significantly impact the family's experience of stress and well-being (Karnas, 2023; Vernhet et al., 2019). The most prominent conceptualisation of coping strategies comes from Lazarus and Folkman (1984) and is based on the distinction between problem-oriented and emotion-oriented coping strategies⁷. Problem-oriented active coping describes strategies that directly target a stressor (Carver et al., 1989; DeHaan et al., 2013). Such a coping strategy can be observed, for example, when parents in economic hardship actively seek solutions to overcome economic pressure by learning about government support programmes or local assistance services that offer financial relief. Emotion-

⁷ In some contexts, it is argued that the current classification of coping strategies used by parents to manage perceived stress is too simplistic and that a more precise subdivision is required (for an overview, see Karnas 2023).

oriented coping strategies focus on regulating one's own emotions in a challenging situation without necessarily solving the underlying problem (Folkman & Moskowitz, 2004). They are used more frequently when the situation appears unchangeable to the individual (Stapinski et al., 2010). The targeted search for social support is also considered an important coping strategy (Carver et al., 1989; Vernhet et al., 2019). A detailed description of how social support can be located as a resource in the home learning environment is provided in Chapter 6.2.3.

In summary, the specific added value of these coping strategies lies in enabling an effective response to experienced stress and mobilising adaptive resources from the environment. In this regard, the cognitive evaluation of a particular stress-inducing event is also relevant, as it significantly influences how stressful a situation is perceived to be (Lazarus, 1966; Lazarus & Folkman, 1984). Specifically, a distinction is made between primary and secondary *appraisal* in this relation. The primary dimension of appraisal refers to the significance attributed to an event and the extent to which it is perceived as harmful, threatening, or challenging. The secondary dimension of appraisal, on the other hand, focuses on personal resources available to cope with a particular situation. The interaction between primary and secondary appraisals influences the level of perceived stress (Lazarus & Folkman, 1984).

It is thus clear that coping is a complex, multi-layered process that is influenced by both the environment, with its demands and resources, and by individual personality traits (e.g., the ability to manage one's own emotions) (Langenhof & Komdeur, 2018; Sánchez-Álvarez et al., 2015).

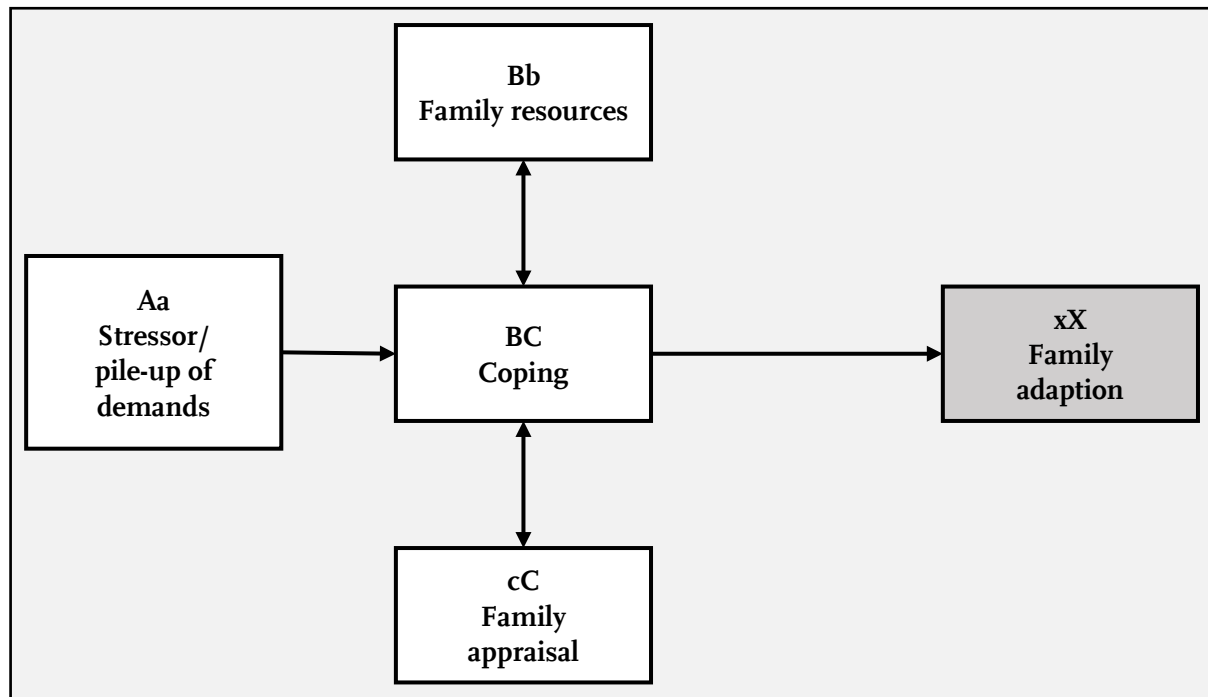
It should be noted that cultural and biographical backgrounds, as well as basic personality traits, can also help explain how individuals deal with stress. However, the concept of coping proves to be a superior approach, as coping strategies can be learned and changed and are therefore particularly suitable for intervention measures (Folkman & Moskowitz, 2004).

Studies on the adaptability of families often draw on McCubbin and Patterson's (1983) double ABC-X model of family adaptation (Figure 4). This model extends the original ABC-X model to include the dimensions and processes families use to adapt to stressors. The model focuses on the following key elements: stressors that place strain on families, such as challenging situations or crises (A); internal and external resources that families use to cope with these stressors, such as financial resources and social support (B); and finally, the specific perception and evaluation of the stressors (C). The combination of internal and external resources and the specific perception and appraisal of stressors results in the coping strategies that a family uses to respond to stressors (BC). The interactions among these central elements ultimately influence the family's adaptability (X).

The model also considers the synchronicity or overlap of everyday stress and challenging and stressful situations by considering additional stressors that can exacerbate the stress that families are already exposed to in everyday life (aA). The same applies to expanded resources (bB) and changes in the meaning attributed to a challenging situation (cC) (McCubbin & Patterson, 1983).

Figure 4

The double ABC-X model of family adaptation (McCubbin & Patterson, 1983)



Research also shows that parental coping abilities are crucial for managing parental stress and are closely linked to the quality of interactions between parents and children (Oppermann et al., 2021; Taylor & Conger, 2017). Developing and applying effective coping abilities not only promotes parents' well-being but is also crucial for positive parenting practices and children's socio-emotional development (Gulliford et al., 2015; Oppermann et al., 2021; Taylor & Conger, 2017). Particularly during stressful events such as the COVID-19 pandemic, coping strategies have been shown to not only reduce parents' stress levels but also strengthen their emotional bond with and support for their children (Baugh et al., 2024; Fogel et al., 2022; Gedaly et al., 2024). Problem-oriented active coping strategies, which aim to directly address underlying problems, seem particularly beneficial for families' adaptability, as they are associated with lower stress levels in parents and are considered protective of their well-being (Cheng & Lai, 2023; Vernhet et al., 2019). There is also empirical evidence for the relevance of the appraisal of an event: Nazaré and Fonseca (2021) showed that a negative appraisal of the birth of a child increased mothers'

stress levels. Ultimately, however, there is also empirical evidence that coping strategies can be changed and specifically strengthened through targeted interventions (Douma et al., 2021; Gil et al., 2000; Holday & Smith, 1995; Vernhet et al., 2019). Despite the complexity and context-dependence of the coping construct, research in this area offers valuable insights into how families can cope with crises and challenging situations. On this basis, effective, targeted interventions can be developed to support families in better coping with acute and chronic stress.

Finally, it should be noted that coping strategies can originate from individual family members as well as from the family as a whole – e.g., in the sense of familial resilience – (DeHaan et al., 2013). However, a detailed examination of this possibility is not relevant to the scope of this dissertation. To embed coping as a parental ability within a resource-oriented representation of the home learning environment, the focus here is deliberately on parents' individual coping strategies. Furthermore, Taylor and Conger (2017) point out that, due to the changeability of coping strategies, internal personal resources in particular represent a promising approach for family support programmes.

5.2.2 Parental self-efficacy beliefs

Lazarus and Folkman (1984) postulate that individuals who believe in their ability to cope with or change a situation tend to favour problem-oriented coping strategies, which in turn promote the adaptability of families. It therefore seems sensible to consider parental beliefs, such as parental self-efficacy, together with parental coping and appraisal under the dimension of parental resources.

Self-efficacy arises from the belief in one's own ability and the conviction that one is capable of accomplishing a specific task (Bandura, 1994). When a task is successfully completed, this strengthens the perception of one's own self-efficacy. However, this also applies in the reverse scenario: Failure to complete a task reduces the perception of one's own self-efficacy (Bojczyk et al., 2018). Therefore, self-

efficacy beliefs are considered relevant for coping with specific tasks or challenges, especially in the context of perceived stress (Gessulat, 2022; Niklas & Lehl, 2025).

In recent years, the concept of self-efficacy beliefs has also gained attention in the context of successful parenting (Gessulat, 2022, for an overview). Parental self-efficacy reflects parents' perceptions of their ability to be successful in their role as parents, i.e., to raise a child and adequately support their learning and development (e.g., Bojczyk et al., 2018; Hess et al., 2004).

A central assumption about parental self-efficacy is that parents with a strong sense of self-efficacy tend to support their children more competently across various developmental stages. In contrast, parents with low self-efficacy may have difficulty coping with the complex demands of parenthood (Bandura, 1997). Furthermore, it is assumed that parental beliefs, such as perceived self-efficacy, develop over the course of a lifetime, are mediated by acculturation processes⁸, and are stable in the medium term (Glatz et al., 2022; Melhuish et al., 2008). They are therefore subject to only slow change.

In the family context, empirical studies show that parental self-efficacy is crucial for creating an environment in which children can experience learning (Bojczyk et al., 2018). As early as the 1990s, researchers found that parents with a higher sense of self-efficacy spent more time carrying out learning-stimulating activities with their children at home (Hoover-Dempsey et al., 1992). More recent studies also show that parental self-efficacy is a key predictor of positive parenting behaviour, educational processes and, ultimately, beneficial child development (Albanese et al., 2019; Gessulat, 2022; Jones & Prinz, 2005; Peacock-Chambers et al., 2017; Vukovic et al., 2013). Regarding the quantity of educational processes, empirical evidence shows that parents with high parental self-efficacy offer their children significantly more learning-stimulating activities, which in turn correlates with better language and

⁸ Acculturation processes encompass comprehensive social, psychological and cultural changes that occur when two or more cultures engage in long-term contact. This process is bidirectional, whereby elements of one culture, such as language, values and traditions, are adopted or adapted (Berry, 1970).

social abilities in children (Bojczyk et al., 2018; Gessulat et al., 2024; Peacock-Chambers et al., 2017). Furthermore, studies show that parents from disadvantaged backgrounds (low family income, low level of parental education) and parents with a migration history or refugee experience (especially in the phase of adaptation to new cultural requirements) often have lower scores in parental self-efficacy (Ardelt & Eccles, 2001; Boruszak-Kiziukiewicz & Kmita, 2020; Gessulat et al., 2023; Peacock-Chambers et al., 2017; Wittkowski et al., 2016). This can further exacerbate disparities in children's home learning environments. The findings also point to the importance of considering the relations between family structures and parental self-efficacy.

There is now also a scientific consensus that self-efficacy beliefs must be addressed in a domain-specific manner if the goal is to strengthen specific abilities in certain areas (Bojczyk et al., 2018; Pajares, 1996). This means, for example, that parents' language-related self-efficacy must be specifically strengthened if the goal is to increase parental ability in supporting their children's language development (Bojczyk et al., 2018).

5.3 Potential resources of the family system: Structures, co-parenting and time

Even though family structures in the home learning environment are considered relatively stable and difficult to change (Melhuish et al., 2008), depending on their characteristics, they can still provide important resources within the family system to strengthen children's educational processes. This is the case, for example, when a family has a high socio-economic status or in family settings where there is a balanced ratio of adults to children within the family.

In addition to specific family structures, factors such as the quality of the parental couple relationship and co-parenting, i.e. cooperative collaboration between parents, within the family also appear to be relevant resources (Margolin et al., 2001; Nunes et al., 2021; Schoppe-Sullivan et al., 2016). These aspects, such as specific family structures, contribute significantly to child development.

Ultimately, however, available time resources are also necessary for designing educational processes within the home learning environment. The following chapters, therefore, deal with a detailed examination of these resources.

5.3.1 Specific family structures: Socio-economic status

The *socio-economic status* of a family is an essential component of family structures and reflects a child's social background (Baumert & Maaz, 2006; Elliott & Bachman, 2018). Since socio-economic status can be operationalised in different ways and therefore reflects different aspects, the consideration of various indicators (e.g., parental education [e.g., ISCED], the occupational status of parents [e.g., ISEI-08], family income and perceived financial problems due to poverty and job loss) can play a decisive role in interpreting relations (Braveman et al., 2005; Mues et al., 2021).

The *International Socio-Economic Index of Occupational Status* (ISEI; Ganzeboom & Treiman, 2003) is considered an established, internationally used classification of socio-economic status. The ISEI enables the categorisation of occupations on a one-dimensional scale, allowing individuals' social status to be classified (Schimpl-Neimanns, 2004). The occupation is regarded as the element that mediates between education and income (Niklas & Lehl, 2025).

Another way of operationalising socio-economic status is to use the *International Standard Classification of Education* (ISCED). The ISCED is an internationally recognised system developed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) for classifying levels and types of education that takes into account different education systems and formats. Low ISCED levels, ranging from zero to two, correspond to secondary or lower secondary education. Medium levels (three to five) classify general secondary education up to short-cycle tertiary education, while high levels (six to eight) represent bachelor's degrees or higher education (UNESCO, 2011). The ISCED is regularly updated to reflect changing educational realities and serves as the basis for many national and international research projects, statistics and education reports.

Social factors such as poverty and financial burden are also linked to processes in the home learning environment (Bolten, 2024). Disparities in the home learning environment could therefore also be explained by *family income* and *perceived financial problems* resulting from poverty. As explained in Chapter 5.1, families in socio-economically disadvantaged situations in particular lack the basic resources to meet their children's needs. In addition, the perception of poverty is often accompanied by anxieties or existential concerns about the future, which also hinders the creation of a stimulating home learning environment (Bendickson, 2020). As a result, children affected by poverty often experience less linguistic stimulation, less cognitive support and an overall less supportive home learning environment (Neuman et al., 2018).

Research on the home learning environment has repeatedly shown that family structures, such as a family's socio-economic status, have a clear but moderate influence on processes within the home learning environment, even if they do not fully explain its variance (Lehrl, 2018; Melhuish et al., 2008; Niklas & Schneider, 2013, 2017; Sylva et al., 2004; Wirth et al., 2023). For example, there is evidence that the home learning environment of children from socially disadvantaged backgrounds, whose parents have less formal education, less prestigious occupations and lower household incomes, is less stimulating for children's learning (Anders et al., 2012; Niklas & Lehrl, 2025; Tietze et al., 2005). Specifically, research findings indicate that low socio-economic status is often associated with less parental involvement in learning-stimulating activities, which can impair positive developmental outcomes in childhood (Melhuish et al., 2008; Sylva et al., 2004). Studies that specifically examine children's language and reading abilities show that the home learning environment of children from families with lower socio-economic status has fewer linguistically stimulating interactions, which, in turn, negatively impacts children's language and reading abilities (Morgan, 2005; Niklas et al., 2016a).

As already explained in Chapter 4.3.3, the following must be noted regarding the empirical significance of socio-economic status: Although the various aspects of socio-economic status are an important influencing factor within the home learning environment, they cannot fully explain disparities in child development. Low socio-economic status often, but not necessarily, has a negative impact on child development. According to the structural-processual model of the home learning environment, it is the processes (e.g., learning-stimulating activities) within the family that make the decisive difference for successful child development (Sylva et al., 2004).

5.3.2 Specific family structures: The family setting

The family setting describes the composition of adults and children within a family (adult-child ratio) but also includes the age difference between siblings (Niklas & Lehl, 2025). Differences in the availability of resources, such as parental attention and patience, that each child receives sometimes result from the family setting and are explained using the resource dilution model (Öberg, 2017; Steelman et al., 2002). According to the resource dilution hypothesis (Blake, 1989), a family's resources, such as time, material goods, linguistic stimulation and cognitive support, must be shared among siblings. The share of resources each child receives is directly related to their development and educational success. As a result, a child in a family with several siblings tends to receive fewer resources, while an only child experiences these resources, especially parental attention, undivided (Blake, 1989; Steelman et al., 2002).

Several studies support the idea that individual development and educational success of children are reduced when there are more children in the household, consistent with the resource dilution hypothesis (Bagger et al., 2021; Conley, 2000; Helbig, 2013; Jæger, 2007; Wu, 2016). However, more recent studies argue that this effect is context-dependent, gender-specific and multidimensional, and that the positive influence of older siblings is often completely ignored (e.g., Helbig, 2013).

Another topic of discussion is that social and interpersonal resources diminish less quickly than financial or material resources (Wu, 2016).

Ultimately, different family settings can also be described using typologies, or family types. The family type (such as single-parent, two-parent, or large families), which comprises various personal resources, is also considered a characteristic of family structures. A study conducted in 2019 shows that taking family types into account can be empirically relevant: Children from two-parent families performed better at school than children from other family types (Guetto & Panichella, 2019). However, when considering such findings, it is essential to take into account the role of social, cultural, and economic resources, as well as the often higher level of family stability in two-parent families. In research on family types, these aspects are often considered confounding factors (Guetto & Panichella, 2019; Lindemann, 2024; Pribesh et al., 2020; Seyda & Lampert, 2009). Simply looking at family structure alone cannot fully explain differences in children's academic success and development, nor can it be interpreted as a causal relationship (Niklas & Lehl, 2025; Seyda & Lampert, 2009). Nevertheless, growing up in a single-parent family (minor or adult children living with a single parent in one household) is often seen as a risk factor for child development (Evans et al., 2013; OECD, 2018; Taylor & Conger, 2014; Waldfogel et al., 2010). There is empirical evidence that life as a single parent can be particularly stressful (Harknett & Hartnett, 2011; Kotchick et al., 2005; Taylor & Conger, 2017), and children living in single-parent families are more likely to exhibit adjustment problems, primarily due to financial disadvantage, poorer parental mental health, and poorer parenting practices, including a lack of regular and direct parent-child interactions or learning-stimulating activities (Taylor & Conger, 2014; Waldfogel et al., 2010).

In the debate about the empirical significance of family type for child development, however, it must be emphasised that the identified associations between family type and (cognitive) development in children are often fragile and therefore offer only limited direct explanatory value, and that causal relationships between family type and child development can hardly be proven. Although there is

evidence that children from traditional two-parent families have better educational opportunities on average (e.g., Seyda & Lampert, 2009), the differences compared to children from other family types are often small, inconsistent and not particularly significant (Niklas & Lehl, 2025; Pekrun, 2002). The prevailing view is that the resources available in a family and how they are used to stimulate learning are crucial for successful child development (Niklas & Lehl, 2025; Seyda & Lampert, 2009).

5.3.3 Co-parenting

Co-parenting describes cooperative collaboration in matters of care and upbringing and addresses a relationship level between parents or caregivers, regardless of any romantic relationship between the individuals involved in the upbringing (McHale et al., 2004). The concept of co-parenting⁹ focuses primarily on actively shaping and maintaining the parental role after separation or divorce, mutual support and cooperation between parents, and initiating or participating in joint activities undertaken by those responsible for the care and upbringing of a child (Talbot & McHale, 2004). The concept can be used to describe both individual and multiple aspects of the relationship between parents or caregivers (e.g., agreement on parenting issues, exposure to conflict, mutual support) (e.g., Feinberg et al., 2012; Parkes et al., 2019). According to Feinberg (2003), co-parenting also refers to the distribution of responsibilities for work, household and child-rearing between parents (parental role distribution). Concerning the distribution of parental roles, however, it must be emphasised that social and cultural contexts (e.g., socio-economic status, parental education, cultural background and gender ideologies) influence the way in which parents shape their roles, how satisfied they are with the way they are shaped and how strongly they are involved in the home environment

⁹ In this dissertation, the concept of co-parenting is understood as cooperative parental collaboration after separation or divorce. In everyday family life, however, the term often describes a type of family life in which several adults jointly assume responsibility for the upbringing of one or more children without being or having been in a romantic relationship with each other. Possible forms of family life are not the subject of this dissertation.

(Junge et al., 2021; Lavee & Katz, 2002; Niklas et al., 2020). Parental beliefs about learning also significantly influence how parental roles are exercised and distributed, thereby shaping the home learning environment (Ma et al., 2024).

The concept is now applied to various family types (e.g., single parents, same-sex or heterosexual two-parent families) (Favez et al., 2019; Talbot & McHale, 2004) and is regarded as an important resource for the functioning of families and, consequently, for the development of children in their home environment (Margolin et al., 2001). Co-parenting is understood as a multidimensional concept that defines both positive (e.g., mutual support and cooperative collaboration) and negative dimensions (e.g., conflicts between parents and competitiveness), which coexist simultaneously in families in the form of complex and unique dynamics (Fagan & Kaufman, 2015).

A central assumption of the construct is that the interplay between positive and negative co-parenting aspects (supportive versus conflictual) can be interpreted as either a protective or a risk factor for the well-being and functioning of the family (Nunes et al., 2021). For example, in phases when families are exposed to high levels of stress, responsibilities for work, household chores and child-rearing must be (re)distributed in a spirit of cooperative collaboration. This can have a major impact on the well-being of parents and the functioning of the entire family (Frankhauser et al., 2018; Lamela et al., 2016).

Research highlights the importance of parents working together, sharing responsibilities, and engaging in their children's learning at home, especially in early childhood (Christopher et al., 2015; Parkes et al., 2019). In the family context, empirical studies show that supportive co-parenting has been proven to reduce parental stress (Durtschi et al., 2017; Schoppe-Sullivan et al., 2016) and increase perceptions of parental self-efficacy (Camisasca et al., 2019). Specifically, parents who cooperate report less stress and feel more competent in their parental role (Delvecchio et al., 2015; Park et al., 2025). A lack of supportive co-parenting, on the other hand, has been linked to increased risk of parental stress (Schoppe-Sullivan et

al., 2016), which can lead to a less stimulating home learning environment (see Chapter 5.1).

The importance of co-parenting for child development is also well documented: Conflictual co-parenting has been identified as a risk factor for children's social and cognitive development, while supportive co-parenting is associated with fewer behavioural problems and better socio-emotional abilities in children – even when families are under enormous stress (Nunes et al., 2021; Teubert & Pinquart, 2010). Accordingly, supportive co-parenting can be identified as an important resource and protective factor for the home learning environment.

There is also empirical evidence of the interaction between co-parenting and other aspects of family dynamics, such as the parental couple relationship (e.g., Christopher et al., 2015; Parkes et al., 2019; Talbot & McHale, 2004). Like supportive co-parenting, the quality of the parental couple relationship also has a relation to children's socio-emotional abilities (Goldberg & Carlson, 2014; Marchand-Reilly & Yaure, 2019; Zemp et al., 2016). Specifically, studies indicate that children of parents with high satisfaction in their parental couple relationship and infrequent couple conflicts develop stronger socio-emotional abilities and exhibit fewer behavioural problems (Harold & Sellers, 2018; Li et al., 2023a; Marchand-Reilly & Yaure, 2019; Van Eldik et al., 2020; Parkes et al., 2019).

The relationship between the three variables co-parenting, quality of the parental couple relationship and child development is explained in research by two different central mechanisms – either via the so-called 'spill-over effect' (Nelson et al., 2009) or the 'compensation effect' (Engfer, 1988). The spill-over effect assumes that positive or negative aspects of the parental couple relationship are transferred to parent-child interactions. For example, if parents live in a conflict-ridden couple relationship, this can negatively influence their parenting behaviour (e.g., parent-child interaction, provision of learning-stimulating activities) (Christopher et al., 2015). On the other hand, compensatory mechanisms may play a role in mediation: It is hypothesised that dissatisfaction in the parental couple relationship leads parents to care more intensively for their children, either to compensate for the lack

of love in the parent-child relationship or to protect the child from possible consequences of parental conflicts (Christopher et al., 2015). There is also evidence that negative relations between parental conflicts and child outcomes are mediated by co-parenting (Katz & Low, 2004) and that co-parenting acts as a significant moderating factor between the parental couple relationship and child development (Camisasca et al., 2019; Marchand-Reilly & Yaure, 2019; Parkes et al., 2019). This makes the construct of co-parenting particularly fruitful for research on single-parent families, among others: Empirical findings show that most of these families experience (sometimes long-lasting) stressful conflicts after separation from the other parent (Reim et al., 2024). Strengthening supportive co-parenting practices among separated parents is therefore an important factor in buffering the negative impact of parental conflict on child development (Cox et al., 2021; Kaplan & Pruett, 2000; Nunes et al., 2021).

In summary, the previous argumentation highlights the importance of supportive co-parenting as a key protective factor against family stress and for child development. Supportive co-parenting in families can therefore be seen as a relevant resource in the home learning environment and as a contributor to strengthening educational processes in early childhood.

5.3.4 Time resources

According to Lange (2020b), time is considered a fundamental resource for both the family and social systems as a whole. Accordingly, time spent together and freely available within the family is an essential condition for education and socialisation. Consequently, the availability of *time resources* is an important aspect in terms of a stimulating home learning environment, as the ability of parents to devote sufficient time to educational processes has a direct influence on child development (Hoover-Dempsey et al., 2005; Li et al., 2020).

Specifically, research shows that the time parents spend with their children in learning-stimulating activities has a direct influence on children's cognitive, linguistic and social development (Blaurock & Kluczniok, 2019; Coneus et al., 2010;

Hernández-Alava & Popli, 2017). There is also a certain age dependence of time resources: While basic care (e.g., nursing, feeding, safety) dominates parent-child interactions in the first years of life, targeted learning-stimulating activities and play activities become more important as the child grows older (Hernández-Alava & Popli, 2017). According to Waldfogel (2006), changes in the content of parent-child interactions require a sensitive and appropriate use of time so that parents can respond adequately to specific requirements of each phase of child development. The extent to which time resources are devoted to learning-stimulating activities is, in turn, related to specific family structures in the home learning environment. In this regard, research shows that families with higher levels of education devote more time to such activities (Blaurock & Kluczniok, 2019; Bonifacci et al., 2024). Low-income families, on the other hand, often invest less time in supporting their children in this way (Blaurock & Kluczniok, 2019; Hoover-Dempsey et al., 2005). Blaurock and Kluczniok (2019) describe this effect as a ‘developmental gradient’ for time use within the home learning environment, thereby highlighting the relations between specific family structures of the home learning environment and the availability of time resources. In addition, time resources can be seen as a factor that mediates social inequalities: A lack of time resources, for example, caused by work or multiple burdens, reduces opportunities for learning-stimulating activities and reinforces social inequalities (Blaurock & Kluczniok, 2019; Bonifacci et al., 2024).

There is also empirical evidence of gender-specific differences in the perception of time scarcity. According to this evidence, mothers are often more affected by time scarcity than fathers. The study by Panova and colleagues (2017) shows that mothers perform comprehensive time coordination and organisational tasks when dealing with time resources, which can lead to considerable stress. Ultimately, the level of parental stress, self-efficacy, and social support also influences parents’ ability to provide sufficient time resources to educational processes within the home learning environment (Oppermann et al., 2021). Overall, the findings show that the conditions for the availability and scarcity of time resources within the family are

complex and result from an interplay of individual factors, conditions in parents' working lives and specific challenging situations in families (Lange, 2020b).

6 Support systems for the home learning environment

As explained in detail in the previous chapters, the home learning environment plays a crucial role in child development. In light of global crises and social upheavals, more and more families are affected by global stress and everyday stress (Bolten, 2024; Fegert et al., 2020; Klemm, 2015). For parents, this creates a multitude of challenges that can prevent them from creating a stimulating home learning environment and meeting the diverse demands of everyday family life (Linberg, 2018; Mills-Koonce et al., 2011). However, the home learning environment can be strengthened through various support systems (Anders et al., 2019). At the same time, digital services are becoming increasingly important as they offer new opportunities to strengthen parental abilities and enhance a stimulating home learning environment (Anders et al., 2023; Prokupek & Cohen, 2020). This chapter takes a closer look at the international perspective on family support and the complexity of support services for families in the German context. It also discusses specific family support measures and the availability of social support, highlighting their importance for strengthening the home learning environment.

6.1 The support landscape in Germany in international comparison

In numerous European countries, various strategies have been developed to support families with young children and strengthen a stimulating home learning environment (Cohen et al., 2020b). An international European comparison shows that there are different types of family support measures: The two most prominent trends include, on the one hand, preventive programmes to support parents and promote good parenting practices, which have a proactive effect. On the other hand, family support measures consist of child protection measures that are often reactive and come into play when problems or extreme situations arise (e.g., neglect and child endangerment) (Anders et al., 2019). Within these approaches,

implementation and integration into countries' administrative systems vary, which affects the accessibility and effectiveness of the measures. In a cross-country comparison, it is therefore crucial to adopt a differentiated perspective on these systems (Nata et al., 2017).

In some European countries, such as England, Germany and Norway, family support measures are part of government early intervention strategies that integrate education, health and social services (Cadima et al., 2017). According to Cadima and colleagues (2017), effective family support is based on diverse interventions, easily accessible services, an integrated service approach and a wide range of support services. Although there are differences in organisation, countries such as England, Germany and Norway tend towards readily available, coordinated approaches that balance universal and targeted services to provide comprehensive support to families (Cadima et al., 2017).

Germany considers itself a democratic and social state that has developed a comprehensive social welfare system (Trzcinski & Camp, 2014). Supporting families, especially amid external conflicts and crises that pose numerous challenges, is a central concern of German family policy. Furthermore, special protection for the family is enshrined in the German Basic Law (Art. 6, § 1). Accordingly, all families with children living in Germany have access to formal support services – i.e., state, municipal, and civil society services – and numerous benefits aimed at improving their financial situation and supporting them in everyday life. These services are based on a variety of family policy measures and include general financial assistance as well as specific support for low-income families. A central element of German family policy is the introduction of expanded preventive measures to avoid (child) poverty (e.g., child benefit¹⁰ and parental allowance¹¹) (Federal Ministry of Labour and Social Affairs, 2020). In addition, social

¹⁰ One of the most important financial benefits in Germany, which ensures basic care for a child (Federal Ministry of Labour and Social Affairs, 2020).

¹¹ Financial benefit calculated on a sliding scale from 65% to 67% of the income earned by one parent 12 months prior to the birth of their child. Parental allowance compensates for lost income when parents reduce their working hours or take a break after the birth of a child to care for the newborn (Federal Ministry of

security systems that predate the Social Welfare Act are of great importance. Such systems offer low-threshold, timely and locally adapted measures that provide families with early support.

Another important aspect of family policy support is the targeted promotion of single-parent families (Klemm, 2015). Single parents, for example, receive special tax treatment. They are granted an additional tax relief amount, which effectively reduces the taxable income of single parents (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2023). Advance maintenance payments also support single parents if the other parent fails to meet their maintenance obligations and help to secure the child's financial basis (Federal Ministry of Labour and Social Affairs, 2020).

There are additional targeted support services for low-income families. For example, child allowance provides additional financial assistance to families whose income is just above the threshold for other social benefits (Federal Ministry of Labour and Social Affairs, 2020). Families who receive the child allowance and housing benefit can also, under certain conditions laid down by law, take advantage of subsidies under the education and participation package, which ensures that children have access to cultural and educational opportunities (e.g., school trips; trips organised by preschools or daycare centres; personal school materials) (Federal Ministry of Labour and Social Affairs, 2020). Finally, the Federal Foundation 'Mother and Child' offers financial assistance to expectant mothers on low incomes. These broad government benefits play a crucial role in supporting families, improving children's educational opportunities and helping parents to balance work and family life (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2018). In Germany, these services are part of child and youth welfare and are largely financed by public funds. Many of these services, such as educational counselling or socio-educational family assistance, are provided free of charge.

Labour and Social Affairs, 2020; Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2023).

6.2 Support systems: Family support measures and social support

As explained in Chapter 2, child development is influenced by various ecological systems, such as familial, educational, and societal factors (Bronfenbrenner & Morris, 2006). A closer look at the family context reveals that support systems for strengthening the home learning environment encompass various factors: Support can come from proximal influences in the home learning environment's exosystem, such as the extended family and family support measures (Niklas et al., 2016a). Social support and targeted family support measures can help mitigate the negative effects of parental stress, poverty and low self-efficacy on the home learning environment (Bendickson, 2020). These opportunities to support families can make a decisive contribution to strengthening the home learning environment, reducing educational disadvantage and promoting child development (Bendickson, 2020).

6.2.1 Family support measures: Relevance and current challenges

In Germany, several formal support systems are in place to promote child development and parental well-being. In particular, 'early intervention' services support families with young children and psychosocial stress (Neumann et al., 2023; Ulrich et al., 2022). Early intervention services consist of low-threshold, preventive health-related and psychosocial support services for families with children up to the age of three, with the aim of strengthening parental abilities and child development. These services come from areas such as child and youth welfare, healthcare and early intervention and are coordinated by professionals in local networks (NZFH, 2024; Paul et al., 2018).

Similarly, further early intervention services, such as parenting programmes and targeted interventions, offer informational support on various topics related to child development (e.g., dialogic reading, counting, learning strategies) and help parents implement learning-stimulating activities at home and strengthen their parenting role (Niklas et al., 2016b; Outhwaite et al., 2025). Targeted counselling, education and knowledge sharing on child development, health, parenting and support options also help parents reduce uncertainty and make informed decisions

(Hoagwood et al., 2010; National Academies of Sciences, Engineering, and Medicine, 2016).

For young children who have not yet experienced institutional education, dependence on a stimulating home learning environment is particularly pronounced. The WHO emphasises the importance of parental involvement in early learning during the first 1,000 days of life (the first three years) and considers this period crucial for effective interventions (WHO, 2020). Therefore, early interventions that specifically aim to strengthen the home learning environment and support parents in feeling competent enough to promote their children's development are particularly important (Ereky-Stevens et al., 2019; Kuger et al., 2012). Numerous measures have been developed to improve parental care for young children and strengthen the quality of parent-child relationships. These measures generally aim to promote positive parenting practices and coping strategies and to strengthen parental self-efficacy (Welsh et al., 2014).

Relevant approaches to strengthening the home learning environment and their impact

How to offer activities that stimulate learning or strengthen parental self-efficacy are essential topics for parenting programmes, as they not only promote parental abilities but also provide lasting support for children's emotional and social development (Jelley et al., 2016; McCormick et al., 2020). Equally relevant are programmes that address stress-related coping mechanisms and the importance of co-parenting (Folkman & Moskowitz, 2004; Nunes et al., 2021).

There is empirical evidence confirming the effectiveness of parenting programmes that aim to promote *learning-stimulating activities* between parents and children and thus support child development: Parenting programmes that teach parents how to promote their children's language or mathematical abilities in a playful way have proven to be particularly beneficial (McCormick et al., 2020). These programmes can address both the frequency and quality of these activities (de Bondt et al., 2020; McCormick et al., 2020; Niklas et al., 2016b) and have also been shown to be effective in the early home learning environment, i.e. for children under the

age of 3 (Linberg et al., 2020). However, the potential of many parenting programmes to strengthen a stimulating home learning environment through learning-stimulating activities is not fully exploited, and scientific evidence often shows moderate correlations (Anders et al., 2019; McCormick et al., 2020). Considering these findings, it may be useful to focus parenting programmes more strongly on additional resources in the home learning environment.

To encourage parents to offer their children learning-stimulating activities, they must be able to create suitable learning opportunities. They must also have confidence in their ability to competently support their children through various stages of development (Bojczyk et al., 2018). Consequently, *parental self-efficacy* is seen as a success factor for a stimulating home learning environment and represents another important approach for parenting programmes, which is also considered empirically significant: Studies show that parental self-efficacy can be effectively strengthened above all when it is addressed in a domain-specific manner (Bojczyk et al., 2018; Outhwaite et al., 2025). This means that parenting programmes or interventions that specifically address child language development, for example, effectively enable parents to competently support and accompany their children in their language development. This would not be the case if only general parental self-efficacy were addressed (Bojczyk et al., 2018). In addition, research shows that parental self-efficacy can be addressed at a very early stage, making it an important approach for early interventions (Giallo et al., 2013).

As explained in Chapter 5.2.1, parental *coping and appraisal* are relevant parental resources. According to Folkman and Moskowitz (2004), these resources are among those that can be effectively strengthened through interventions. Building on Lazarus' theory that stress results from the individual appraisal of an event (post-appraisal), it also seems sensible to use interventions that focus on appraisal with the aim of strengthening parental resources before stress even arises. Numerous studies have demonstrated that programmes for parents that focus on coping and appraisal have a positive impact on parents' stress management and coping strategies: Approaches to promoting problem-oriented coping have been shown to

protect families from stress or overload, improve parental well-being and strengthen adaptive coping abilities in parents of children with (chronic) illnesses or developmental disorders (Calero Plaza et al., 2017; Douma et al., 2021; Doupnik et al., 2017).

In addition to strengthening parental resources at the individual level, it is also very important, in the context of the home learning environment, to promote the intra-parental context, i.e., the joint upbringing and support of children by both parents (see Chapter 5.3.3). Interventions aimed at improving *co-parenting* can help to optimise cooperation between parents. This not only leads to a more stable and supportive environment for the child, but also reduces parental stress and conflicts, which have been shown to be a risk factor for a stimulating home learning environment (see Chapter 5.1). Studies show that effective co-parenting can be addressed through targeted interventions and has positive effects on parental well-being and parent-child interactions (Feinberg et al., 2021; Feinberg & Kann, 2008; Nunes et al., 2021). The positive effects apply to different target groups, both vulnerable and non-vulnerable families. Although these effects are rather moderate, they nevertheless highlight the relevance of co-parenting programmes for strengthening the home learning environment (Nunes et al., 2021).

Despite the large number of existing family support programmes and the positive effects they have on children's development and parents' well-being (Bojczyk et al., 2018; Douma et al., 2021; Feinberg et al., 2021; Folkman & Moskowitz, 2004; Giallo et al., 2013; McCormick et al., 2020; Niklas et al., 2016b; Nunes et al., 2021), there are still significant challenges to be overcome. The following sections highlight the key obstacles facing family support measures and the need to improve and adapt them continuously.

Current obstacles to the use of family support measures

Despite the extensive range of family support measures, there are still considerable challenges in their implementation. It should be noted that family support measures are always embedded in a country-specific social context (e.g., population

characteristics, income inequalities, and poverty conditions/especially child poverty, and social and family policy frameworks, such as parental leave provisions). This has an impact on country-specific approaches and challenges (Cadima & Nata, 2017). For example, in many European countries, there are challenges regarding access to high-quality support services, particularly due to insufficient coordination of services (Cadima et al., 2017). In Germany, too, family support measures are confronted with problems such as a lack of accessibility for certain target groups (socially disadvantaged families or families with significant language problems) (Anders et al., 2019). Barriers to access, such as bureaucratic hurdles, a lack of low-threshold services and stigmatisation, mean that the needs of many families are not being met (Hall & Bierman, 2015; Nickel et al., 2024; Neumann et al., 2023). In addition, most programmes in Germany that support families have a local focus, and there is often a lack of comprehensive documentation and systematic evaluation of these initiatives (Erdem & Anders, 2017). Although many of these programmes are tailored to specific target groups, such as socially disadvantaged families, the strategies used to reach these groups often prove ineffective (Erdem & Anders, 2017; Wilke et al., 2014).

European programmes supporting parents and families are characterised by a remarkable diversity of theoretical concepts. These range from unclear theoretical foundations to eclectic approaches that combine diverse theories and intervention principles (Nata et al., 2017). In addition, the quality of these programmes varies considerably between different regions (Cadima et al., 2017). Given the sometimes heterogeneous nature of family support programmes across the 16 German federal states, both institutional and practical cooperation and networking pose considerable challenges (Erdem & Anders, 2017). In Germany, the structural establishment of initiatives such as early intervention is generally considered successful. Nevertheless, there remains a considerable need for professional development, particularly in municipal management and planning, as well as in the creation of services for specific target groups (Paul et al., 2018).

Another key problem is adequately addressing the heterogeneous needs of different target groups, including families with low socio-economic status and families from diverse cultural backgrounds. These groups differ significantly in terms of culture, language and degree of integration into the education system (Erdem & Anders, 2017). Furthermore, the content of family support measures is not always tailored to families' actual needs (Anders et al., 2019). In the German context, it is apparent that many families, especially those with greater support needs (including single parents, large families, and families with low socio-economic status), do not take advantage of these services or are not sufficiently informed about them. Families experiencing high levels of stress, in particular, are often not adequately reached, which makes it difficult to provide needs-based support (Erdem & Anders, 2017). Ultimately, rigid time structures and the 'come-and-go' nature of traditional family support measures also often lead to non-participation, as families often must be in a specific place at a specific time to receive support (Cadima et al., 2017). From parents' perspective, there is often a desire for tailored support that includes financial assistance, flexible childcare options, access to counselling centres, and opportunities to exchange ideas with other parents (Lee et al., 2024; McManus & Suizzo, 2021).

6.2.2 Digital approaches of family support: Potential and developments

Although the COVID-19 pandemic has exacerbated existing deficits in family support measures, it has also led to the professionalisation and adaptation of support services, for example, through increased use of digital platforms for counselling and support (Cohen et al., 2021; Weimann-Sandig et al., 2025). However, due to the rapid development and spread of digital media, parents are increasingly seeking digital support for parenting issues. It is also clear that parents today are familiar with digital media and use it in a variety of ways, for example, to combat boredom or stress (Plowman et al., 2010; Radesky et al., 2015). In summary, digital media has become a constant companion that is fully integrated into everyday life and available at all times (Anders et al., 2019; Brito et al., 2017) and has the potential to reduce

both the accessibility issues of parenting programmes and the cost of providing effective, evidence-based interventions (Hall & Bierman, 2015). As a result, digital services for parents aimed at strengthening the home learning environment have also become increasingly important in recent years. In addition to online courses and coaching platforms, these include apps that aim to empower parents in their role as primary educators and promote regular, direct parent-child interaction and activities (Anders et al., 2023; Hall & Bierman, 2015; Prokupek & Cohen, 2020). Significant developments in this area have also been observed in Germany, including the interactive parenting app from the *Chancenreich* family support programme offered by the Carina Foundation¹² in Herford (North Rhine-Westphalia). This app aims to strengthen parental abilities in the early language development of their children and to strengthen the early home learning environment (Anders et al., 2023) (further details in Chapter 12). What makes digital media special in the context of family support is that they offer a diverse range of experiences and flexible access to knowledge that is available anytime, anywhere, thus presenting few barriers to access. In addition, digital parenting programmes can be used strategically to target specific groups that may be difficult to reach (Breitenstein et al., 2014; Hall & Bierman, 2015). Parenting apps and similar applications, therefore, offer a novel approach to family support programmes. In addition, it has been shown that such programmes are indeed increasingly using these technologies and offer the possibility of supplementing or even expanding existing measures (Hall & Bierman, 2015; Prokupek & Cohen, 2020).

Similarly, research on the effectiveness of digital services reveals that supporting parents through notifications on digital devices is a promising approach for family support programmes (e.g., Nata et al., 2017). Specifically, studies have shown that online programmes that include interactive elements and everyday content are

¹² The Carina Foundation is a German charitable organisation. Their family support programme *Chancenreich* (www.carinastiftung.de/chancenreich) specifically addresses parents of newborns and supports them until their child is 3 years old. It is one of the few family support programmes in Germany that has been extensively and scientifically evaluated for its impact and has been proven to positively influence learning-stimulating activities and parental self-efficacy in the home learning environment (Anders et al., 2015, 2017, 2023).

particularly effective. Not only do they increase parental self-efficacy, but they can also promote parental abilities in dealing with child development processes (Anders et al., 2023; Jelley & Sylva, 2018; Jelley et al., 2016; Outhwaite, 2023; Opie et al., 2024; York et al., 2019). Finally, app-based parenting programmes also have the potential to integrate audiovisual and multilingual elements, enabling them to appeal to a broader and more diverse user group and better cater to the heterogeneous needs of families (Anders et al., 2019).

However, the effectiveness of these digital services is not unlimited. It depends on the quality of the programmes, with programmes that have a clearly structured curriculum and interactive elements such as feedback, video tutorials and peer support being particularly successful (Qu et al., 2022). Another success factor is the sustainability of use. Parents who combine digital services with specific, everyday activities report more joint activities with their children and an improved parent-child relationship (Outhwaite, 2023; Stuckelman et al., 2022).

Despite the promising results, the long-term effects of these digital programmes have not yet been conclusively established. In addition, researchers still face the challenge of clarifying the extent to which parents with low socio-economic status can actually benefit from technology-based parenting programmes, as this population group is difficult to recruit for intervention studies and may not be sufficiently informed about digital resources to support them (Hall & Bierman, 2015). Accordingly, it is important to investigate long-term effects and ideal design of these programmes (Lin-Lewry et al., 2024; Opie et al., 2024). In addition, digital parenting programmes should be designed to be easily accessible and to support parents in their individual life situations, achieving the greatest possible impact. It is particularly important for professionals and researchers working in the field of early childhood to use technology to optimise parenting practices. This can promote the dissemination of evidence-based practices (Hall & Bierman, 2015). Therefore, it is important to focus on strengthening a cooperative and trusting relationship between parents and educational professionals. One possible approach would be to develop and expand these relationships through joint engagement with digital

parenting programmes, such as parenting apps, by having trained professionals assist parents in using the programmes or using the programmes as opportunities for exchange and relationship building.

Finally, however, it should be noted that the field of digital approaches of family support is undergoing rapid change, which is why research on the evidence for digital parenting programmes needs to be constantly updated. Furthermore, the increasing relevance of artificial intelligence in this area has not yet been sufficiently researched and should be examined in detail.

6.2.3 Social support

The availability of social support is a crucial protective factor in the home learning environment and has been shown to be particularly protective against perceived parental stress (Carver et al., 1989; Masarik & Conger, 2017; McConnell et al., 2011; Oppermann et al., 2021; Parkes et al., 2019; Vernhet et al., 2019). According to Cohen (2004), social support refers to the perception of belonging to a social network that provides various resources to help an individual adapt to stress. Social support can take various forms, such as the availability of informal support from friends, neighbours or relatives outside the household (Bojczyk et al., 2018; Kotchick et al., 2005; McConnell et al., 2011; Oppermann et al., 2021).

There is also empirical evidence that available social support contributes significantly to how strongly a family perceives emotional stress (Dunn et al., 2001; Manning et al., 2011; Wierda-Boer et al., 2008). In young children, parental perceptions of social support promote children's willingness to learn, with the home learning environment acting as an important mediator (Yan et al., 2022). Finally, socially supported parents showed a higher frequency of positive parent-child interactions (Green et al., 2007) and a reduction in ineffective parenting practices (McConnell et al., 2011). Research also indicates that both informal support from social networks and structural networks, which can be broadly summarised under the construct of social support, are important protective factors in the family context

(Bojczyk et al., 2018; Kotchick et al., 2005; McConnell et al., 2011; Oppermann et al., 2021).

Social networks and informal support

In addition to formal support services, informal support from social networks plays a central role in coping with everyday parenting, in perceiving parental stress, and in creating a stimulating home learning environment. Social networks offer not only emotional but also practical resources, especially in stressful life situations (Fierloos et al., 2023; Hoagwood et al., 2010; Nuri et al., 2019). Especially in times of crisis, such as during the COVID-19 pandemic, informal support is essential for many families caring for chronically ill children or those with special needs (Bertogg & Koos, 2021; Geweniger et al., 2024; Sauer & Kraus, 2024). The main sources of this support are usually partners, grandparents, other relatives, friends and neighbours. In many cases, they provide practical help such as childcare, shopping, emotional support through listening and encouragement, or financial assistance to relieve the burden on the family (Bertogg & Koos, 2021).

Empirical evidence has also confirmed that affection, understanding, encouragement and the feeling of not being alone help parents to cope with stress and strengthen their confidence in their own role as parents. Informal support from partners, grandparents or friends ultimately has a positive effect on child development in the family context (Hoagwood et al., 2010; Nuri et al., 2019). However, research has also shown that low-income families or those without close networks are particularly at risk of receiving insufficient support (Bertogg & Koos, 2021; Hill et al., 2021; Klärner & Knabe, 2019). Furthermore, informal support is not always stable. It can change over time and is not equally available to all families (Hill et al., 2021; Klärner & Knabe, 2019; Radey & McWey, 2019).

Support from one's own peer group, i.e., exchanges with other parents (e.g., in parent networks or groups), also plays an important role in social support. This creates opportunities to support each other and share experiences (Elliott, 2020; Lancaster et al., 2023; Lee et al., 2024). Research indicates that exchanging ideas with

other parents can reduce stress and improve parents' well-being (Vernhet et al., 2019). In addition, peer support can often be tailored to parents' individual interests and needs, offer opportunities to expand existing social networks, strengthen a sense of belonging, and ultimately promote the acquisition of knowledge (e.g., on child development) (Lee et al., 2024).

Structural networks

Structural networks, such as additional childcare and flexible forms of employment or working hours (e.g., flexitime models and home office), support families and strengthen the home learning environment, as the availability of structural networks can help parents cope with stress and balance responsibilities between work and family life (Haines et al., 2024).

Research also shows that such measures have positive effects, but also present challenges: Flexible working hours and working from home have been shown to reduce the potential for conflict between work and family life, improve well-being and allow more time for family (Agnoletto, 2024; Darouei & Pluut, 2021; Hokke et al., 2021). However, challenges remain in the form of the risk of blurring the boundaries between work and family life, increased workloads and unclear boundaries, especially in the absence of external childcare (Kallitsoglou & Topalli, 2024).

In terms of support systems for the home learning environment, it can be summarised that targeted financial, emotional, and practical support services tailored to families' actual needs are necessary to promote parental well-being and parenting abilities and to strengthen a stimulating home learning environment. A balanced combination of these different types of support makes a significant contribution to relieving the burden on parents, creating a stimulating home learning environment and thus promoting the positive development of children.

7. Summary and research desiderata

The following chapter begins with a summary of the key insights, concepts and empirical findings that form the framework of this dissertation. It then formulates the identified research desiderata, derived from a detailed analysis of the existing literature, and points out current open questions and research gaps. These remarks aim to provide a concise outlook on potential future research approaches and to highlight the contribution of this dissertation to the ongoing scientific discussion.

7.1. Summary

The second chapter of this dissertation emphasises the central role of the family as a formative context for (early) childhood education from a systemic perspective. This perspective enables analysis of family interactions within the context of broader social, cultural, and economic influences. Klemm (2015) describes the family as an autopoietic system that is shaped by its interactions with the environment. In contrast to traditional theories, which often consider individual factors in isolation (e.g., behaviourist approaches), the systemic perspective focuses on the relationships among the elements of a system, contributing to a differentiated understanding of child development. A central concept of the systemic approach illustrated in this dissertation is Urie Bronfenbrenner's socio-ecological theory, which describes human development as dependent on various environmental influences. Here, the family is the primary microsystem that significantly influences the child's development. This theoretical basis is frequently used in various disciplines, including sociology, psychology and (early) education, and emphasises the processual nature of child development in the family context. According to Bronfenbrenner's theoretical understanding, child development is influenced to varying degrees by different environmental factors. Distal factors, such as the family's socio-economic status, can be mediated by proximal factors, such as regular direct interactions between children and parents. It is assumed that these direct interactions are crucial for educational processes in early childhood (Niklas & Lehl, 2025). The chapter concludes that child development depends not only on

interactions in the family context but also on challenging and crisis situations families face, which are also related to resource availability and thus influence child development.

Chapter 3 examines different types of crises that can affect the family system. Crises are seen as fundamental turning points that can bring about profound changes in individual and social systems (Schubert & Klein, 2018). From a systemic perspective, it is assumed that challenging life events, social upheavals and crises affect the family as a whole. Within the family context, fundamental structures and dynamics (e.g., conflicts, divorce, loss of employment) determine the ability of families to adapt to such situations (Bolten, 2024; Klemm, 2015; Walsh, 2021). In times of global crises, such as the COVID-19 pandemic, parents are faced with challenges that can have a negative impact on parent-child interactions (Bolten, 2024). Bronfenbrenner's socio-ecological theory offers a suitable framework for analysing the effects of global crises on child development in the family context through its systemic perspective.

Chapter 3 continues to focus on global crises, specifically the COVID-19 pandemic. In this regard, the chapter uses empirical findings to illustrate that stress levels among families were elevated during the COVID-19 pandemic, leading to restrictions on social interaction and a decline in support from social networks (Fegert et al., 2020; Nicola et al., 2020; Oppermann et al., 2021). In addition, the pandemic had a profound impact on families, particularly through measures such as the closure of daycare centres and restrictions on social contact, which were implemented during the first wave of infections in Germany (Oppermann et al., 2021). Many parents report financial worries and a feeling of helplessness, as it was more difficult to meet their children's needs during this time (Brandstetter et al., 2022; Geissler et al., 2022). Overall, the COVID-19 pandemic has placed great demands on families' ability to adapt and has necessitated new coping strategies (Bolten, 2024; Brakemeier et al., 2020).

In addition, Chapter 3 addresses social upheavals such as advancing digitalisation and the diversification of family life forms, which in Western industrialised nations is primarily described by the breakdown of traditional family structures and lifestyles based on traditional gender norms. As a social upheaval, advancing digitalisation has brought about profound changes in families, but it also poses new challenges, particularly regarding parental care and interactions between parents and children (Bolten, 2024; Tosuntaş & Griffiths, 2024). Chapter 3 also focuses on the significance of individual crises in the family context, as they are often linked to global and social upheavals. Individual crises, such as separation or divorce, can have a profound impact on families, especially when they occur in disadvantaged social contexts (Bolten, 2024; Klemm, 2015).

There is empirical evidence that the increasing number of divorces and separations is a decisive factor in the rise of single-parent families in Western societies and often represents a significant and stressful life event (D'Onofrio & Emery, 2019; Fadel et al., 2025). In this context, many families are affected by financial and organisational challenges characterised by legal adjustments, conflicts between parents and changes within social networks. These stressors can significantly impact family members' well-being (Bolten, 2024). However, studies show that not all single parents perceive their life situation as crisis-ridden; assessments of one's own situation vary greatly (Dharani & Balamurugan, 2024; Shorey & Pereira, 2023). Finally, the chapter emphasises the importance of a deeper understanding of the family as the primary learning environment and the home learning environment in which children grow up. This is equally important for developing more effective support mechanisms for families. Finally, it is recognised that while crises can pose significant challenges, they can also promote adaptive behaviours within families and create opportunities for growth and transformation.

Chapter 4 examines the central importance of the home learning environment for early childhood development. It begins by highlighting historical research on the role of the family as a primary learning environment and introduces the Home

Observation for Measurement of the Environment (HOME) scale as an important tool for assessing the quality of cognitive and emotional support in the family environment. Various definitions of the home learning environment are presented, and theoretical assumptions about the importance of stimulating parent-child interactions in supporting early childhood education are explained. Subsequently, the structural-processual model of the home learning environment is presented, which distinguishes between family structures (such as parental education and family income), parental beliefs (including attitudes towards education and parenting), and processes (the quality and frequency of interactions and learning-stimulating activities between parents and children). The chapter emphasises that, according to theoretical assumptions, educational processes – both formal and informal – are crucial for children’s development. Specifically, it argues that proximal processes, such as regular interactions between parents and children, are crucial for cognitive, social and emotional development and are key variables for successful development in early childhood.

It then presents key empirical findings that confirm the influence of educational processes on children’s development (Kluczniok et al., 2025; Li et al., 2023b; Oppermann et al., 2023; Rose et al., 2018). A lack of such processes can be associated with educational disadvantages in cognitive, linguistic and mathematical abilities (Melhuish et al., 2008; Sammons et al., 2015). Informal learning opportunities, such as reading aloud or singing, are also very important for language development in early childhood and have lasting effects into secondary school (Raikes et al., 2006; Sénéchal et al., 1996). However, there are significant differences between families in the promotion of language and mathematical abilities, which are already apparent in early childhood (Ginsborg, 2006; Morgan, 2005). These differences can promote educational inequalities and contribute to persistent performance differences between children that are difficult to compensate for (Duncan et al., 2019).

The interrelationships between family structures and parental beliefs in the constitution of the home learning environment are then discussed. The focus below is on the relationship between family structures and educational processes in the

home learning environment. The relationship between parental beliefs and educational processes in the home learning environment is also examined in detail. Finally, Chapter 4 also addresses the interplay between family structures, parental beliefs and educational processes in the home learning environment.

Empirical studies show that both family structures and parental beliefs influence the quantity and quality of learning-stimulating activities in the home learning environment (Junge et al., 2021; Kluczniok et al., 2013; NICHD Early Child Care Research Network, 2003; Niklas, 2015). In this context, a distinction between general and domain-specific processes is significant (Kluczniok et al., 2013). Family structures have a significant, albeit moderate, influence on learning-stimulating processes: They often have an indirect effect by providing important resources for activities (Elliot, 2020; Kluczniok et al., 2013). In contrast, parental beliefs strongly influence educational processes and act, for example, as mediators between socio-economic status and the language abilities of three-year-old children (Niklas et al., 2020). However, the strength of the connections between the three dimensions of the home learning environment varies depending on the cultural, social, and economic context, thus demonstrating the context-dependence of the home learning environment (Elliot, 2020; Kluczniok et al., 2013).

Finally, Chapter 4 highlights research on educational processes in the home learning environment of young children aged zero to three years – an age group for which there are currently gaps in knowledge (Kluczniok et al., 2025; Linberg et al., 2020). Empirical findings show that educational processes such as reading together are particularly important for the language development of infants and toddlers (Attig & Weinert, 2019; NICHD Study of Early Child Care, 1999), as looking at picture books has positive effects on reading and language abilities (Karrass & Braungart-Rieker, 2005). Apart from studies on early interactions with picture books (Horst et al., 2011; Montag et al., 2015; Weisleder & Fernald, 2013), activities that promote learning at home continue to be rarely considered empirically in the home learning environment of children under three years of age, especially for children under twelve months (Hall et al., 2021; Linberg et al., 2020).

Chapter 5 discusses the role of various resources in families' adaptability from a systemic perspective. The perspective of successful adaptation underlying this dissertation aims to maintain a stimulating home learning environment. The chapter first discusses that stress in families is closely related to the availability and perception of resources. A lack of material, social or emotional resources can increase stress levels, especially among socially disadvantaged parents (Brody et al., 1999; Dunst, 2022; McManus & Suizzo, 2021; Pereira et al., 2024; Slopen et al., 2022). According to Lazarus and Folkman (1984), parental stress arises when the demands of parenthood exceed one's own coping resources. This stress impairs parents' well-being and is associated with lower cognitive and socio-emotional development in children (Jones et al., 2021; Ward & Lee, 2020). The family stress model (Conger et al., 1992; Masarik & Conger, 2017) explains how stressors such as financial problems affect parental well-being and parent-child interactions. For example, high parental stress correlates with lower quality parent-child interactions and reduces cognitive stimulation in these relationships (Field, 2010; Linberg, 2018; Mills-Koonce et al., 2011).

Parental coping and appraisal are then examined as important resources in the home learning environment: Families' ability to adapt to challenges is described by the concept of coping, which encompasses a variety of problem-oriented strategies for managing stress and strain (DeHaan et al., 2013; Folkman & Moskowitz, 2004). These strategies vary depending on the context and can include both cognitive and behavioural elements (VandenBos, 2007). The choice and effectiveness of these coping strategies have a significant impact on family well-being (Karnas, 2023; Vernhet et al., 2019). Chapter 5 also introduces McCubbin and Patterson's (1983) double ABC-X model of family adaptation, which describes how stressors, resources and their perception influence a family's ability to adapt.

Research shows that parental coping is closely linked to the quality of parent-child interactions (Oppermann et al., 2021; Taylor & Conger, 2017). Problem-oriented coping strategies (e.g., actively seeking solutions to overcome financial

hardship) in particular promote families' adaptability and are associated with lower stress levels (Cheng & Lai, 2023; Vernhet et al., 2019). During stressful situations such as the COVID-19 pandemic, the positive effects of coping strategies on the emotional bond between parents and children become apparent (Baugh et al., 2024; Fogel et al., 2022; Gedaly et al., 2024).

The following chapter discusses parental beliefs as important resources in the home learning environment: Parental self-efficacy, defined as confidence in one's ability to successfully cope with tasks, plays a central role in the adaptability of families (Bandura, 1994). Individuals with a strong sense of self-efficacy tend to employ effective problem-oriented coping strategies (Gessulat, 2022; Lazarus & Folkman, 1984).

Studies show that higher parental self-efficacy correlates with increased engagement in learning-stimulating activities and is thus associated with improved language and social abilities in children (Bojczyk et al., 2018; Gessulat et al., 2024; Peacock-Chambers et al., 2017). Parents from disadvantaged backgrounds or with a migrant background face particular challenges, as they often have lower self-efficacy beliefs (Ardelt & Eccles, 2001; Gessulat et al., 2023; Wittkowski et al., 2016). In summary, both coping and parental self-efficacy are essential resources for strengthening the home learning environment and thereby promoting child development.

The following section highlights that specific family structures, co-parenting and time resources are also decisive factors that can strengthen the stimulating nature of the home learning environment and thus significantly promote child development. The socio-economic status (e.g., parental education and occupational status) is a central aspect of family structures that reflects a child's social background (Baumert & Maaz, 2006). Low socio-economic status is often associated with a less stimulating home learning environment and reduced parental involvement in learning-stimulating activities, which can have negative effects on child development (Melhuish et al., 2008; Sylva et al., 2004). Other relevant family structures include the family setting. This encompasses both the ratio between

adults and children and the age difference between siblings. The family setting can also influence the availability of resources such as parental attention and patience (Niklas & Lehl, 2025; Steelman et al., 2002). In this relation, the resource dilution hypothesis postulates that in families with a comparatively large number of children, each child tends to receive fewer resources for their own development (Blake, 1989; Steelman et al., 2002). This assumption is supported by studies showing that a greater number of siblings is associated with a lower frequency of learning-stimulating activities in the home learning environment (Bagger et al., 2021). The chapter also notes that different family settings can be classified into different family types, such as single-parent or two-parent families.

Empirical findings on child upbringing across different family types indicate disparities in child development, with children from more traditional structures tending to have better educational opportunities on average (Seyda & Lampert, 2009). Despite these trends, however, there are often only minor and inconsistent differences in the cognitive development of children from different family types, suggesting that the use and availability of resources within the family are more decisive (Niklas & Lehl, 2025; Pekrun, 2002).

Next, the chapter focuses on co-parenting as a family system resource. Co-parenting describes cooperative collaboration in parenting, regardless of a romantic relationship between the parents (McHale et al., 2004). It is understood as a multidimensional concept that encompasses both positive and negative aspects (Nunes et al., 2021). Supportive co-parenting, in particular, plays a central role in children's development, as it correlates with lower parental stress, whereas conflictual co-parenting is identified as a risk factor (Nunes et al., 2021; Teubert & Pinquart, 2010). Social and cultural contexts also influence the quality of the co-parenting relationship between parents, and the parental couple relationship, with positive aspects of co-parenting acting as a buffer against parental stress (Camisasca et al., 2019; Marchand-Reilly & Yaure, 2019). Overall, research shows that promoting supportive co-parenting practices is crucial for strengthening a stimulating home learning environment and child development (Lamela et al., 2016).

Finally, time resources are considered a fundamental resource for education and socialisation in the home learning environment (Lange, 2020b). The time parents spend with their children directly influences their cognitive, linguistic and social development (Hernández-Alava & Popli, 2017). Empirical findings show that families with higher levels of education invest more time in learning-stimulating activities, whereas low-income families often devote less time to them (Blaurock & Kluczniok, 2019; Bonifacci et al., 2024; Hoover-Dempsey et al., 2005). In addition, mothers are often more affected by time constraints than fathers (Panova et al., 2017). Finally, the influence of stress, self-efficacy and social support on the availability of time resources is also discussed, highlighting the complexity of this issue (Oppermann et al., 2021).

Chapter 6 explains how support systems can help to promote parenting abilities and thus strengthen the home learning environment. In an international comparison, different European countries have different approaches to family support measures, which are differentiated between preventive programmes and reactive child protection measures (Nata et al., 2017). From a national perspective, Germany has developed a comprehensive welfare system that supports families in difficult times and offers important financial assistance and preventive measures to combat (child) poverty, including special support for single-parent families and low-income families (Federal Ministry of Labour and Social Affairs, 2020; Trzcinski & Camp, 2014). In line with Bronfenbrenner's socio-ecological theory, it is further discussed that support systems for strengthening the home learning environment include various factors that can mitigate family stress, poverty and low self-efficacy in particular (Bendickson, 2020). In Germany, formal support systems such as 'early intervention' offer preventive, low-threshold services aimed at strengthening parental abilities and child development (Neumann et al., 2023; Ulrich et al., 2022).

Empirical evidence points to the effectiveness of parenting programmes, e.g., in promoting learning-stimulating activities between parents and children (McCormick et al., 2020). Despite these positive approaches, challenges remain

regarding the accessibility and adaptability of programmes to heterogeneous family needs (Anders et al., 2019). Digital approaches to family support measures, which the COVID-19 pandemic has reinforced, show promising potential to improve parental self-efficacy and adapt to individual needs, but require further research to evaluate their long-term effectiveness and accessibility for parents with low socio-economic status (Hall & Bierman, 2015; Outhwaite, 2023).

Finally, the chapter discusses the importance of social support in strengthening the home learning environment. Social support is understood as the perception of belonging to a social network that provides resources to improve adaptability to stress (Cohen, 2004). It is a crucial protective factor for the home learning environment, especially in reducing parental stress (Carver et al., 1989; Vernhet et al., 2019). Informal support from friends and family has proven particularly valuable in providing emotional and practical support during challenging life situations, thereby promoting parent-child interactions and child learning (Hoagwood et al., 2010; Yan et al., 2022). Structural networks, such as flexible working hours and childcare, contribute to parents' stress management but also pose challenges, such as the blurring of boundaries between work and family life (Haines et al., 2024). Overall, a balanced combination of financial, emotional and practical support is necessary to ensure parental well-being and a stimulating learning environment, which is crucial for the positive development of children.

7.2. Research desiderata

The following section summarises existing research gaps on challenging and crisis situations in the family context, the home learning environment in general, parental stress, adaptation, and specific resources, as well as support systems for the home learning environment.

7.2.1. Challenging and crisis situations in the family context

Crises and challenging life situations in the family context can have profound and lasting effects on early childhood development (Bassett & Bradley, 2022). Systemic

barriers – such as cramped living conditions, limited resources and a lack of accessible services – hinder effective support for families in times of crisis. These barriers are often insufficiently taken into account when designing support measures or formulating policy (Murray et al., 2025). Although research on this topic has increased in recent years, particularly due to the COVID-19 pandemic, there are still significant gaps in understanding, support, and effective interventions for families and young children facing crises such as pandemics and economic hardship. There is a lack of theoretical frameworks that shed light on complex relations, as well as methodological tools to analyse how social, economic and political crises affect young children and their families. A major weakness is that existing research often fails to adequately reflect the complexity and diversity of crises (Grimm et al., 2020). In addition, families from marginalised backgrounds and families in non-Western contexts are often underrepresented in research. This limits the understanding of their specific needs and the development of inclusive measures (Urban, 2015). Furthermore, educational standards that should maintain sensitive care and provide opportunities for early learning or family involvement during crises and challenging life situations often lack explicit, comprehensive guidelines for early childhood development in emergencies. There is also a lack of scientific evidence on how to mitigate the negative effects of future global crises on families with young children (Bassett & Bradley, 2022; Murray et al., 2025). This underscores the urgency of developing interdisciplinary, multidimensional models to analyse the effects of crises on child development across different family contexts.

7.2.2. The home learning environment

Regarding the home learning environment, although its multidimensional nature is well documented for children aged three to six, there is a notable lack of research on children under two years of age. Despite the recognised importance of this early phase for child development, significant gaps remain in knowledge about the home learning environments of these children (Hall et al., 2021; Linberg et al., 2020). The current state of research also calls for the perspective of caregivers other than

mothers: If we consider that in scientific studies with children, the majority of responses come from mothers (e.g., Lee et al., 2024; Löchner et al., 2024; Outhwaite et al., 2025; Saracho & Spodek, 2008), then a large research gap and the need for further, comprehensive studies on the role of fathers or other persons involved in education becomes apparent (e.g., Leech et al., 2023). Niklas and Lehl (2025) also postulate that parental attitudes are closely linked to activities actually carried out in the family learning environment. In this context, in particular, they argue, there is a need for a clearer examination of the roles played by mothers, fathers, and other caregivers, both independently and jointly, in these relations. The home learning environment, like the realities of life in Western industrialised societies in general, is becoming increasingly complex, which influences our understanding of the factors that promote child development (Jones et al., 2017). This raises the question of the extent to which currently established models of the home learning environment can still adequately address the increasing complexity of the realities of life for families with young children.

7.2.3. Parental stress, adaptation, and specific resources of the home learning environment

Empirical evidence clearly shows that high parental stress is associated with lower quality of parent-child interactions and lower cognitive stimulation (Field, 2010; Gershoff et al., 2007; Linberg, 2018; Mills-Koonce et al., 2011). However, there are still important gaps in research, particularly regarding underlying mechanisms, the diversity of stress experiences (e.g., global versus everyday stress), and effective interventions for coping with parental stress. Among the most significant gaps are the limited understanding of mediators (e.g., parental couple relationship and co-parenting) and the interplay of relevant resources and coping strategies of families (Jones et al., 2021; Löchner et al., 2024; Pan et al., 2025; Richter et al., 2025; Rusu et al., 2025). Since most studies are limited to cross-sectional designs (Rusu et al., 2025), little is known about how the interaction between relevant resources and adaptation strategies develops over time and across different family settings, such

as single-parent families (Jiang et al., 2023). Exceptions are studies that examine parental stress during the COVID-19 pandemic. These often collect data across several measurement points and often cover an observation period of one to two years (e.g., Mullins et al., 2025). The scientific evidence on parental stress in families with children affected by a developmental disorder or chronic illness is extremely extensive. At the same time, it is necessary to conduct studies with families in which typically developing children live (Rusu et al., 2025).

Concerning family system resources, parental resources and social support, there is extensive evidence that these factors can demonstrably cushion the effects of stress (Dunst, 2022; Löchner et al., 2024; Rusu et al., 2025). Further research is needed to identify which factors offer the greatest protection and how these can be strengthened in practice (e.g., through parenting programmes) (Cheng & Lai, 2023; Löchner et al., 2024; Pan et al., 2025).

As already discussed in the research desiderata on the home learning environment, the research summarised in this section also largely focuses on studies of mothers. Fathers and non-traditional caregivers continue to be underrepresented here, even though existing studies demonstrate their high level of stress (Barnett et al., 2025; Philpott et al., 2017). Ultimately, there is also a lack of data on dyadic stress processes between parents (e.g., co-parenting) and between parents and children (Crnic & Ross, 2017; Feinberg et al., 2010; Rusu et al., 2025).

In summary, although research on parental stress highlights several important protective factors for maintaining a stimulating home learning environment, there are still significant gaps in our knowledge regarding which factors are most effective, how they interact, and how to effectively support families with different stress levels and needs. To close these research gaps, parental stress must be examined more holistically. This requires more comprehensive, longitudinal and intervention-oriented studies (Rusu et al., 2025). However, it also requires more specific and integrative models of theoretical relations and assumptions with a systemic perspective on families.

7.2.4. Support systems of the home learning environment

The following section summarises research gaps in support systems for the home learning environment. First, family support measures are considered. An analysis of deficits in research on social support follows this.

As illustrated in Chapter 6.2, support for families with young children is crucial for a stimulating home learning environment and child development. Key research gaps regarding family support measures, both internationally and specifically in Germany, relate primarily to access and use, orientation towards actual needs of families, the effectiveness of family support measures, and the effectiveness of digital options for family support.

About access to and use of family support measures, a so-called ‘prevention dilemma’ (Neumann & Renner, 2016) can increasingly be observed: Preventive services, such as early intervention, parent-child groups or counselling services, reach above-average numbers of highly educated middle-class families, while families under particular stress are less likely to participate in such services (Nickel et al., 2024). There is a lack of studies that systematically examine how information channels, costs, bureaucracy and shame influence usage among families at risk of poverty, migrant families or families with mental health issues – and how these barriers can be broken down (Neumann & Renner, 2016). Disadvantaged families, such as those affected by poverty, often face obstacles in accessing support services. Factors such as lack of awareness, stigmatisation, and logistical challenges (e.g., working hours, transport options) have been researched less than the phenomenon of non-take-up of available support services (Cebolla et al., 2025; Nickel et al., 2024).

When considering the orientation of family support measures towards actual needs of families, the following can be stated: Although orientation towards family needs is an established guiding principle of existing support services, there are still gaps in knowledge regarding how support for families with young children can be effectively tailored to individual and, in some cases, very heterogeneous needs of families (e.g., information requirements, cultural fit, participation) and which specific elements of family support measures produce which results for which

families (Dempsey et al., 2009; McCarthy & Guerin, 2022). There is also a lack of uniform practice and measurement models that systematically map the different needs of families and translate them into concrete measures (McCarthy & Guerin, 2022). In addition, much of the research focuses on traditional middle-class two-parent families, while diverse family structures, cultural backgrounds and non-traditional care models receive only limited attention (Barnett, 2008; Jensen & Sanner, 2021; Taylor et al., 2022). Resource-oriented research on diverse family settings remains a key gap (Barnett, 2008; Jensen & Sanner, 2021).

When assessing the effectiveness and quality of family support measures, the following conclusions can be drawn: Despite the wide range of existing programmes, there are comparatively few systematic, controlled effectiveness studies on existing services for families with young children, particularly concerning combinations of measures and their long-term effects (Cohen et al., 2020c). Furthermore, little research has been conducted on low-threshold access, cultural fit, and parental participation in programme development (Neumann & Renner, 2016; Stullich et al., 2024).

As outlined in Chapter 6.2.2, digital opportunities for family support are a promising approach to strengthening the home learning environment. The sustainability of the effects is currently still largely unclear. To make valid statements in this regard, more intensive research is needed on the long-term effects of such approaches (Lin-Lewry et al., 2024; Opie et al., 2024). Further research is also needed to investigate the ideal design of these offerings (Lin-Lewry et al., 2024; Opie et al., 2024). The increasing relevance of artificial intelligence in this area has not yet been sufficiently researched. Although artificial intelligence is being used in other areas of life, such as the world of work (Giering & Kirchner, 2025), healthcare and medicine (Sonntagbauer et al., 2023) and as assistance systems (Züllig, 2025), families as an independent field of action hardly appear in these debates, or family-related potential (e.g., support for learning processes) is only discussed marginally (Züllig, 2025). In addition, research still face the challenge of clarifying the extent to which parents with low socio-economic status can actually benefit from technology-

based parenting programmes, as this population group is difficult to recruit for intervention studies (Wilke et al., 2014) and, on the other hand, may be insufficiently informed about digital opportunities to support their parenting tasks (Hall & Bierman, 2015).

The existing gaps in research regarding the importance of social support can be summarised as follows: Existing evidence clearly supports social support as a protective factor for stressed families, but there is a lack of differentiated, longitudinal and intervention-related studies that systematically compare mechanisms, target groups (especially fathers and disadvantaged families) and effective forms of support (Iacob et al., 2020; Peer & Hillmann, 2014). Although empirical evidence clearly shows that social support cushions the impact of high parental stress, further research is needed to determine how best to support families under stress, especially during times of crisis (Ghezih et al., 2025). However, a systematic investigation of the construct of ‘social support’ also reveals heterogeneous differentiation: In many studies, the type of social support is inconsistently recorded (Ilias et al., 2018, for an overview). In scientific literature, social support is largely defined as informal emotional support provided by one’s own family, friends or other significant others (Bertogg & Koos, 2021; Fierloos et al., 2023; Geweniger et al., 2024; Kallitsoglou & Topalli, 2024; Kotchick et al., 2005; McConnell et al., 2011; Oppermann et al., 2021; Parkes et al., 2019). However, some studies operationalise it as formal support, for example via special networks such as clubs, associations or family support services (Bertogg & Koos, 2021; Geweniger et al., 2024) or independently of specific persons or institutions in the sense of general material and informational support (Oppermann et al., 2021). In recent years, numerous studies have identified an increasing focus on structural forms of support. Examples include flexible working hours and the use of home offices (Agnoletto, 2024; Darouei & Pluut, 2021; Haines et al., 2024; Hokke et al., 2021).

8. Objectives of the present dissertation

Early childhood education in the home learning environment is influenced by a dynamic interplay between available resources and the everyday challenges families face (Bojczyk et al., 2018; Crnic & Ross, 2017; Gessulat, 2022; Taylor & Conger, 2017). An examination of educational processes in early childhood based on individual theoretical approaches means that not all relevant factors influencing educational processes can be adequately captured:

1. The structural-processual model of the home learning environment (Kluczniok et al., 2013; Melhuish et al., 2008) offers an in-depth understanding of how family structures and parental beliefs shape educational processes and how these affect child development. However, it does not consider the influence of parental stress on interactions and learning-stimulating activities between children and parents.
2. The family stress model (Conger et al., 1992; Masarik & Conger, 2017), on the other hand, deals extensively with the effects of parental stress within the family as well as with risk and protective factors, but does not have a clear focus on the educational processes that take place within the family. Furthermore, the concept of stress remains strongly focused on economic hardship and only marginally addresses other facets of stress or their interactions. Finally, the discussions on parental stress in the previous chapters suggest that this type of stress should be viewed more from a systemic perspective.
3. The double ABC-X model of family adaptation (McCubbin & Patterson, 1983) addresses constructs fundamental to family adaptability and stress management but has no direct reference to the home learning environment or educational processes within the family.

In light of these considerations, this dissertation examines specific resources in the home learning environment that contribute to strengthening educational processes in early childhood in the long term. It takes an interdisciplinary perspective that allows theories and model-based approaches from (early) education, sociology, and psychology to be linked together. This interdisciplinary link provides deeper insight into the dynamics that influence children's learning and development in the family context. Particular attention is paid to the previously described concepts of the home learning environment, family adaptability, and experiences of stress and strain within the family. The frame of reference is the structural-processual model of the home learning environment (Kluczniok et al., 2013; Melhuish et al., 2008), into which the facets of the other two model approaches are integrated. The model synthesised from this also takes up aspects of resource research from an individual and systemic perspective (Taylor & Conger, 2017). This model synthesis develops a resource model of the home learning environment that considers both family and parental resources in the home learning environment, as well as key support systems. Furthermore, the model synthesis contributes to an expanded explanatory basis for strengthening educational processes in early childhood. This dissertation thus makes a valuable contribution to the further development of theoretical and practical approaches in fields of research and action that strengthen educational processes in early childhood.

To investigate specific resources in the home learning environment that contribute to strengthening educational processes in early childhood, the following three research questions are explored:

Definition and objective of the first research question

To understand how different family structures, financial burdens and other parental stressors influence educational processes in the home learning environment during times of crisis in families, the following research question is analysed in sub-studies 1 and 2:

1. To what extent do specific family structures and parental stressors influence educational processes in the home learning environment against the backdrop of social challenges and crises?

Sub-study 1 examines the adaptability of the home learning environment to mild, moderate and severe global stress, with a focus on the provision of learning-stimulating activities in different family settings (single-parent families, two-parent families, large families with four or more children) during the first COVID-19 lockdown in Germany and the significance of various parental stressors, such as changes in parental employment and closures of daycare centres. Sub-study 2 examines how learning-stimulating activities are structured in single-parent families compared to two-parent families, accounting for family background and potential financial burdens. In addition, elementary stressors in single-parent families are identified to highlight the importance of everyday stress for the home learning environment.

The approaches of both sub-studies enable the analysis of specific family structures and parental stress in relation to prevailing social challenges and crises. The concept of stress is examined from both societal and individual perspectives (global stress versus everyday stress).

Definition and objective of the second research question

To integrate the central dimensions of family and parental resources into the structural-processual model of the home learning environment, sub-studies 1, 2 and 3 address the following research question:

2. How do family and parental resources influence the provision of educational processes in the home learning environment?

The first sub-study focuses in particular on the importance of the family setting and the perceived distribution of roles in partnership as a facet of co-parenting during

the COVID-19 pandemic for the adaptation of the home learning environment of children between the ages of 3 and 6 years to social stress. Sub-study 2 is dedicated to investigating specific family and parental resources for coping with everyday stress in single-parent families. The analyses focus on cooperative collaboration between separated parents and conflict exposure between them as facets of co-parenting, problem-oriented coping and positive appraisal, parental self-efficacy, and the importance of time resources for a stimulating home learning environment for children aged 3 to 6 years. In addition, the main stressors in this family setting have been identified. The third sub-study examines the extent to which changes in language-related parental self-efficacy are related to changes in frequency of language-stimulating activities in the early home learning environment of children aged 3 to 24 months.

Definition and objective of the third research question

Finally, the dissertation examines the extent to which certain resources in families can be addressed through family support measures and which other networks are crucial for supporting the home learning environment. As the home learning environment is also becoming increasingly digital due to advancing digitalisation, digital approaches to family support are also at the centre of the research question. The three sub-studies deal with the above-mentioned aspects to varying degrees. The research question is as follows:

3. Given the diverse needs of families and an increasingly digitalised society, what approaches can family support measures take to strengthen specific resources in the home learning environment?

Sub-study 1 examines the importance of the availability of social support during the COVID-19 pandemic for the adaptability of the home learning environment of children between the ages of 3 and 6 years to global stress. The second sub-study then focuses on the importance of informal support from social and structural

networks as a special form of social support for a stimulating home learning environment for children aged 3 to 6 years from single-parent families.

Finally, sub-study 3 is devoted to investigating digital approaches and their potential for formally supporting families with children aged 3 to 24 months. Specifically, this sub-study examines the relationships between the intensity of use of a parenting app, changes in the frequency of language-stimulating activities within the home learning environment, and mediating effects of changes in language-related parental self-efficacy.

Figure 5 illustrates the specially developed *resource model of the home learning environment*, which brings together the central model concepts and research questions of this dissertation and places them in a common context. Due to the embedding of the dissertation in an overarching theoretical context, the resource model of the home learning environment also includes components and relationships that were not empirically tested in the three sub-studies (e.g., findings on child outcomes or the appraisal of a crisis at the family level). In addition, Table 1 provides information on which constructs are examined by the individual sub-studies. A detailed overview of the constructs and their operationalisation in the three sub-studies can be found in the appendix (Appendix D).

Figure 5

Main graphic of the dissertation: the resource model of the home learning environment

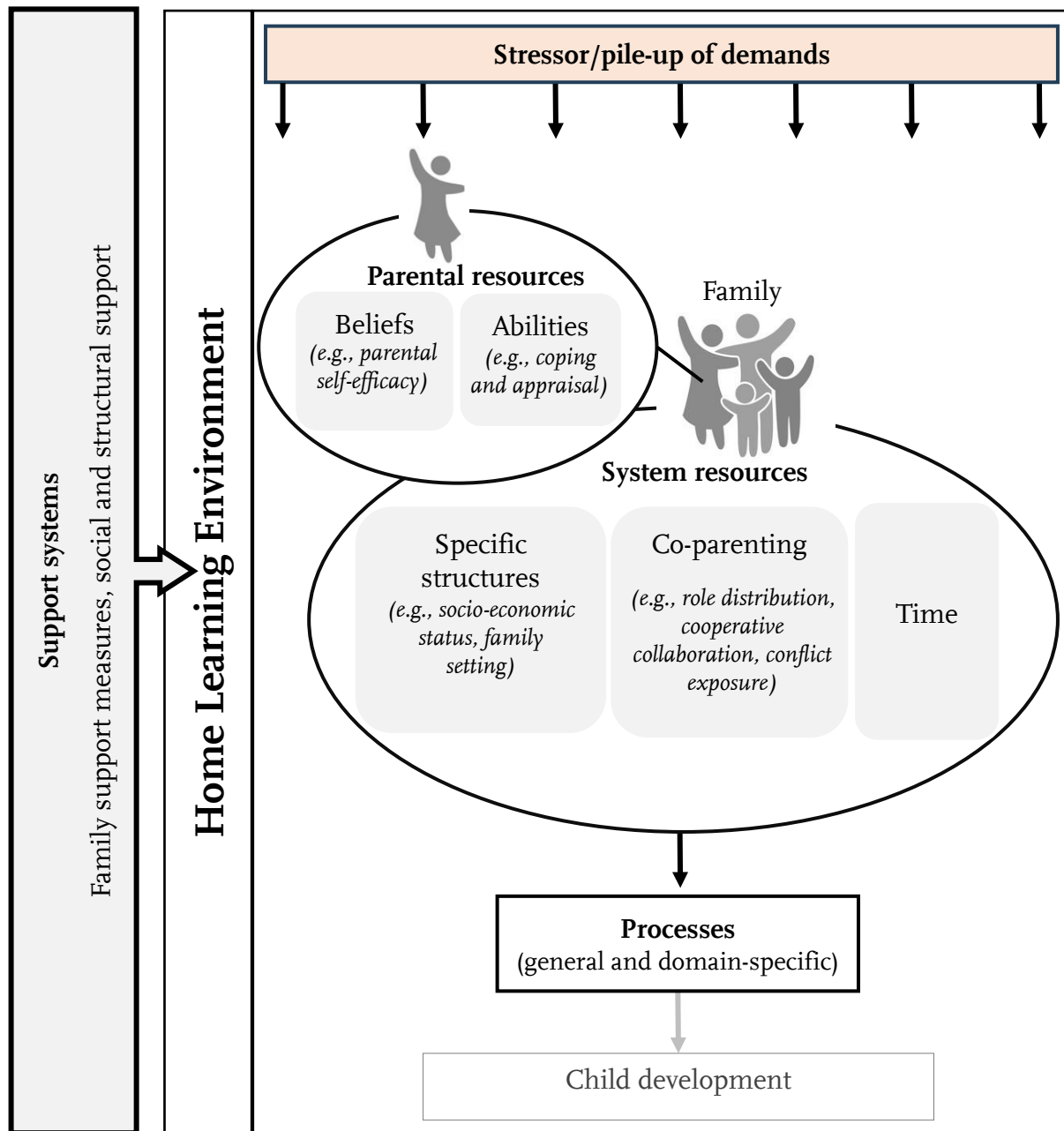


Table 1*Location of constructs within the three sub-studies*

Study 1	Study 2	Study 3
Parental resources		
	Beliefs (<i>parental self-efficacy</i>)	
Abilities (<i>coping</i>)	Abilities (<i>coping and appraisal</i>)	Beliefs (<i>parental self-efficacy</i>)
Family system resources		
	Specific structures (<i>socio-economic status, family setting</i>)	
Specific structures (<i>socio-economic status, family setting</i>)	Co-parenting (<i>cooperative collaboration, conflict exposure</i>)	
Co-parenting (<i>role distribution</i>)		
	Time	
Parental stress		
Stressor/pile-up of demands (<i>in terms of global crises</i>)	Stressor/ pile-up of demands (<i>in terms of individual crises</i>)	
Support systems		
Social support	Social and structural support	Family support measures (<i>digital approaches</i>)
Processes		
Learning-stimulating activities	Learning-stimulating activities	Learning-stimulating activities

9. Methodological procedure of the sub-studies

In line with the research questions mentioned above, this dissertation project examines information from four different data sources: Sub-study 1 is based on data from the survey ‘Families and Childcare Centres in Times of COVID-19’ (Cohen et al., 2020a), which was conducted during the first lockdown in Germany in 2020 as part of efforts to contain the SARS-CoV-2 virus. Sub-study 2 takes a mixed-method approach and uses data from the first and second waves of the National Education Panel Study (NEPS) of the kindergarten cohort (starting cohort 2) from 2011 and 2012 (Blossfeld et al., 2011). On the other hand, the results of this sub-study are based on qualitative data collected in Germany in 2024 as part of the specially conducted interview study ‘LAKi: Realities of life for single-parent families with young children’ (Prokupek & Erdem Möbius, unpublished). Sub-study 3 uses data from the first and second measurement points, as well as usage data from a digital parent app of the *Chancenreich* parenting programme from 2022, from the study ‘DIGIFam: Development and implementation of a digital educational component to increase the quality of family stimulation’ (Anders et al., 2023). Table 2 provides an overview of the sub-studies, their respective databases, and methodological approaches. Furthermore, the diverse methodological and statistical approaches used in the individual sub-studies can be taken from this table.

Table 2

Overview of the data basis and methodological approach of this dissertation project

	Study 1	Study 2	Study 3
Source of data	Families and childcare centres in times of COVID-19 (Cohen et al., 2020a)	Waves 1 and 2 of the NEPS kindergarten cohort (starting cohort 2) (Blossfeld et al., 2011) Interview study LAKi (Prokupek & Erdem Möbius, unpublished)	Measurement times 1 and 2 of the DIGIFam study (Anders et al., 2023)
Data basis	Nationwide cross-sectional online survey of German families	Nationwide computer-assisted telephone interviewing of German families Qualitative semi-structured interviews of German single-parent families	Online survey of a local convenience sample of quasi-experimental comparison group design, conducted longitudinally over three data collection time points App user data
Sample size	8,513 parents	1,088 parents 11 interviews with single parents	184 parents
Age of target children	Children aged between 18 and 69 months	Children aged between 3 and 7 years	Children aged between 3 and 24 months
Method of analysis	Analyses of variance with post hoc analyses Multiple group regressions combined with post hoc analyses of the regression coefficients (Wald test) Missing data analyses (Little, 1988)	Multiple group regressions Missing data analyses (Little, 1988) Qualitative content analysis (Mayring, 2014)	Multiple regression and mediation analysis Threshold analysis using partly graphical methods Missing data analysis (Little, 1988) Selection analysis (logistic regression analysis)

The three sub-studies, including their research questions, hypotheses, methods and the results relevant to the dissertation project, are described below.

10. Sub-study 1: Families with young children during the COVID-19 pandemic

Sub-study 1 examines the adaptability of the home learning environment to mild, moderate and severe global stress, with a focus on the provision of learning-stimulating activities in different family settings (single-parent families, two-parent families, large families with four or more children) during the first COVID-19 lockdown in Germany and the significance of various parental stressors, such as changes in parental employment and closures of daycare centres. To this end, the double ABC-X model of family adaptation (McCubbin & Patterson, 1983) is applied to the context of child development within the home learning environment.

The first years of life (0–6 years) are a particularly sensitive phase for cognitive, linguistic, social and emotional development (Anders et al., 2012). If essential learning and interaction experiences do not occur during this period or are significantly impaired, this can have long-term negative effects on children's educational opportunities and development (WHO, 2020). During the COVID-19 pandemic, daycare centres, playgroups and public places such as playgrounds were often closed or only accessible to a limited extent. As a result, the home learning environment became the central location for early childhood education, with parents playing a crucial role in their children's education and development. The pandemic also led to significant parental stress, uncertainty, and multiple burdens in many families, including financial strain due to reduced employment or the simultaneous demands of working from home and childcare. Changes of this kind can significantly affect interactions between parents and their children, which is an important aspect of child development. In addition, families in such situations are required to be highly adaptable.

As an indicator of the adaptability of the home learning environment, sub-study 1 examines changes in the frequency of learning-stimulating activities between parents and children (operationalised as 'home learning activities') during the first

lockdown compared to the previous period, in accordance with McCubbin and Patterson's (1983) ABC-X model of family adaptation.

Specifically, sub-study 1 examines the impact of the first COVID-19 lockdown on the adaptability of learning-stimulating activities between parents and children in different family types, and the significance of perceived role distribution in the partnership, parental stress and social support (operationalised as general advice on parenting issues) for changes in the home learning environment. In this regard, it is assumed that the family settings examined draw on different resources to respond to pandemic-related stressors, such as changes in employment and the closure of daycare centres, which, in turn, is reflected in differences in the adaptability of the home learning environment (Hypothesis 1a). In addition, we hypothesise that there is a relation between changes in employment and childcare outside the home and the adaptability of families (Hypothesis 1b). Regarding the significance of different resources, we assume a positive relationship between the supportive distribution of roles within the partnership and family adaptability (Hypothesis 2a1) as well as between social support and family adaptability (Hypothesis 2a2). We also assume that parental stress influences adaptability differently in different family settings (Hypothesis 2b). In this regard, it is hypothesised that the relations between perceived parental stress and adaptability are strongest in single-parent families due to the lower human resources (only one adult in the household) (Hypothesis 2c), while the relationships between perceived parental stress and adaptability in large families are weakest due to the distribution of work and childcare responsibilities for usually several small children (Hypothesis 2d).

The design of the study 'Families and Childcare Centres in Times of COVID-19' (Cohen et al., 2020a), from which the data for sub-study 1 originate, consisted of a cross-sectional survey using an online questionnaire, which was conducted in spring 2020 and in which a total of 8,513 families with children aged 18 to 69 months participated, divided into 7,911 two-parent families with one to three children, 429

single-parent families and 173 large families with at least four children. The sample can be described as a convenience sample¹³.

The recruited parents came from all 16 German federal states, with some, such as Bavaria, Baden-Württemberg, and North Rhine-Westphalia, being particularly well represented (Cohen et al., 2020a). The average age of the respondents was 37 ($SD = 4.5$; age range 18–69). In terms of educational level as measured by ISCED levels (low = 0–2, medium = 3–5, high = 6–7), the families surveyed can be classified as privileged: In all three family types, the ISCED value is at a medium level (single-parent families: $M = 2.7$, $SD = 0.6$; traditional two-parent families: $M = 2.9$, $SD = 0.4$; large families: $M = 2.8$, $SD = 0.5$). At the time of the survey, 74% of parents were employed (21% full-time, 45% part-time and 8% on short-time working). Before the COVID-19 pandemic, 79% of parents were employed (27% full-time, 52% part-time and 0.3% on short-time working). The average time children spent in care outside the parental home fell from 7 hours per day ($SD = 2.4$) to 1.5 hours per day ($SD = 3.0$) at the time of the survey.

In order to be able to make statements about the adaptability of the home learning environment in the families surveyed, a change variable was generated for the frequency of learning-stimulating activities compared to the period before lockdown. Using a seven-point response scale (from 1 = significantly less often to 7 = significantly more often), parents were asked about the frequency of learning-stimulating activities (e.g., reading aloud or doing crafts) that they or another family member had carried out with the target child compared to before lockdown. In the model specification, the change variable serves as the dependent variable. Changes in household-level activities (–1 = less, 0 = no change, 1 = more) and changes in hours of childcare outside the home (–2 = significantly less, –1 = less, 0 = no change, 1 = more, 2 = significantly more) compared to the period before lockdown were considered as predictors. Similarly, the level of perceived parental stress was

¹³ A convenience sample, also known as an ad hoc sample, is characterised by a random selection of respondents or research subjects who are currently available or easily accessible (e.g., via personal contacts, social media or mailing lists of large non-profit organisations and foundations) (Golzar et al., 2022).

measured linearly across four items (e.g., ‘I often feel overwhelmed by the new tasks and demands, e.g., homeschooling, keeping the child occupied’), with scale values ranging from 1 to 4, with higher values reflecting higher levels of parental stress. To examine the relation between parental stress and adaptability more closely, the threshold concept of Oppermann and colleagues (2021) was used as a guide, and parental stress was additionally modelled as dummy variables, with quartile divisions used to set thresholds for medium and high stress. Parents with a score between 2.33 (2 = strongly disagree) and 3.0 (3 = strongly agree) on the linear stress scale are marked with 1 in the medium stress dummy variable (1 = medium stress, 0 = low or high stress). Parents whose stress perception on the linear stress scale is at least 3.25 are assigned 1 to the high-stress dummy variable (1 = high stress, 0 = medium or low stress). Low stress was defined as a scale value of 2.25 or less. Social support, which describes how strongly respondents felt supported by their social environment during lockdown (e.g., ‘Is there someone who can give you good advice when you have problems?’), was measured using a five-point response scale (from 1 = never to 5 = always). The perception of supportive roles within the partnership comprised four items, e.g., whether respondents felt sufficiently supported by their partner in childcare or household tasks. A four-point scale was used to measure agreement with these or similar statements (from 1 = strongly disagree to 4 = strongly agree). Single-parent families were unable to answer this scale due to their marital status. Control variables included parental education (ISCED), perceived financial problems before the COVID-19 pandemic (from 1 = we had no financial problems to 5 = we had major financial worries), the gender of the respondent (0 = female, 1 = male), the age of the target child (in months) at the time of the survey, and the gender of the target child (0 = female, 1 = male) were taken into account as control variables.

Descriptive analyses and variance analyses with post-hoc tests were conducted to investigate the effects of the first COVID-19 lockdown on the adaptability of the home learning environment in different family settings ad hoc tests were conducted to identify significant differences in the mean values of learning-stimulating

activities of parents and their children as a sign of adaptability of the home learning environment, changes in parental employment, and external childcare between family settings. In addition, multiple group regressions were conducted to examine whether differences in parental employment and external childcare were associated with the adaptability of the home learning environment, with family setting as the grouping variable. This analysis enabled the identification of significant differences in group-specific parameter estimates. Descriptive analyses and analyses of variance were also conducted to answer the research question on the importance of perceived role distribution in partnership, parental stress and social support for the adaptability of the home learning environment. The relations between supportive role distribution and changes in the frequency of learning-stimulating activities were analysed using multigroup regressions and post hoc analyses. Finally, possible relations between social support and changes in the frequency of learning-stimulating activities, as well as the influence of parental stress, were calculated using additional group regressions.

Findings from the first sub-study suggest that parental employment changed only marginally during the first lockdown across all three family types, but this does not mean families were not affected by changes associated with the COVID-19 pandemic. Even though the volume of employment did not change noticeably in many families, the proportion of respondents who worked from home rose from 28% to 38% during the first lockdown. All families experienced a significant decline in childcare hours outside the home during the lockdown. Single-parent families ($M = -1.4$, $SD = 0.9$) were slightly less affected by these changes than two-parent families ($M = -1.7$, $SD = 0.7$). This can be explained in part by the fact that single-parent families were particularly entitled to emergency childcare. Large families ($M = -1.5$, $SD = 0.9$) were also slightly less affected by these changes than families with two-parent families ($M = -1.7$, $SD = 0.7$). All families, regardless of their family setting, were equally affected by parental stress. The same was found for the perception of social support: All families reported a moderate level of perceived social support. In two-parent families and large families, respondents reported

living in a partnership that tended towards a supportive division of roles. Contrary to Hypothesis 1a, the results show a general increase in learning-stimulating activities in all family settings compared to before the first lockdown, with moderate differences observed between families: During the lockdown, parents from two-parent families ($M = 5.0$, $SD = 0.8$; $p = 0.000$) and single parents ($M = 4.9$, $SD = 0.8$; $p = 0.010$) offered their children learning-stimulating activities significantly more often than parents from large families ($M = 4.6$, $SD = 1.0$). No significant difference was found in the frequency of learning-stimulating activities between two-parent and single-parent families ($p = 0.335$). Contrary to the assumption in Hypothesis 1b, changes in employment and external childcare did not have a relation to adaptability in families.

Regarding linear stress, comparisons across families showed that all three family settings experienced equal levels of parental stress. In all families, a negative relation was found between perceived parental stress caused by the COVID-19 pandemic and the adaptation of the home learning environment (continuous provision of learning-stimulating activities despite pandemic-related stressors), but only at high levels of stress (single-parent families: $\beta = -0.19$, $SE = 0.06$; two-parent families: $\beta = -0.11$, $SE = 0.01$; large families: $\beta = -0.27$, $SE = 0.09$). Contrary to the assumptions of hypotheses 2c and 2d, the observed statistical relation was particularly pronounced in large families rather than in single-parent families.

Regarding social support, the findings show no differences in perceived social support among families. They further confirm that this variable acts as a protective factor against high parental stress, with this effect being significantly pronounced in large families ($\beta = 0.25$, $SE = 0.10$). At the same time, it was also present in two-parent families but less pronounced ($\beta = 0.08$, $SE = 0.01$). In single-parent families, this relation was not statistically significant, possibly due to childcare alternatives in the private sphere, established support networks, and the special entitlement to emergency childcare in daycare centres. The findings thus confirm Hypothesis 2a2, according to which there are positive links between social support and the adaptability of families, at least for two-parent families and large families.

Furthermore, the supportive distribution of roles within the parental partnership did not show any statistically significant influence on the adaptability of the home learning environment. Hypothesis 2a1, according to which a supportive distribution of roles within the partnership is positively related to adaptability in families, could therefore not be confirmed.

In summary, the findings from sub-study 1 are highly relevant to early childhood educational research, as they help close research gaps in family settings, such as single-parent and large families. They also illustrate once again how high parental stress weakens the stimulating nature of the home learning environment and how social support has a protective effect against this, especially in large families. By adapting the double ABC-X model of family adaptation (McCubbin & Patterson, 1983) to the context of child development within the home learning environment, we demonstrate how global stress caused by stressors associated with the COVID-19 pandemic affects the home learning environment. The results illustrate that social support acts as an important protective factor for the home learning environment in times of crisis. The focus on large families is particularly relevant here, as these have been identified as at risk.

Several limitations must be taken into account when interpreting the results: The data come from a Germany-wide online survey, which yielded a convenience sample. Among other things, this means that parents with low levels of education and single-parent families are underrepresented compared to the German average (German Federal Statistical Office, 2021). The cross-sectional structure of the data does not allow for causal conclusions, and the results presented mostly show low effect sizes and small regression coefficients, which require cautious interpretation. In addition, due to the study's cross-sectional design, it was not possible to directly assess how the frequency of learning-stimulating activities changed over time. The statements about changes since the first lockdown are based on the parents' self-assessments. Information on the original frequency of learning-stimulating activities is not available in the data. In addition, self-reported data from parents may be distorted by social desirability bias. Ultimately, the experiences of families during

the first lockdown may differ greatly from later phases of the COVID-19 pandemic. Therefore, the present results must always be interpreted with the temporal context in mind.

Nevertheless, this study provides empirically sound starting points for education and family policy strategies in times of crisis and highlights the need for differentiated support measures. The development of low-threshold support services that can be adapted to different family settings is therefore essential. These services include, in particular, flexible childcare options and measures to strengthen parental abilities and support networks.

11. Sub-study 2: Parental stress and the home learning environment

Sub-study 2 examines the relationship between parental stress and the home learning environment in the everyday lives of single-parent families in Germany. The study aims to identify specific stressors, risk factors and protective factors that influence the learning and development of children aged between three and seven in these families. Sub-study 2 is based on the concept of the home learning environment (Kluczniok et al., 2013). In addition, the family stress model developed by Masarik and Conger (2017) is used to examine the influence of various stressors that occur in the everyday lives of single-parent families on parental behaviour (e.g., the provision of parent-child interaction and activities) and the associated protective and risk factors. A mixed-methods approach is used to gain a deeper understanding of the challenges faced by single-parent families and the adaptability of their home learning environment to (accumulated) everyday stress.

Single parents in Germany are defined as individuals who live with their minor children without a partner in the household (Bhayana, 2023). According to this definition, approximately 2.8 million single-parent families are living in Germany, of whom approximately 1.6 million have dependent children (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2023). Compared to two-parent families, single-parent families are at a significantly higher risk of poverty (42.9%

vs. 8.4%) and sometimes face greater challenges in everyday life. However, the German social welfare system offers a variety of support measures for families, including financial assistance and infrastructure services (e.g., childcare).

As already illustrated in sub-study 1 of the dissertation, the family is a crucial learning environment whose characteristics significantly influence children's development (Kluczniok et al., 2013; Melhuish et al., 2008). The concept of the home learning environment refers to the quality of stimulation provided in families and emphasises the importance of regular and direct interactions and activities between parents and children (Linberg, 2017). Parental stress, particularly triggered by financial burdens, can reduce the stimulating nature of the home learning environment and create inequalities within it (Masarik & Conger, 2017). For example, there are significant differences in the promotion of learning opportunities, particularly in low-income families, where stress due to financial worries often impairs educational processes (Gershoff et al., 2007).

Single-parent families are often particularly affected by financial stress (Federal Statistical Office, 2024; OECD, 2018) and experience greater challenges in coping with everyday family life compared to two-parent families. However, research findings also indicate that the availability of social support and specific resources can help to cope with parental stress (Kotchick et al., 2005; Martin-West, 2019). Parental self-efficacy and active coping strategies, alongside social support, are considered important protective factors that can mitigate the negative effects of stress (Bojczyk et al., 2018; Cheng & Lai, 2023; McConnell et al., 2011). High parental self-efficacy promotes effective parenting practices (Bojczyk et al., 2018) and positive interactions with children (Gessulat, 2022). Supportive co-parenting can also be a significant protective factor (Nunes et al., 2021).

Sub-study 2 is dedicated to answering two research questions: Firstly, it examines how learning-stimulating activities are structured in single-parent families compared to two-parent families, considering family structures and financial burdens. It is assumed that a negative perception of the economic household situation is associated with fewer learning-stimulating activities (Hypothesis 1), and

it is hypothesised that this relation will be more pronounced in single-parent families than in two-parent families (Hypothesis 2). Furthermore, the study analyses which factors can be identified as main stressors and risk factors for single-parent families with young children and which protective factors help them to cope with parental stress and maintain a stimulating home learning environment. For this reason, in addition to financial burdens, other stress-related factors in single-parent families are identified.

To answer the research questions, a mixed-methods study was conducted in sub-study 2, combining quantitative data from the German National Education Panel Study (NEPS) with qualitative data from interviews with single-parent families. An explanatory sequential mixed-methods design (Creswell & Clark, 2017) enables the sequential collection of quantitative and qualitative data, with the quantitative results formulating specific research approaches for qualitative analysis. This approach increases the validity of the results through data triangulation, a process in which a research subject is viewed from two (or more) points of view using different methodological approaches (Flick, 2020).

The quantitative sample comprised 1,088 parents with children aged 5.7 years on average (68.5 months in single-parent families, 68.9 months in two-parent families). Of these, 116 were single-parent families, and 972 were two-parent families, whose family structures and frequency of learning-stimulating activities were recorded quantitatively. The majority of parents are considered relatively educationally privileged and, in some cases, have a slightly higher level of education than the general German population (Federal Statistical Office, 2024). The qualitative sample consisted of 11 single-parent families with an average child age of 4.3 years. A significant proportion of the parents ($n = 7$) had completed higher education (with a bachelor's and/or master's degree).

The home learning environment was measured in the quantitative sample of families using an eight-point frequency scale (from 1 = never to 8 = several times a day) for five learning-stimulating activities (reading aloud, activities with letters, activities with numbers, memorising rhymes and songs, and painting and crafts).

The assessment of the economic household situation (from 1 = very poor to 5 = very good) was considered a predictor of the frequency of these activities, while control variables included family structures such as socio-economic status (HISEI-08), family language, child age and age of respondents, parental working hours, and number of siblings living in the household. The quantitative analysis included group comparisons between single-parent families and two-parent families. The qualitative analysis was performed in MAXQDA using qualitative content analysis (Mayring, 2014) and a combined coding approach. First, a theory-driven category system was created, which was then inductively expanded after initial content coding. The further analysis of the qualitative data is intended to expand on the findings from the quantitative data analysis. This methodology enables a comprehensive investigation of the relations between parental stress and the home learning environment in single-parent families, specifically in the context of Germany.

The findings of the quantitative analyses show that single-parent families had lower socio-economic status scores than two-parent families: Single-parent families had an average HISEI-08 score of 48 ($SD = 18.6$), while two-parent families had an average of 58 ($SD = 19.9$). In both types of families, learning-stimulating activities took place several times a week (single-parent families: $SD = 0.9$; two-parent families: $SD = 0.9$). Regarding their perception of their household's economic situation, single-parent families rated their situation as neither particularly good nor bad on average ($M = 3$, $SD = 0.9$), while two-parent families rated their household's economic situation as rather good ($M = 4$, $SD = 0.9$). Group comparisons of the mean values showed that single-parent families rated their economic household situation significantly worse than two-parent families ($U = 31993.0$; $Z = -8.06$; $p < 0.001$). The multiple group regressions showed that, in single-parent families, a better assessment of the economic household situation is related to a higher frequency of learning-stimulating activities in the home learning environment ($\beta = 0.25$; $SE = 0.09$; $p < 0.01$). In two-parent families, on the other hand, no significant relation was found between the perception of the economic household situation and

the frequency of learning-stimulating activities; instead, the gender of the child was relevant, with girls in these families being involved in learning-stimulating activities more often than boys ($\beta = 0.07$; $SE = 0.03$; $p < 0.05$). The results show that a low perception of the economic household situation is a significant stressor for single-parent families in Germany and confirm the hypothesis that a poorer assessment of one's own economic household situation is associated with a lower frequency of learning-stimulating activities in single-parent families.

Findings from the qualitative analyses conducted to answer the research question about the main stressors, risk factors, and protective factors for single-parent families with young children indicate that financial burdens are perceived as the most significant stressors. These manifest themselves in a low perception of the economic household situation, which, in turn, impairs the quality of parent-child interactions and the ability to offer a variety of learning-stimulating activities. However, financial burdens also lead to increased worries and fears about the future in some single-parent families. Some single parents also find themselves in a related dilemma: They cannot increase their working hours because doing so would lead to higher childcare expenses (e.g., through babysitters). In addition, time pressure and emotional stress, such as conflicts with the ex-partner and a lack of parental self-efficacy, are significant risk factors that increase parental stress in single-parent families. On the other hand, the qualitative results identify several protective factors, including parental resources such as high parental self-efficacy and active, problem-oriented coping strategies that help single parents manage perceived stress. Furthermore, supportive co-parenting between separated parents is important, as is access to social support networks (e.g., from friends and family members) and structural support networks (e.g., childcare services, flexible work arrangements) that enable single-parent families to maintain a stimulating home learning environment. These findings highlight the complexity of the everyday challenges faced by single-parent families and emphasise the need for targeted support systems.

In summary, sub-study 2 clearly shows how the quantitative and qualitative results complement each other: The use of a mixed-methods approach enabled the identification of specific stressors, risk factors, and protective factors, and the analysis of their influence on the home learning environment in single-parent families. While the quantitative results reveal fundamental relationships between perceptions of the economic household situation and learning-stimulating activities within the home learning environment, the qualitative insights deepen our understanding of specific stressors, risk factors, and protective factors in the everyday lives of single-parent families.

When interpreting the results, some limitations of the study should be considered. The cross-sectional data from the NEPS provide only a snapshot; the stability of the home learning environment over time is not accounted for. In addition, the quantitative analyses in sub-study 2 are limited to the frequency of learning-stimulating activities without also considering their quality. As in sub-study 1, the data in this study are based on parental self-reports, which carries the risk of social desirability bias and could distort the accuracy of the findings. Regarding the findings from the qualitative data, it must be considered that this is a small, non-representative sample, which limits the generalisability of the results. Furthermore, data from interviews may be distorted by social desirability, as respondents may give answers that are more socially acceptable. This can affect the validity of the data. In addition, qualitative data is often highly context-dependent, meaning results may vary due to cultural or situational factors. These contextual aspects may limit the transferability of the results to other contexts. Finally, it must also be noted that the quantitative data is from 2012, while the qualitative data was collected in 2024. The interpretation of the findings, therefore, requires consideration in the respective temporal context.

In summary, sub-study 2 highlights specific stressors, risk factors and protective factors that influence the home learning environment of single-parent families in Germany. The results show that understanding these factors is crucial to supporting single-parent families in coping with everyday challenges. The results from sub-

study 2 also show that, despite the sometimes adverse circumstances faced by some single-parent families, these families also demonstrate strengths, load capacity and a high degree of adaptability. The findings from sub-study 2, therefore, contribute to the promotion of positive parenting practices and to a deeper understanding of the home learning environment.

12. Sub-study 3: Potential of a digital parenting app to support parents of toddlers

Sub-study 3 examines the potential of a digital parenting app to support parents, particularly regarding the relationships among app usage intensity, language-related parental self-efficacy, and early childhood language development in families with toddlers. Sub-study 3, therefore, argues that language-related parental self-efficacy plays a central role in parental support for early childhood language abilities and that digital media can offer a useful supplement to the promotion of language-related parental self-efficacy, as a stimulating language-related home learning environment (home literacy) has a significant influence on children's language development (de Bondt et al., 2020; Niklas et al., 2016c).

Specifically, the sub-study discusses the crucial role of the family as the primary learning environment in early childhood development, especially for the language development of very young children (3–24 months). Research shows that learning-stimulating activities contribute significantly to children's language development (Niklas & Schneider, 2017). Therefore, a stimulating home literacy environment is particularly important for young children who are not yet receiving institutional education (WHO, 2020). However, there are considerable differences in how families promote their children's language and reading development (Lehrl et al., 2020b; Morgan, 2005; Wirth et al., 2023). To counteract these inequalities, early support for the home literacy environment is recommended (Niklas et al., 2024).

Empirical evidence clearly shows that parental self-efficacy is a significant predictor of learning-stimulating activities between parents and children and successful child development, particularly in the areas of cognitive and language abilities (Gessulat, 2022; Jones & Prinz, 2005). It is also clear that families with lower

incomes or educational levels often show lower parental self-efficacy (Ardelt & Eccles, 2001). Studies on app-based parenting programmes have shown positive effects on parental self-efficacy and learning-stimulating activities in the home learning environment (Jelley & Sylva, 2018; Jelley et al., 2016; York et al., 2019). Digital media thus offer new opportunities for family support, especially through apps that provide flexible access to information (Biber et al., 2019).

The Carina Foundation, a German non-profit organisation, launched the *Chancenreich* family support programme in 2009 in cooperation with the city of Herford. This programme is aimed at parents of newborns and supports them until their child reaches the age of three. *Chancenreich* is one of the few scientifically evaluated programmes in Germany that has been shown to have a positive impact on learning-stimulating activities and language-related parental self-efficacy in the home learning environment (Anders et al., 2015, 2017, 2023). To promote digitalisation in family support, a smartphone app was developed for *Chancenreich* that includes both organisational elements (e.g., appointment reminders) and an educational section for parents. The latter is crucial for improving early language support for children by strengthening parents' beliefs about their abilities to support their children's early language development and supporting language-stimulating activities in families (Anders et al., 2023). The app is aimed at parents with children in the age-sensitive period for early language development, from birth to 24 months. All parents in the programme can download the app to their devices. Through weekly topics on early childhood language development and three weekly push notifications on specific content related to early childhood language development, parents are empowered in their language-related self-efficacy and receive specific tips on language-stimulating parent-child activities. These tasks encourage parents to actively participate in their children's language development and empower them in their parenting role.

Building on this, sub-study 3 examines the potential of the *Chancenreich* parenting app for language-related parental self-efficacy and home literacy, focusing on the relationships between the intensity of app use, language-related parental self-

efficacy and language-stimulating parent-child activities. The first research question examines the relation between the intensity of *Chancenreich* app use and changes in language-related parental self-efficacy. In this regard, it is assumed that the intensity of app use is positively related to an increase in language-related parental self-efficacy (Hypothesis 1a) and that a minimum number of app tasks (threshold value) must be completed for a significant increase in language-related parental self-efficacy (Hypothesis 1b). Another research question concerns how changes in language-related self-efficacy are associated with changes in the frequency of language-stimulating activities within families. It is hypothesised that the increase in language-related parental self-efficacy is associated with an increase in the frequency of language-stimulating activities (Hypothesis 2). Finally, the third research question examines possible direct and/or indirect relations among the intensity of app use, changes in the frequency of language-stimulating activities, and mediating effects through changes in language-related parental self-efficacy. In this regard, it is assumed that the intensity of use of the *Chancenreich* app is related to an increase in the frequency of language-stimulating activities, mediated by an increase in language-related parental self-efficacy (Hypothesis 3).

Sub-study 3 uses data from the first and second measurement points of the DIGIFam study (Anders et al., 2023), which was conducted in a quasi-experimental longitudinal design across three measurement points. For sub-study 3, data were collected from 184 German families with toddlers. Parents answered online questions about their use of the *Chancenreich* app and reported their self-assessed language-related self-efficacy and the frequency of language-stimulating activities with their child. Regressions, a threshold analysis, and a mediation analysis were conducted to investigate the research questions regarding the relations among the intensity of use of the *Chancenreich* app, changes in language-related parental self-efficacy, changes in the frequency of language-promoting activities, and possible direct or indirect relations among the three variables.

Between September 2021 and September 2022, parents were recruited through the *Chancenreich* family support programme, in daycare centres and family centres,

and via social media. Flyers were also distributed in public places, resulting in a convenience sample. The participating families were assigned to an intervention group (app users) and a comparison group. The parents in the intervention group had access to the *Chancenreich* app and received information about their child's language development. In addition, 69 parents in the intervention group took part in an online parenting course on early language development, but the effects of this course are not part of the investigations in sub-study 3. Parents in the comparison group did not use the app and did not receive any other language-related family support from *Chancenreich*. The sample ($n = 184$) includes families with children aged 3 to 24 months ($M = 12.5$, $SD = 3.5$). Of these, 131 parents belong to the intervention group and 53 to the comparison group. Overlap between the groups was statistically excluded. Approximately 95% of the participating parents were mothers. The average age of the parents was 34 years ($SD = 4.2$, age range 24–49 years). The majority of parents had a slightly higher level of education than the general German population (German Federal Statistical Office, 2024): 75% had a high school diploma (total population: 34%) and 62% had a university degree (total population: 19%). This indicates a very privileged, homogeneous group of parents.

The frequency of language-stimulating activities (partly adapted from Caldwell & Bradley, 1984) (e.g., reading or looking at picture books together) that parents or another family member carried out with the target child was recorded using an eight-point frequency scale (from 1 = never to = several times a day). Using the scales for the frequency of language-stimulating activities at measurement points 1 and 2, a change variable was generated and treated as a dependent variable in the subsequent analyses. Regarding language-related parental self-efficacy, a scale consisting of five items (e.g., 'I am confident that I can support my child's language development in an age-appropriate manner') was developed in sub-study 3, inspired by Coleman and Karraker (2003). Using this scale, the parents surveyed rated their confidence in their ability to provide early language support on a five-point response scale (from 1 = strongly disagree to 5 = strongly agree). A change variable was also generated using the language-related parental self-efficacy scales from

measurement points 1 and 2. The intensity of app use was measured by the number of app tasks completed during the 10-week intervention (0–30 tasks) and included as a predictor in the analyses. Through the app tasks, parents received information, for example, that children are very receptive to language learning in their first year of life, and it was emphasised that parents have a major influence on how their children learn to speak. In addition, the app suggested, among other things, that parents look at books together with their toddlers so that babies can learn new words in a playful way. For the comparison group, the missing values for the app tasks were set to '0'. This not only allows a distinction between the intervention and comparison groups but also enables clearer differentiation between the intensity of app use and non-use. The control variables considered were the age of the target child (in months) at the first measurement point, the family language (1 = not predominantly German, 0 = predominantly German), socio-economic status (measured by the family's net equivalent income) and the number of children (0–17 years) and adults (18 years and older) living in the household.

Results show that the intensity of app use is positively related to an increase in language-related parental self-efficacy ($\beta = 0.36, p < .001$). This means that the more app tasks the parents completed, the greater their language-related parental self-efficacy increased, i.e., the parents felt more self-efficacious in promoting their children's early language development. The threshold analysis showed an exponential positive relationship between the number of completed tasks and increases in language-related parental self-efficacy, evident from 10 to 12 completed app tasks. In addition, language-related parental self-efficacy stabilised (plateau effect). Changes in language-related parental self-efficacy were also observed for 15 to 25 tasks, but these were too vague to draw clear conclusions. In addition, the increase in language-related parental self-efficacy was positively related to an increased frequency of language-stimulating activities. This relation remained stable even when the completed app tasks were considered ($\beta = 0.30, p < .001$). The mediation analysis did not find a direct relation between app use and language-stimulating activities ($\beta_{\text{direct}} = 0.03$ [95% CI: $-0.14, 0.20$], $p = 0.737$). However, since

the total indirect effect ($\beta_{\text{indirect}} = 0.10$ [95% CI: 0.04, 0.17], $p = 0.003$) was significant, this confirms exclusively indirect mediation. This means that the relationship between app use and language-stimulating activities is completely mediated by language-related parental self-efficacy.

The results underscore the importance of digital approaches to family support measures, especially when it comes to strengthening parental abilities in the area of early childhood language development. They show that digital parenting apps are promising tools for promoting parents' parental self-efficacy regarding their (language-promoting) abilities, which in turn strengthens a stimulating home learning environment, and in particular a stimulating home literacy environment. The fact that language-related parental self-efficacy acts as a mediating variable in this regard once again highlights its enormous importance for early interventions to strengthen the home learning environment and demonstrates how important this parental resource is. The findings from sub-study 3 can help to develop more effective strategies for supporting families with young children. In particular, they can support parents by emphasising the importance of parental self-efficacy in the early stages of their children's development. The study also points out that domain-specific content (e.g., early childhood language development) and the type of communication (regular push notifications with everyday tasks, motivation) via the app are important for the success of such interventions. In addition, the threshold analysis shows that interventions can be effective if parents work through a minimum amount of content – in the case of the *Chancenreich* app, this means that parents had to complete at least 10 app tasks for the intervention to deliver its added value.

Nevertheless, some limitations should be considered when interpreting the results. The data come from a relatively small, geographically limited German sample collected online and thus represent a convenience sample. In addition, parents with low educational attainment and low socio-economic status are underrepresented in sub-study 3 compared to the German average (German Federal Statistical Office, 2024). The different group sizes in the intervention and

comparison groups must also be taken into account. Parents who only used the app were considered together with those who also participated in an online parenting course. This could distort the assessment of the influence of app use, as the course content may also have been relevant to the relationships described. The measurement of the frequency of language-stimulating activities in this sub-study is also based on parental self-reports, which, as already noted in the limitations of the other two sub-studies, could distort the findings due to social desirability. Finally, like the data from sub-studies 1 and 2, the present data set does not allow any conclusions to be drawn about the quality of the (language-related) processes in the home learning environment.

Overall, however, sub-study 3 impressively demonstrates that digital approaches to family support measures not only adequately address important resources such as parental self-efficacy, but also contribute to strengthening the home learning environment, which is crucial for early (language) development. Sub-study 3 underscores the growing importance of app-based family support programmes and highlights the potential for strengthening families' parenting abilities through digital approaches. Furthermore, the study offers new insights into the home learning environment of children in their first year of life, an age group that has been considered severely under-researched to date (Hall et al., 2021; Linberg et al., 2020).

13. Major contributions of the present dissertation

The aim of this dissertation is to examine specific resources in the home learning environment that have a lasting positive impact on educational processes in early childhood. Particular focus is placed on analysing the home learning environment, the adaptability of families and stress factors that influence them. The chosen research topic is examined using an interdisciplinary approach that integrates concepts from (early) education, sociology and psychology. Based on these findings, a proposal for a resource model of the home learning environment was developed, which considers the importance of family and parental resources within the home learning environment, as well as available support systems, from a systemic perspective. Overall, the dissertation contributes to the further development of research and practice in the field of strengthening educational processes in early childhood.

This chapter summarises the key findings of the empirical studies and embeds them in a broader theoretical context. Chapters 13.1 to 13.3 begin with an overview of the findings of the three sub-studies, which are then discussed in the context of existing research literature. Each sub-chapter also presents research desiderata (cf. Chapter 7.2) that are addressed by the results of the three sub-studies. This is followed by a discussion of the theoretical models underlying this dissertation (Chapter 13.4). The chapter concludes with a detailed discussion of new demands on family support and the question of equal opportunities and social cohesion (Chapter 13.5).

13.1. To what extent do specific family structures and parental stressors influence educational processes in the home learning environment against the backdrop of social challenges and crises?

The results of sub-studies 1 and 2 contribute significantly to answering the first research question: With reference to the double ABC-X model of family adaptation (McCubbin & Patterson, 1983), results of sub-study 1 show that educational processes within the home learning environment proved to be adaptable during the

first lockdown of the COVID-19 pandemic, which manifested itself in an average increase in learning-stimulating activities between parents and children. This observation extends across all family settings studied and suggests that, overall, the pandemic-related restrictions presented an opportunity to intensify and transform educational processes in the home learning environment. However, a negative relation was also found between pandemic-related parental stress and the adaptability of the home learning environment, although this relation only became significant at high levels of parental stress. This relation was particularly pronounced in large families (parents living as a couple with four or more children in a shared household), which underlines the varying vulnerability of family settings. The results are therefore useful for highlighting the specific challenges faced by large families in crisis situations and for providing empirical starting points for education and family policy strategies that address their needs. The identification of large families as a risk group is particularly relevant from an educational perspective, as interventions and family support measures can be implemented more effectively if these families and their needs are given greater consideration in the design of family support services.

Sub-study 2 focuses on the complexity of the home learning environment of single-parent families and specific stressors that influence the educational processes of children between the ages of three and six. The family stress model (Conger et al., 1992; Masarik & Conger, 2017) is used as a theoretical framework to analyse parental behaviour in relation to the provision of parent-child interactions and learning-stimulating activities. The quantitative findings show that single-parent families have a significantly lower socio-economic status than two-parent families, and that financial burdens, as measured by perception of the economic household situation, have a negative impact on the educational processes of the home learning environment in single-parent families as a central stressor. The qualitative analysis of interviews with eleven single parents also highlights the diversity of stressors, which are often rooted in a negative perception of the economic situation, even though some single-parent families have a medium or even high socio-economic

status. These stressors not only impair the quality of parent-child interactions and learning-stimulating activities but also result in a lack of time resources and emotional stress, which can be exacerbated by a lack of parental self-efficacy and conflicts with the separated parent. The cumulative impact of these stressors underscores the complexity of the challenges some single-parent families face in everyday life.

Together, sub-studies 1 and 2 help shed light on the effects of global and individual crises on the educational processes of children with different family structures, using multidimensional analyses (e.g., by considering different family settings and combining quantitative and qualitative analyses). These findings are not only significant from a scientific point of view but also provide a basis for the development of targeted support options in times of social challenges and crises.

Research desiderata: Challenging and crisis situations in the family context

The results from sub-study 1 close several previously identified research gaps that focus on challenging and crisis situations in the family context. In particular, they focus on systemic barriers that families face in challenging life situations, such as a lack of social support and a lack of accessible services, such as external childcare. As already outlined in Chapter 7.2.1, Grimm and colleagues (2020) argue that a deep understanding of the effects of crises on young children and their families, as well as the complex and diverse characteristics of such crises, is essential. The present findings contribute to this topic. Large families, which make up about 8% of all families in Germany (Federal Statistical Office, 2026), were particularly burdened by high parental stress during the COVID-19 pandemic, offering new insights into the special needs of this group and the development of inclusive measures (Urban, 2015). The second sub-study also expands the theoretical framework on social challenges and crises by analysing how individual crises, such as separation and divorce, affect young children and their families.

Research desiderata: The home learning environment

Regarding the home learning environment, sub-study 1 also contributes to closing some research gaps: The complexity of the home learning environment and general living realities in Western industrialised societies is constantly increasing, which has a decisive influence on the understanding of factors that promote child development (Jones et al., 2017). In this relation, sub-study 1 applies the double ABC-X model of family adaptation (McCubbin & Patterson, 1983) to child development within the home learning environment. This integrative model combines established theories of the home learning environment with the increasing complexity of family life with young children, thereby explicitly examining the adaptability of the home learning environment.

Research desiderata: Parental stress, adaptation, and specific resources of the home learning environment

Regarding parental stress, sub-study 1 examines stress experiences under the construct of ‘global stress’ that affected families with young children during the COVID-19 pandemic. Iacob and colleagues (2020), as well as Peer & Hillmann (2014), call for differentiated studies that consider different target groups. Sub-study 1 meets this requirement by systematically comparing different dimensions of parental stress in different target groups, such as two-parent families, single-parent families, and large families. The second sub-study also provides insights into the increasing complexity of family life with young children by examining parental stress in relation to the home learning environment. Sub-study 2 offers a more complex examination of parental stress in single-parent families from a systemic perspective. As requested in various places (e.g., Löchner et al., 2024; Pan et al., 2025; Rusu et al., 2025), it closes research gaps, particularly with regard to underlying mechanisms and the diversity of stress experiences within the construct of ‘everyday stress’, and contributes to the expansion of the data base on stress experiences in families with typically developing children, as called for in the meta-analysis by Rusu and colleagues (2025).

13.2. How do family and parental resources influence the provision of educational processes in the home learning environment?

Findings of the first sub-study indicate that the distribution of roles within the partnership, in the context of co-parenting, has no significant impact on the adaptability of the home learning environment – at least in the context of social challenges and crises. This finding suggests that during crisis events such as the COVID-19 pandemic, other factors – possibly those with a stronger emotional or cognitive dimension – play a more decisive role in strengthening a stimulating home learning environment.

In contrast, the qualitative results of the second sub-study confirm the relevance of specific parental resources. High parental self-efficacy, active problem-oriented coping strategies and positive appraisal contribute significantly to single-parent families' ability to deal with perceived everyday stress more effectively. These parental resources are not only important for parents' well-being, but also for maintaining a stimulating home learning environment. Furthermore, it has been shown that supportive co-parenting, especially between separated parents, is a crucial factor in stress management in single-parent families and an important resource for the family system in creating a stimulating home learning environment.

The third sub-study also emphasises the need to focus on parental self-efficacy and highlights the possibility of addressing this parental resource at a very early stage of the home learning environment. It illustrates that parents' belief in their ability to shape their children's educational processes actively is a key resource in the home learning environment. This is important because creating a stimulating home learning environment is particularly important for children under the age of two, as institutional stimulation does not (yet) take place in many families at this stage.

In summary, both parental resources (especially high parental self-efficacy) and resources within the family system (especially supportive co-parenting) are essential for providing educational processes and strengthening a stimulating home learning

environment in early childhood. The interaction of these resources can therefore be considered crucial for educational processes, which are essential, especially in the early stages of children's lives.

Research desiderata: The home learning environment

Findings obtained in sub-study 3 contribute to closing some previously identified research desiderata: Among other things, they offer new insights into the home learning environment of children in their first year of life, an age group that, as discussed in Chapter 7.2.2, has been considered severely under-researched to date (Hall et al., 2021; Linberg et al., 2020).

Research desiderata: Parental stress, adaptation, and specific resources of the home learning environment

In addition to the adaptability of the home learning environment, sub-study 1 highlights specific resources within it. Scientific literature repeatedly calls for research into the different roles of mediators of parental stress and family adaptation (Jiang et al., 2023; Löchner et al., 2024; Pan et al., 2025; Rusu et al., 2025). This request is addressed in sub-study 1, for example, through analyses of the significance of role distribution within the parental partnership as a facet of co-parenting, as well as the interactions among relevant resources and adaptability across different family settings. In sub-study 2, data on dyadic stress processes between parents (e.g., co-parenting) are presented to supplement this. The findings of the third sub-study expand on insights regarding parental resources (see Chapter 7.2.3) and, once again, place the importance of parental self-efficacy for a stimulating home learning environment at the centre of debates on resources. Results of the third sub-study also show that addressing parental self-efficacy in a domain-specific manner is a decisive factor for language-related educational processes in the home learning environment. The third sub-study, therefore, identifies parental self-efficacy as a significant resource in the context of the present dissertation. The results suggest that this resource can be addressed particularly in the very early

phase of the home learning environment, namely in the first year of a child's life. As Barnett (2008) and Jensen and Sanner (2021) postulate, resource-oriented research on diverse family settings remains a central gap. Overall, sub-studies 1, 2, and 3 make a decisive contribution to closing existing research gaps in this area by adopting a resource-oriented perspective on the home learning environment.

13.3. Given the diverse needs of families and an increasingly digitalised society, what approaches can family support measures take to strengthen specific resources in the home learning environment?

Answering the third research question requires a differentiated consideration of social and structural support networks as well as innovative digital approaches to family support measures. The results of the first sub-study show that social support in times of crisis acts as a key protective factor for the home learning environment. In large families, in particular, this type of support significantly reduces parental stress. This effect is also present in two-parent families but is less pronounced. The establishment of low-threshold support services that are adequately adapted to different family settings is therefore essential to meet the specific needs of all families. To this end, it is also necessary to raise awareness of the support systems available to families, how they work in different family settings, and whether parents are aware of them. Against this background, it is equally crucial to expand support services, such as emergency childcare and effective family support measures, especially for families with young children who face social challenges and crises.

The second sub-study supplements findings on the importance of social support from the perspective of structural support networks. Access to such networks is particularly important for single parents to maintain a stimulating home learning environment. Targeted, need-based family support measures must be developed with a systemic perspective to efficiently address the complex needs and everyday situations of families. Without such a perspective, family support measures could lose their effectiveness in modern, increasingly digitalised society.

Finally, the third sub-study highlights the potential of digital interventions, particularly through the introduction of a digital parenting app. Tools like this can not only strengthen parental self-efficacy but also support the implementation of specific learning content, such as language development in the home environment. It has been shown that digital approaches that offer regular push notifications with everyday tasks and motivational messages contribute significantly to the development of parental resources and the strengthening of the home learning environment. This makes it clear that family support measures, such as the *Chancenreich* parenting app, play a crucial role in the field's development, especially amid social upheavals (e.g., the growing digitalisation of society) that many families are facing. A key aspect of apps of this kind is the ability to provide specific content and resources tailored to the individual needs of families. This includes information on early childhood education, stress management support, and everyday suggestions for promoting language and cognitive development in young children. Regular push notifications and interactive tasks not only provide parents with valuable ideas but also encourage them to participate in their children's development actively. Furthermore, such digital approaches increase the accessibility of information and support services, which is particularly important for single-parent, low-income or particularly disadvantaged families. They offer a low-threshold opportunity to seek and access support without physical presence. This can facilitate the integration of families with special needs into existing social networks and connect them to local support services.

In summary, it is clear that an effective approach to family support measures, given the diverse needs of families and the digitalisation process, requires a combination of robust social and structural support networks, differentiated support services and innovative digital approaches. In this regard, findings from the three sub-studies provide a deeper understanding of the interactions among parental stress, specific resources, adaptability, and the home learning environment of families with young children. This understanding is central to the development of family support measures and interventions that specifically address the needs of

families. This targeted approach not only strengthens the various resources of the home learning environment (e.g., parental self-efficacy, active problem-oriented coping and appraisal, supportive co-parenting), but also sustainably improves educational processes within families in early childhood.

Research desiderata: Support systems of the home learning environment

Regarding existing research gaps in the area of social support, the results from sub-study 1 show that social support in times of crisis, such as the COVID-19 pandemic, is a crucial protective factor for many families. Iacob and colleagues (2020), as well as Peer & Hillmann (2014), call for differentiated studies that consider different target groups. Sub-study 1 meets this requirement by taking a differentiated look at the importance of support systems in the home learning environment in different target groups, such as two-parent families, single-parent families and large families, and systematically comparing these three family types. The findings offer important insights into how families in challenging life situations, and especially in times of social crisis, can be supported. Overall, sub-study 1 thus makes a valuable contribution to a better understanding of social challenges and resources in the family context, as well as to the development of need-based support approaches.

Results of the second sub-study also contribute significantly to closing previously identified research gaps, filling gaps in our understanding of effective interventions for families and young children facing economic hardship. The findings also contribute to a broader understanding of the differentiation of the construct of ‘social support’ by exploring different forms of social support networks: emotional support from friends or other caregivers and structural forms of support, such as flexible working hours and the use of home offices.

In addition, findings of the third sub-study expand on insights regarding parental resources (see Chapter 7.2.3), showing how these can be strengthened in practice (e.g., through parenting programmes) (Cheng & Lai, 2023; Löchner et al., 2024; Pan et al., 2025). Ultimately, results from sub-study 3 also help to address some research gaps regarding family support measures (Chapter 7.2.4) by providing new insights

into the accessibility and low threshold of digital parenting programmes and their specific use in Germany. These findings expand the knowledge base on the effectiveness of digital family support options. The threshold analysis conducted as part of this study also expands insights into the design and effectiveness of these offerings.

13.4. Discussion of theoretical models

As already explained in Chapter 8, educational processes in the home learning environment are characterised by a complex interplay between available resources and the everyday challenges of family life. In this context, three central models were cited that offer different but complementary perspectives on educational processes in early childhood: The structural-processual model of the home learning environment (Kluczniok et al., 2013; Melhuish et al., 2008) provides an in-depth understanding of how family structures and parental beliefs influence processes within the home learning environment and thus child development. However, it does not adequately consider the influence of parental stress on interactions and learning-stimulating activities between parents and children. The family stress model (Conger et al., 1992; Masarik & Conger, 2017) addresses in detail the effects of parental stress and relevant risk and protective factors within the family. Nevertheless, the model lacks a clear focus on specific educational processes within the home learning environment. Furthermore, the stress measured remains limited to economic dimensions in particular, without comprehensively illuminating multifactorial aspects of parental stress or the interaction of different stressors. The double ABC-X model of family adaptation (McCubbin & Patterson, 1983) addresses important constructs crucial to families' adaptability and stress management. However, it has no direct reference to the home learning environment or to children's educational processes in early childhood. Against this background, a model synthesis is necessary to develop a comprehensive understanding of the specific resources of the home learning environment that contribute to the sustainable strengthening of educational processes in early childhood.

This dissertation integrates the three theoretical models described above, some of which originate from different disciplinary contexts. This interdisciplinary perspective allows for the linking of theories and model-based approaches from (early) education, sociology and psychology. The synthesis promotes deeper insight into the dynamics that influence children's learning and development in the family context and integrates the previously described concepts of the home learning environment, family adaptability, and experiences of stress and strain. The resulting synthesised model also takes up aspects of resource research from an individual and systemic perspective (Taylor & Conger, 2017). This comprehensive model synthesis has resulted in the development of a resource model of the home learning environment that considers both family and parental resources as well as key support systems.

The added value of the proposed model synthesis is outlined below: Examining different disciplinary models requires a meta-perspective, which is adopted in this argument. This also highlights one of the central strengths of the dissertation. The interface thus created between different disciplines, their fundamental theories and model approaches represents a decisive contribution to the exploration of complex educational phenomena in the family context. Dealing with associated conceptual challenges, which can be regarded as a core component of the theoretical achievement of this dissertation, requires a differentiated examination of the respective approaches as well as a conceptual harmonisation of terms used and different approaches to understanding system levels and research logics. For example, there are different definitions of stress that take psychological (e.g., mental health and emotional well-being), structural (e.g., consequences of loss of employment) and systemic perspectives (e.g., stressors resulting from global stress that challenge the family as a whole system). The different system levels and theoretical traditions of the models used illustrate this complexity: The structural-processual model of the home learning environment focuses primarily on the micro-level of learning, is empirically oriented, and emphasises child outcomes in

terms of learning and development. In contrast, the family stress model operates primarily at the meso-level of Bronfenbrenner's socio-ecological model (cf. Chapter 2) and focuses mostly on relationships under conditions of economic hardship, adopting a clear causal approach. The double ABC-X model, on the other hand, formulates assumptions about family adaptation to challenging and crisis situations from a dynamic-systemic perspective, with a stronger focus on resources within the family. A differentiated consideration of the various model-related approaches and the subsequent synthesis of these approaches into an overarching overall model enables a deeper understanding of interactions between the different factors and makes a valuable contribution to expanding the explanatory basis for strengthening educational processes in early childhood. This dissertation thus makes a significant contribution to the further development of theoretical and practical approaches in the fields of research and action that deal with the promotion of educational processes in early childhood.

13.5. New demands on family support and the question of equal opportunities and social cohesion

The following chapter is devoted to the topic of new demands on family support, equal opportunities and cohesion within society.

13.5.1. New demands on family support

The integration of digital approaches into family support measures, such as apps for strengthening parenting abilities, is leading to a number of new demands in this field. These demands relate both to the design of (digital) support services and to the underlying concepts of family support: In a diversified society, support services must increasingly be tailored to the individual needs of families (Anders et al., 2019; Erdem & Anders, 2017). As already discussed in Chapter 6.2.2, digital approaches enable the provision of personalised content that considers specific circumstances in families, such as different educational backgrounds of parents or specific burdens

such as stress or financial uncertainties (Anders et al., 2019; Breitenstein et al., 2014; Hall & Bierman, 2015).

The digital transformation of family support measures also ensures that support services are made easily accessible (Hall & Bierman, 2015). This means that information and services should be available without major obstacles to reach families who may be reluctant to contact traditional support structures or are unaware of them. A user-friendly app can be a low-threshold way of accessing support (Breitenstein et al., 2014; Hall & Bierman, 2015). However, digital approaches also offer the opportunity to integrate interactive elements into existing support services. This is of particular interest for service design, as families should not only be passive consumers of information but also actively involved in the support process to derive the greatest possible added value from a service (Nata et al., 2017; Qu et al., 2022).

As the findings on the importance of support systems illustrate, the availability of social and structural support networks is just as relevant to the home learning environment as the provision of adequate family support measures. Families should therefore also be supported and encouraged to use existing social networks and/or create new ones. Support for families should therefore also focus on connections between families, neighbours and professionals to strengthen the development of a trusting and supportive environment.

Finally, approaches to supporting families – whether digital or not – should increasingly focus on data collection and analysis to better understand the needs of families and evaluate the effectiveness of support services (Erdem & Anders, 2017). Continuous adaptation and improvement of services is based on feedback and data from participants. These are therefore crucial for the relevance and effectiveness of family support measures.

Overall, these requirements highlight the need to design family support as a dynamic, adaptable process that can respond to the constantly changing challenges and needs of families. This requires interdisciplinary approaches that incorporate

theoretical, empirical and practical insights from (early) education, psychology, sociology and technology to develop comprehensive and effective support systems.

13.5.2. Equal opportunities and cohesion within society

Family support measures, especially digital approaches such as parenting apps, can help to create more equal opportunities in today's society. On the one hand, digital parenting apps provide access to valuable information and educational resources (Biber et al., 2019) that are often not evenly distributed. These tools give families from educationally disadvantaged backgrounds or socially disadvantaged circumstances the opportunity to obtain important content-related inspiration for the upbringing and education of their children, which they might not otherwise find (Breitenstein et al., 2014; Hall & Bierman, 2015). Digital approaches to family support measures can therefore also reduce information gaps. This also enables parents to make informed decisions about their children's development. The low threshold for support services this entails can also promote equal opportunities: Digital approaches often make support services more accessible and less stigmatising, as families can seek help in their own time and environment (Biber et al., 2019). This is particularly important for families who, for various reasons (lack of mobility, lack of time, lack of financial resources, high levels of psychological stress, multiple burdens within the family, lack of childcare options), find it difficult to seek out support services.

By providing parents with practical guidance and strategies that can be integrated into everyday life, apps such as the *Chancenreich* parent app can also help to boost parents' confidence in their own abilities (Anders et al., 2023). Current studies show that parents who feel more competent in their parenting are better able to create a supportive learning environment for their children (Bojczyk et al., 2018; Outhwaite et al., 2025). Strengthening parental self-efficacy can positively impact children's development and contribute to the early promotion of equal opportunities in families (Giallo et al., 2013). In addition, parenting apps can provide targeted early childhood education programmes tailored to the specific developmental needs of

children. By improving access to educational resources for both parents and children, these measures can support the development of the abilities necessary for children's later academic and social success. Ultimately, the use of digital approaches to family support measures enables addressing the diverse and, in some cases, very specific needs of families (Anders et al., 2019) and diversifying support services (e.g., for single-parent families and families with a different family language). This can allow many families to receive the support that is right for them, relatively independently of their family background characteristics.

Similarly, family support measures, especially digital approaches such as parenting apps, can foster networking among families within their communities (Lee et al., 2024; Vernhet et al., 2019) and thus social cohesion within these communities. Social cohesion refers to the cohesion within a society and the degree of social integration, support and belonging among its members (Beauvais & Jenson, 2002; OECD, 2011). By sharing experiences and creating support networks, families can find social support and solidarity. Through interconnected platforms and interactive apps, parents can communicate with one another, share experiences, and seek support (Cohen et al., 2021; Weimann-Sandig et al., 2025). These social interactions can contribute to the formation of communities that support one another, thereby strengthening social cohesion. Barriers between different social groups can thus be broken down and mutual understanding promoted, which is essential for social cohesion. Over time, social networks can emerge that are crucial for overcoming social isolation and finding solutions to challenges together, ultimately contributing to better integration of individuals or marginalised groups into society (OECD, 2011).

Overall, it is clear that family support measures, such as digital parenting apps, can not only contribute to the individual empowerment of families but also offer essential elements for a more equitable distribution of opportunities and resources and for promoting social cohesion in society. By breaking down barriers and providing targeted support, they can facilitate community building, understanding and integration into the social structure. In this way, they can help ensure that all

children, regardless of their family or social background, receive the best possible conditions for their development and education. This represents a decisive step towards greater equality of opportunity and cohesion in an increasingly heterogeneous society.

14. Limitations and directions for future research

This chapter takes a critical look at the present dissertation, highlighting existing limitations and outlining possible starting points for future research. The findings and limitations of the individual sub-studies are discussed in detail in Appendices A, B and C.

14.1. Validity of the findings obtained in this dissertation

A critical reflection on the limitations of the resource model of the home learning environment is essential to address both context-related and model-related limitations. First, it should be noted that the perspectives of families with refugee experiences in crisis situations are not adequately represented in the resource model. These family contexts pose particular challenges that could call into question the model's general assumptions.

At the model level, the investigation of relations between the analysed resources and global processes, or processes of the mathematical home learning environment (cf. Chapter 4.3), in particular requires a differentiated approach. The status quo of the resource model also leaves open at this point the extent to which the resources examined are directly related to child outcomes. Similarly, to confirm some central assumptions regarding the relations between family support measures and parental resources, there is a lack of empirical data on the effects of those measures on parental coping abilities and co-parenting. Furthermore, it is essential to question the extent to which the described relations and their explanations continue to hold in later phases of the home learning environment. In particular, the practicability and validity of the theoretical assumptions of the resource model should be critically examined over time: It is conceivable that the dynamics of resource relationships

and their influence on children's learning and development processes change over time.

Generalisability

Regarding the generalisability of the results, it should be noted that the findings are of limited transferability. These limitations result in part from non-representative samples (e.g., convenience sampling) and the database's geographical limitations. Furthermore, the samples in the sub-studies are often homogeneous with respect to parental educational level. These factors make it difficult to transfer the results comprehensively to the general population (external validity). Although some data comes from nationwide surveys, as in the case of the NEPS data, it is a relatively 'old' database from 2012, which may affect the timeliness and relevance of the results. Since the data for all three sub-studies come from Germany, the results should be interpreted only in a national context.

Cross-sectional design in two sub-studies

Cross-sectional studies conducted at a specific point in time do not capture long-term developments. Therefore, the cross-sectional data from sub-studies 1 and 2 can only be considered a snapshot. Furthermore, data of this structure are susceptible to bias and cannot reflect causal relationships.

14.2. Areas for future research

Despite the intensive examination of specific resources in the home learning environment for strengthening educational processes in early childhood, as carried out in this dissertation, further consideration of these topics is needed for future research. A central aspect concerns investigating the assumptions of the resource model of the home learning environment, particularly in relation to its links to child outcomes and extended family contexts, such as families with refugee experience. The specific experiences and needs of refugee families require targeted empirical surveys to adequately capture and understand the complex interactions within their

home learning environment. In addition, differentiated research should be conducted on the theoretical assumptions of the model for extremely stressed families – i.e. those suffering from a lack of material, social or emotional resources and multifactorial stressors – as well as for those from educationally disadvantaged contexts. However, recruiting these families for research projects is often difficult for a variety of reasons (Wilke et al., 2014).

Another important area for research is to test the validity of the results in international contexts, especially in non-Western industrialised nations, to determine the extent to which the findings of the resource model of the home learning environment can be applied across cultural and social boundaries. In addition, attention should be paid to the roles of fathers and other caregivers, which is why the model's theoretical assumptions should be tested among these groups.

The relations between the analysed resources and global or domain-specific processes in the mathematical home learning environment represent another relevant field of research. Here, the interaction between family support measures and parental resources, as well as resources of the family system, such as parental co-parenting, should also be examined in detail. Furthermore, it is important to conduct scientific research into the effectiveness of structural support networks in the context of parental employment. This could provide insights into how support systems influence the home learning environment and thus the educational processes of children.

Research into digital family support measures is also an increasingly important area of research, particularly in the context of the ongoing digitalisation of society. There is an urgent need for more knowledge about digital parenting programmes. In this relation, the specific use of these services should also be examined in more detail. However, this also requires systematic controlled efficacy studies to evaluate the design and effectiveness of digital support services. It is important to identify potential barriers to access to ensure that all families can benefit from these innovative resources. An in-depth examination of digital measures can, among other things, help to better understand the needs of families. This could contribute to

optimising existing programmes and developing new, target-group-oriented measures that meet the requirements of an increasingly digitalised society.

Finally, longitudinal studies are necessary to empirically confirm hypotheses about the effectiveness of resources in the home learning environment and to test the validity of model assumptions over time. In addition, the relevance of (quasi-) experimental studies, i.e., studies with randomly assigned control and intervention groups, must be emphasised. This is because only studies with an experimental design can provide actual statements about effects (Eid et al., 2010). Only through such comprehensive and differentiated research approaches can an in-depth understanding of the specific resources of the home learning environment and their significance for strengthening early childhood educational processes be gained.

15. Conclusion and implications for educational policy and practice in Germany

The investigation of specific resources in the home learning environment for strengthening educational processes in early childhood provides new insights that have been used to develop a proposal for a resource model of the home learning environment. These findings enable a deeper understanding of the interaction between parental stress, specific parental and family system resources, and the adaptability of the home learning environment across different family settings and varying family vulnerabilities, especially in crisis situations. Both parental resources (especially high parental self-efficacy) and family system resources (especially supportive co-parenting) are essential for providing educational processes and strengthening a stimulating home learning environment. The interaction of these resources can therefore be considered crucial for educational processes, which are essential, especially in the early stages of children's lives. The findings from this dissertation show that a combination of robust social and structural support networks, differentiated support services and innovative digital approaches represents an effective approach to family support measures. This understanding is central to the development of family support measures and interventions that address families' specific needs. The findings are therefore not only significant for

educational science as a discipline but also provide a basis for actors in child and youth welfare and family policy at the local, state and federal levels to develop targeted support options for families in times of growing social challenges, social upheaval and crises.

Regarding the question of how the findings from the dissertation contribute to the further development of theory, the following points should be highlighted: The results emphasise the relevance of family and parental resources within the home learning environment and existing support systems from a systemic perspective. The model synthesis carried out contributes to a holistic understanding of the specific resources that promote educational processes in early childhood. Furthermore, the model synthesis enables an interdisciplinary analysis of the interactions between resources and early childhood educational processes within the home learning environment, thus forming an important interface between (early) education, sociology and psychology. This synthesis supports a comprehensive approach and makes a valuable contribution to the exploration of complex educational phenomena. Overall, the dissertation promotes both theoretical and practical development in the fields of research and action focused on strengthening early childhood educational processes within families.

This presents opportunities for German education policy and for areas of action in child and youth welfare that could help to address specific resources in the home learning environment, strengthen educational processes in early childhood, and optimise support for families in Germany. In view of current social challenges and increasingly frequent crises, it is necessary to develop targeted support programmes that provide families with assistance in challenging and crisis situations and reduce the burdens that cause parental stress. Regular training for professionals is also necessary to raise their awareness of the needs of families in difficult life situations. An important step towards strengthening parental resources would also be the implementation of support programmes that promote parental self-efficacy. Such programmes could encourage parents to participate more actively in their children's development, support them in their parenting responsibilities and impart strategic

knowledge. To promote the professionalisation of educational professionals who work with parents (e.g., in daycare centres, family centres, family education institutions, and outpatient educational support services) and to raise awareness of the importance of parental resources, it is necessary to expand training courses and workshops. These should focus on parental beliefs and abilities, as well as effective strategies for coping with parental stress. However, knowledge of supportive co-parenting as a relevant resource within the family system should also be more strongly incorporated into the professionalisation of educational professionals and practitioners. In addition, differentiated support services should be developed to meet the needs of different family settings, including those with increased vulnerability (e.g., large families) or families in crisis situations. Promoting access to social support networks is also of great importance to relieve the burden on families in their individual situations. In order to continuously review the effectiveness of family support measures, monitoring and evaluation systems should be implemented that prioritise evidence-based approaches and ensure that the needs of families are continuously recorded and can be incorporated into policy-making. Finally, the integration of digital approaches also represents a significant opportunity for optimising family support measures. Innovative digital tools, such as apps, should be used to provide information, resources, and regular guidance to strengthen educational processes in the home learning environment. In this regard, online platforms can be developed to connect parents and professionals and facilitate information exchange. In this context, it is important to design information materials for parents that highlight the importance of parental resources and family system resources. However, these materials should be produced in different languages, in simple language, with a high proportion of images and a low proportion of text, to reach educationally disadvantaged families and families whose native language is not German in a low-threshold, effective manner.

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Cumulus of publications

Tabular summary of publications

Nr.	Authors	Title	Status	Own contribution
1	Prokupek, L., Cohen, F., Oppermann, E., & Anders, Y.	Families with young children during the COVID-19 pandemic – The importance of family type, perceived partnership roles, parental stress, and social support for changes in the home learning environment during lockdown	Frontiers in Psychology. 14:1119950; 2023	Review of literature and theoretical background; statistical analyses; leadership in drafting of the manuscript
2	Prokupek, L., Erdem Möbius, H., & Kluczniok, K.	Parental stress and the home learning environment in German single-parent families: A mixed-method study	Resubmitted to the Journal of Child and Family Studies, 2026	Review of literature and theoretical background; statistical analyses; recruitment of the qualitative sample; collection and content analysis of the qualitative interview data; leadership in drafting of the manuscript
3	Prokupek, L., Hummel, T., Blaurock, S., Cohen, F. & Anders, Y.	Potential of a digital parenting app to support parents of toddlers: Relations between the intensity of app use, language-related parental self-efficacy and the home literacy environment	British Educational Research Journal, 00, 1–24; 2025	Review of literature and theoretical background; statistical analyses; leadership in drafting of the manuscript

Appendix

List of original articles

1. Prokupek, L., Cohen, F., Oppermann, E., & Anders, Y. (2023). Families with young children during the COVID-19 pandemic – The importance of family type, perceived partnership roles, parental stress, and social support for changes in the home learning environment during lockdown. *Frontiers in Psychology*. 14:1119950. <https://doi.org/10.3389/fpsyg.2023.1119950>
2. Prokupek, L., Erdem Möbius, H., & Kluczniok, K. (resubmitted to the Journal of Child and Family Studies). Parental stress and the home learning environment in German single-parent families: A mixed-method study.
3. Prokupek, L., Hummel, T., Blaurock, S., Cohen, F. & Anders, Y. (2025). Potential of a digital parenting app to support parents of toddlers: Relations between the intensity of app use, language-related parental self-efficacy and the home literacy environment. *British Educational Research Journal*, 00, 1–24. <https://doi.org/10.1002/berj.70022>

Appendix A

Prokupek, L., Cohen, F., Oppermann, E., & Anders, Y. (2023). Families with young children during the COVID-19 pandemic – The importance of family type, perceived partnership roles, parental stress, and social support for changes in the home learning environment during lockdown. *Frontiers in Psychology*. 14:1119950. <https://doi.org/10.3389/fpsyg.2023.1119950>



OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Educational Psychology,
a section of the journal
Frontiers in Psychology

RECEIVED 09 December 2022

ACCEPTED 16 January 2023

PUBLISHED 07 February 2023

CITATION

Prokupek L, Cohen F, Oppermann E and
Anders Y (2023) Families with young children
during the COVID-19 pandemic—The
importance of family type, perceived
partnership roles, parental stress, and social
support for changes in the home learning
environment during lockdown.
Front. Psychol. 14:1119950.
doi: 10.3389/fpsyg.2023.1119950

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Families with young children during the COVID-19 pandemic—The importance of family type, perceived partnership roles, parental stress, and social support for changes in the home learning environment during lockdown

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Beginning in March 2020, the lockdown precipitated by the COVID-19 pandemic resulted in many challenges, especially for families with young children. Many children had little or no access to institutional education. Therefore, they were even more dependent on their parents providing them with home learning activities (HLA) to support their development. We examined the adaptability of families with regard to changes in parents' provision of HLA in traditional two-parent families, single parent families, and large families compared to before the lockdown. We focused on family resources, such as a supportive distribution of roles within the partnership, or social support, as predicting factors of adaptability in $N=8,513$ families with children aged 18–69 months. In addition, we considered parental stress as a further influencing factor. The cross-sectional data depicts families from a nationwide online survey, which we conducted during spring 2020 in Germany. We found that (a) all three family types offered their children more learning activities at home, albeit with slight differences between the families. However, (b) we identified differences in the factors influencing families' adaptability: Across all family types, we found slight to medium negative relations between adaptability and parental stress. The relations were most evident in large families. Furthermore, social support exhibits somewhat positive relations to the adaptability of large families. For adaptability in single-parent families, gender differences were initially evident. Among single fathers, the change in parental HLA was stronger than among single mothers. However, this relation disappeared when we took parental stress and social support into account. For traditional two-parent families and single parents, our analyses revealed (c) barely significant relations between the investigated predictors and changes in HLA during lockdown. Overall, our study confirms that high stress limits the adaptability of providing HLA in families and that social support mitigates negative relations between stress and the provision of HLA, especially in large families. In order to develop effective and needs-based family support programs, it is therefore important to help parents cope with stress and provide them with low-threshold social support. The extent to which these services need to be adapted to different family types must be surveyed in more depth.

KEYWORDS

COVID-19, home learning environment, family adaptability, family type, perceived partnership roles, parental stress, social support

1. Introduction

In the spring of 2020, the COVID-19 pandemic reached Germany, causing severe disruptions for families and their everyday lives. Parents with children under the age of six were particularly exposed to challenges compared to other parents and reported a substantial reduction in their satisfaction with family life (Huebener et al., 2020). One reason for this was the nationwide closure of daycare centers. As a result, many families were denied centralized care and education services. Moreover, contact restrictions also made other care options, such as grandparents, impossible. COVID-19 policies also influenced the working lives of parents (Cohen et al., 2020). Parents who were worried about diminished employment income due to, for example, reduced hours at work or even the loss of their job, had to deal with further challenges and financial concerns. Even those parents who were able to work from home still had to compensate for the missing hours of childcare within the family. Hence, parents had to deal with the difficulties posed by lack of childcare and the new demands of reconciling family and work. Families needed to adapt in the shortest possible time, reorganize working and childcare hours, and redistribute childcare at home. International research on the severe disruptions for families during the COVID-19 pandemic has increased considerably in just a few years. Still few studies focus specifically on families with young children (Huebener et al., 2020; Linnavalli and Kalland, 2021). Some international studies about families with young children examine the impact of the COVID-19 policies on parental and child well-being. The studies often focus on family strains, changes in parenting practices, child development (e.g., socio-emotional development) and family resilience (Gassman-Pines et al., 2020; Prime et al., 2020; Romero et al., 2020). In Germany, studies indicate that children and families may have been particularly vulnerable during the COVID-19. This findings show that family strains and coping to parental stress posed major challenges to parenting during the COVID-19 pandemic (Huebener et al., 2020; Essler et al., 2021; Oppermann et al., 2021; Calvano et al., 2022).

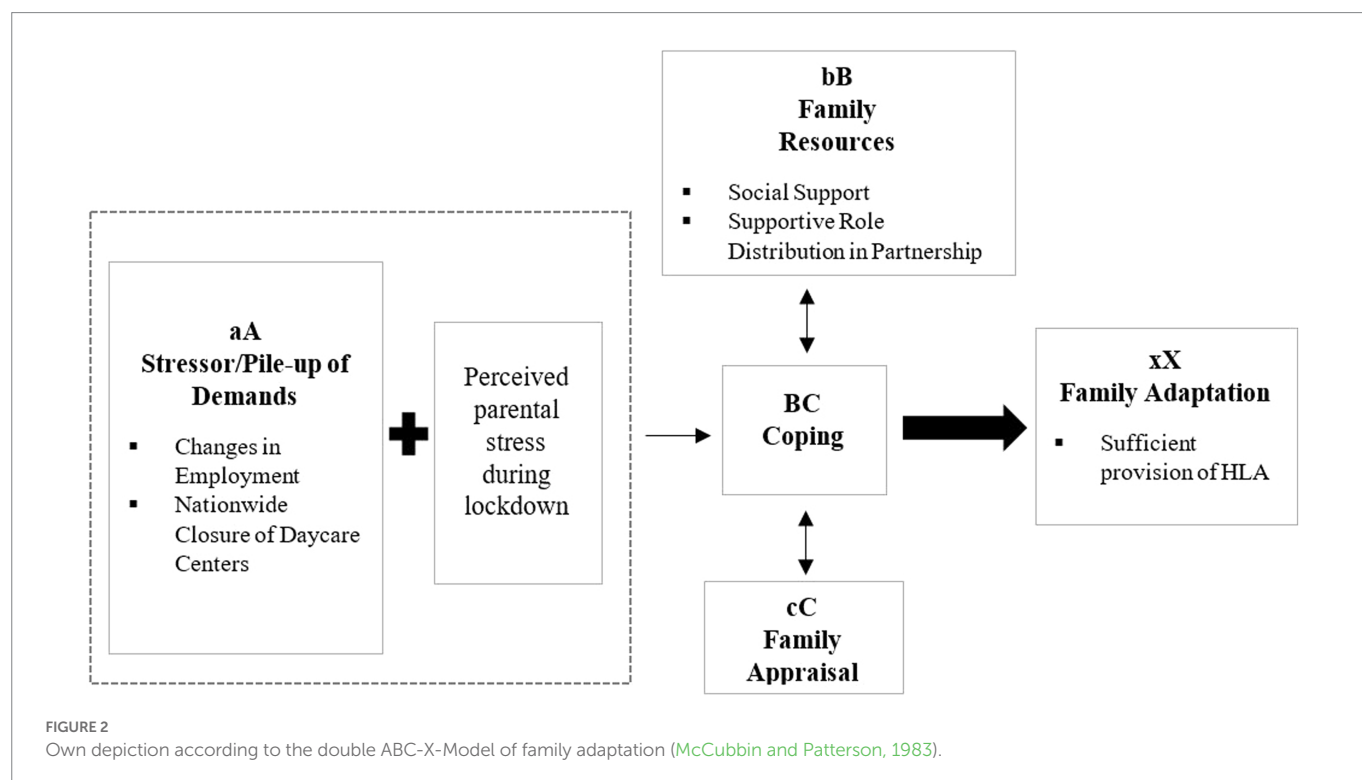
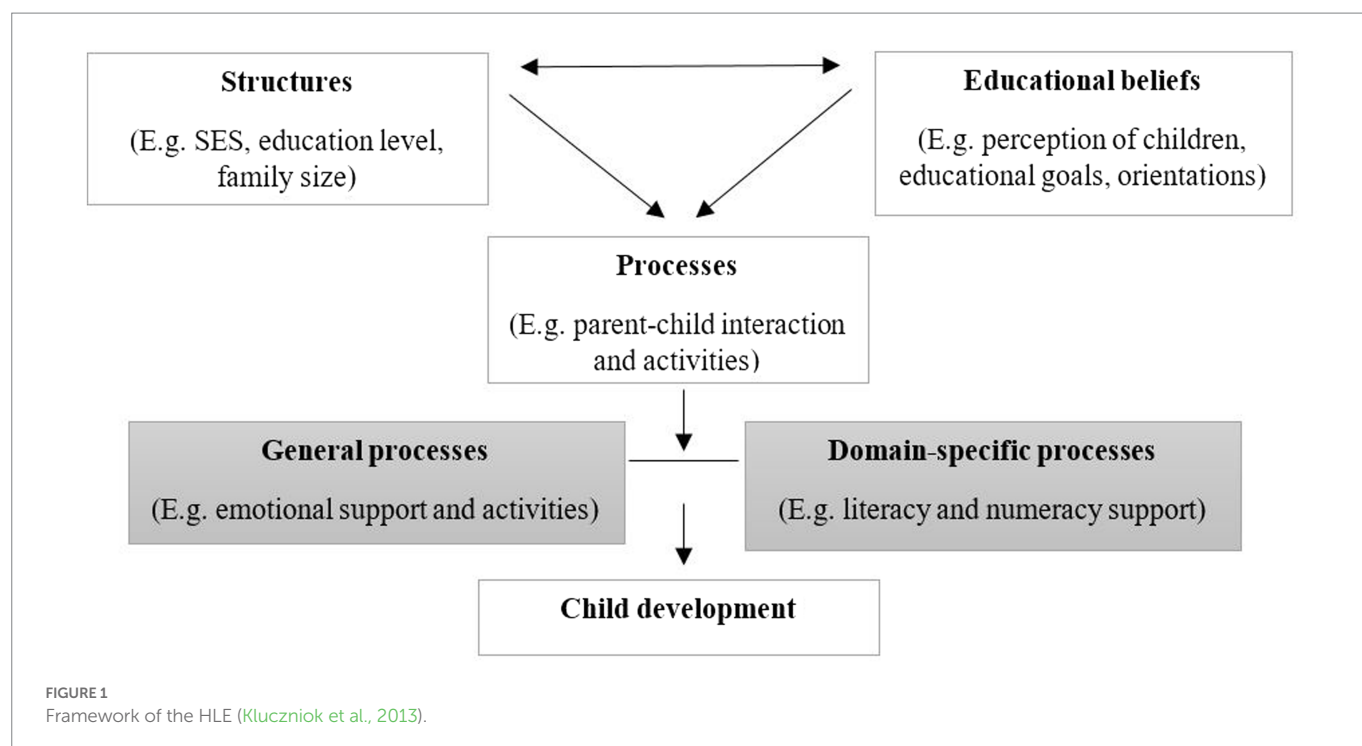
In view of the increasing complexity of the living environment and new societal demands on families, such as those resulting from the COVID-19 pandemic, it is becoming increasingly important to understand those factors that can influence the adaptability of families. In the present study, we consider family adaptability in terms of parents' ability to ensure that children continue to receive sufficient educationally stimulating activities, even if the educational remit of early childhood education institutions cannot be carried out and other stressors impair the functionality of the family system. Another aim of the study is also to investigate family adaptability among traditional two-parent families, single parents, and large families during the first COVID-19 lockdown. This enables statements about adaptability to be linked to the ratio of children to adults within a family setting. In addition to the family type, we also take the relevance of a supportive role distribution within the partnership, social support, and parental stress into account. This family type characteristic approach should help us to learn more about the impact of COVID-19 restrictions on families with young children. Furthermore, we intend to identify protective and risk factors and formulate family type-specific conditions for adaptability.

2. Adaptability of the home learning environment

Referring to Bronfenbrenner (1986) eco-systemic model of human development, the family is a learning environment with its own specific

characteristics. In order to describe the processes within a family, and the effects they have on child development, the framework of the home learning environment (HLE), shown in Figure 1, summarizes structural, processual, and orientation dimensions (Kluczniok et al., 2013). These three dimensions – partly indirectly and partly directly – influence child development, and represent a way of categorizing resources in the learning environment of a family. The structural dimension summarizes characteristics such as household income or parents' educational level, and interrelates with characteristics of the orientation dimension, which describes parents' attitudes to education and child-rearing. The family type (e.g., single parent, two-parent family, large family), which is made up of different personal resources (number of adults and children within a household), is also understood as a characteristic of the structural dimension. Both structural and orientation characteristics are related to the availability of educational resources, such as parent–child activities. We describe these as home learning activities (HLA). The processual dimension includes global family processes such as day-to-day activities or the fostering of a familial atmosphere, but also domain-specific family processes, which focus on educationally relevant activities (Kluczniok et al., 2013). Process quality is determined *via* the frequency and quality of stimulating activities in the home, specifically educationally relevant activities (e.g., reading aloud or looking at picture books together). Studies show a clear, but moderate, relation between structural characteristics and family process quality. Thus, lower socio-economic background characteristics (e.g., low levels of parental education) in a family are associated with a lower quality of processes in families (Sylva et al., 2004; Melhuish et al., 2008).

Family life is subject to certain dynamics. Interactions and relationships between family members respond to changing internal and external circumstances (Bradshaw et al., 2006). If the living conditions of families change (e.g., due to challenging life situations), this can have an impact on the HLE. For many years, family research looked at the special dynamics of families in challenging life situations with the help of the model of family adaptation (McCubbin and Patterson, 1983), shown in Figure 2. From the perspective of child development, appropriate family adaptability must consist of ensuring the educationally supportive character of the HLE, even in challenging life situations or when it is not possible for the child to attend the relevant educational institutions. Thus, in order to understand the needs and adaptability of families, it seems reasonable to assume a link between the HLE and factors which influence family adaptability. The model of family adaptation presents four components of families' adaptability (A, B, C, and X) to a critical event and addresses the interaction between family resources and family perceptions. From this point of view, we can conclude that it is not only the stressor (critical event) that leads to a family crisis. Rather, it depends on whether and in what way a family is able to react appropriately to the stressor and adapt to the concomitant changed life circumstances: The family might equally develop adequate adaptation strategies to deal with the stressful life event and thereby maintain functionality as a family unit (Xu, 2007). The process of family adaptation to stressful life events consists of an interplay between the four different components A, B, C, and X. Stressor A, e.g., the impact of the interventions taken during the COVID-19 pandemic—such as changes in employment or the nationwide closure of daycare centers—disturbs the family's previous patterns of interaction. The internally and externally available resources (e.g., supportive role distribution in the partnership or social support; B) enable families can respond to the stressor. The appraisal of the stressor (e.g., threat or challenge; C) also influences the coping strategies a family uses to respond to the stressor (BC). The outcome



of the interactions between these identified variables corresponds to the family's adaptability (here, the appropriate provision of HLA, xX). The model focuses on the evolving nature of the family unit, including general stressors of everyday family life. It takes into account additional stressors that may exacerbate the stress that families already face in their daily life (aA). The same applies to expanded resources (bB) and changes in the meaning attributed to a challenging situation (cC) (McCubbin and Patterson, 1983). The Double ABC-X Model of family

adaptation shows conceptual similarities to the Family Stress Model (Masarik and Conger, 2017). Both models focus on similar aspects, but differ primarily in the arrangement of variables. The Family Stress Model focuses on stress processes of families, whereas the Double ABC-X Model describes the process of everyday adaptation as well as adaptation during times of crisis. We include the influence of stress on parenting behavior in the Double ABC-X Model and consider this aspect as a variable influencing family adaptability.

During the first lockdown, children had little or no access to institutional education for several months. During this time, they were more dependent than usual on their parents' provision of HLA to stimulate their development. We therefore consider successful adaptability in families during the first lockdown of the COVID-19 pandemic as being represented by parents provided sufficient HLA for their children, even when the attendance of the child's educational institutions was not possible and the functionality of the family system is impaired by other stresses.

2.1. Family adaptability: Protection and risk factors

The challenges of everyday life, as well as changing demands within society, require families to adapt permanently. The concept of family adaptability is also applied when it comes to specifying the change processes which take place in families in response to challenging life situations or crises (Moen and Wethington, 1992) and therefore also for the challenges of family life during the COVID-19 pandemic. Fundamental to understanding family adaptability is the identification of protective factors such as internal family resources (e.g., supportive role distribution within the partnership), financial resources, and social support (Patterson, 2002). These factors all affect a family's involvement in children's development, as well as influencing their broader educational decisions (Kluczniok et al., 2013).

Parental stress experiences, as well as adaptation strategies, influence how intensively parents offer their children HLA (Wierda-Boer et al., 2008; Holthus and Bertram, 2018). It is not only the frequency of educationally stimulating parent-child interactions that matters, but also the parents' responsive and sensitive interaction behavior (Anders et al., 2012; Kluczniok et al., 2013). More and more studies investigating the factors influencing parenthood include measures of parents' perceived stress levels (Crnic and Ross, 2017). According to Deater-Deckard (2004), parental stress describes processes that lead to aversive reactions. The origin of these reactions is the attempt to adapt to the demands of parenthood. The perception of parental stress and the effects of it reflect systemic processes within the family (Crnic and Ross, 2017). Many studies suggest that parental stress predicts inadequate parenting behavior (Crnic and Greenberg, 1990; Crnic et al., 2005). For example, research on the influence of economic stress shows that parents are irritable, frustrated, and less patient when emotional resources cannot be accessed during times of financial stress. The consequences are more punitive parenting as well as the withdrawal and social alienation of the stressed parent (McLoyd, 1990; Magnuson and Duncan, 2002). An earlier study by Oppermann et al. (2021) on the same sample as this article investigated the correlation between parental stress and changes in HLA during the first COVID-19 lockdown in Germany. They found a negative, exponential relation, indicating a threshold of parental stress: The relation between perceived parental stress and changes in HLA appeared above a certain tipping point. Past this parental stress level, HLA exponentially decreased with increasing stress.

The identification of family resources (e.g., supportive role distribution within the partnership) plays an important role in adaptability (Patterson, 2002). In times of crisis, responsibilities for employment, household, and child-rearing have to be (re-)distributed. This can have a great influence on parental well-being (Fankhauser et al., 2018). Consequently, the supportive role distribution within the partnership as a predictor of parental well-being plays an important role

in the functioning of families and the development of children in their home environment. We therefore want to investigate to what extent the supportive role distribution functions as an intra-family protective factor for the adaptability of families (maintaining or increasing HLA provision) in times of crisis. It is just as important that parents feel supported by their social environment and know where to ask for help. Studies have identified social support outside the family as an underlying mechanism for successful adaptability. It contributes significantly to how strongly a family feels the emotional burden of a crisis (Dunn et al., 2001; Wierda-Boer et al., 2008; Manning et al., 2011). Most recently, Oppermann et al. (2021) showed in their family survey that, during the first lockdown, social support was associated with lower parental stress. Furthermore, social support reduced the negative effects of stress on HLA, highlighting the importance of social support for family adaptability.

2.2. Why family types matter

A look at family research shows that most studies deal with the family as a generic unit and rarely classify different family types. Studies often focus on heterosexual married or cohabiting couples and their children (two-parent families; Wierda-Boer et al., 2008; Manning et al., 2011; McStay et al., 2014; Liu et al., 2019). Childhood and family also take place in non-heterosexual relationships. In addition, families form through surrogacy, permanent foster care, or adoption. Moreover, family structures can change over the course of life, regardless of how they are founded (Riggs and Due, 2018). Studies that look at the importance of different family types for child development increasingly examine whether certain family types are more affected by disadvantages than others. According to Bradshaw et al. (2006), children from large families are affected by a greater risk of poverty than children from other family types – poverty can expose families to financial crisis. It is known from current research that in large families, for example, due to the high number of children, that the likelihood of only one parent being employed is higher, while the other parent is more likely to be responsible for care and nursing activities (Bradshaw et al., 2006). Research on single parents, on the other hand, shows that single parents are more likely to have lower parental SES, because SES often reduces after separation or divorce due to the lack of a second income (OECD, 2018). When it comes to coping with everyday demands, studies showed that single parents in particular face special challenges, due to their single-parent status and the reduced time and social resources in their family structure that often go hand in hand with this (Wright, 1989; Bowen et al., 1993). Some studies also argue that if single parents have few opportunities for social support, then these families are more vulnerable to family stress (McQuillan and Bates, 2017). As early as the 1990s, Bowen et al. (1993) studied the adaptability of single parents and found that the lack of social support was the greatest risk factor among single parents in this context. Studies that are more recent also follow these findings (Maldonado and Nieuwenhuis, 2015; Jackson and Kiehl, 2017; Martin-West, 2019). Educational research has not yet sufficiently mapped out the extent to which the factors influencing adaptability differ in other family types. This raises the question of whether it is not precisely families with special needs that face particular challenges in times of crisis, or whether, based on the family type, different resources must be drawn on to cope with challenging life situations. However, in view of the increasing complexity of the living environment and new societal

demands on families, it is becoming more and more important to understand those factors that can influence the adaptability of families.

2.3. Purpose of the study and research questions

In Germany, the COVID-19 lockdown confronted families with challenging situations. Families with young children in particular faced major challenges during this time because children in this age group need more intense care. In addition, they are highly dependent on stimulating HLA offered by their parents, as there is still no influence from the school system. The closure of daycare centers in particular resulted in new demands on the reconciliation of family and work. Some parents also had to cope with changes in their employment (Cohen et al., 2020; Huebener et al., 2020). Those parents who were less affected by changes in employment still had to make up for the missing hours of childcare outside the home. The challenge of continuing to cope with everyday family life also was noticeable in parents' perception of stress (Oppermann et al., 2021).

The number of studies investigating the challenges of family life during the COVID-19 pandemic has increased significantly in recent times. However, since many of the studies deal with the family as a general unit, we would like to focus on different types of families. The negative relation between parental stress and the HLE in general and especially during the first COVID-19 lockdown has already been scientifically proven (Crnic and Greenberg, 1990; Crnic et al., 2005; Oppermann et al., 2021). However, we also want to investigate whether these findings apply equally to all family types. In addition, we are interested in whether negative relations between parental stress and changes in HLA occur in the different family types from the same stress level (low, medium, high levels of stress) onwards. In order to identify, among the surveyed families, those types with special needs in times of crisis, we investigate whether social support is equally considered a protective factor for family adaptation in all families. Finally, we want to look at supportive role distribution in couple households under a family type-specific focus and explore whether the importance of a supportive role distribution within the partnership for adaptability (Patterson, 2002) differs between traditional two-parent families and large families.

Based on current data, we examine differential links between family adaptive capacities (changes in HLA); taking into account different family types (two-parent families, large families, and single parents). Due to different family types, our aim is to examine the relations of changes in parents' HLA with their children during the first COVID-19 lockdown. We define positive adaptability as maintaining or increasing the parental level of HLA with preschool children. This approach aims to better capture the protective factors of families, in addition to the impact of the COVID-19 lockdown, on families with young children, and thus formulate family type-specific needs in crises. We define the following research questions (RQ):

1. What is the impact of the first COVID-19 lockdown on adaptability of parents' HLA in different family types?
 - a. We expect families to draw on different resources based on their family type and therefore we will find differences in adaptability of parents' HLA (H1a).
 - b. We assume that the change in employment as well as in external childcare is related to the adaptability of families (H1b).

2. What is the importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment?
 - a. We assume positive relations between (1) the supportive distribution of roles within the partnership and (2) social support and family adaptability (H2a1 and H2a2).
 - b. We assume that parental stress influences the adaptability differently in the family types (H2b).
 - c. We assume that the relations of perceived stress and adaptability are strongest in single-parent families because of the lower personal resources (only one adult within a household) (H2c).
 - d. We assume that the relations of perceived stress and adaptability will be lowest in large families due to the distribution of employment and care work for mostly several young children (H2d).

3. Methods

3.1. Design and sample

Data stems from the study 'Families and Childcare centers in times of COVID-19', a nation-wide cross-sectional online survey, which examined the effects of the abrupt closure of daycare centers during the first COVID-19 lockdown on German families with young children (Cohen et al., 2020). However, since the restrictions differed greatly in Germany's various federal states, we cannot assume that the sample is representative of the whole of Germany. To our knowledge, this was one of the first studies to examine the situation of families with young children during the first wave of the COVID-19 pandemic in Germany. In April and May 2020, 9,343 parents whose children attended daycare before the lockdown participated in the survey. We recruited a convenience sample through personal contacts, online blogs, social media, and the mailing lists of large non-profit organizations, foundations, and daycare centers. The recruited parents came from all 16 German states, with clustering in some federal states like Bavaria, Baden-Württemberg and North Rhine-Westphalia (Cohen et al., 2020). We excluded all cases without children in the household ($n=289$). We did the same with those who had a relationship with the child other than mother/stepmother or father/stepfather ($n=181$). Finally, we excluded single-parent families who lived with other family members or with roommates/friends from the sample ($n=360$). Thus, the sample does not represent all family types living in Germany. To answer the research question $N=8,513$ families with children aged 18–69 months ($M=37.0$, $SD=4.5$) from the main sample fit these criteria. Of these, 89% of respondents were mothers ($n=7,551$). The average age of respondents was 37 years ($SD=4.5$; age range 18–69 years). We determined the parental educational level *via* three levels: *low*, which corresponds to ISCED levels 0–2 (lower secondary school education and below), *medium*, which corresponds to ISCED levels 3–5 (upper secondary school education to short-cycle tertiary education) and *high*, which corresponds to ISCED levels 6 and 7 (Bachelor's degree or above; UNESCO, 2011). With regard to the level of education, we classify the families as privileged: In all three family types, the ISCED is close to the medium range (Single parents: $M=2.7$, $SD=0.6$; traditional two-parent families: $M=2.9$, $SD=0.4$, large families: $M=2.8$, $SD=0.5$). Moreover, 85% of parents in the sample had a high educational level, 13% had a medium educational level and 0.9% had a low educational level. At the

time of the survey, 74% of parents were employed (21% fulltime, 45% parttime, and 8% on reduced hours). Before the COVID-19 pandemic, 79% of parents were employed (27% fulltime, 52% parttime, and 0.3% on reduced hours). The proportion of those who were on leave or looking for work also increased from 1% to 5% compared to before the lockdown and the proportion of those who regularly work from home increased from 28% to 38% compared to the situation before COVID-19. The employment situation of the respondents' partners has also changed significantly, with from 96% in employment (82% fulltime, 12% parttime and 0.3% on reduced hours) before the lockdown, and 93% in employment during (68% fulltime, 13% parttime and 11% on reduced hours). In addition, 30% of respondents and 22% of partners worked in systemically relevant occupations, which gave them special entitlement to daycare during the lockdown. However, it should be emphasized that the classification of system-relevant occupations was quite heterogeneous between the federal states and at the time of the first daycare closure. At this point, the average time children spent in care outside the home dropped from 7 h/day ($SD=2.4$) to 1.5 h/day ($SD=3.0$). The surveyed families also hardly felt any stress due to the employment situation (their own or their partner's; $M=3.0$, $SD=1.3$) or partnership conflicts ($M=2.6$, $SD=1.1$). Descriptive analyses of family cohabitation revealed that 93% of the families surveyed live together as a traditional two-parent family ($n=7,911$). Five percent of the families are single parents ($n=429$). In contrast, 2% of respondents live together in a large family ($n=173$). Regarding parental education, all three family types show values on the medium ISCED level. The highest parental educational background was found in two-parent families ($M=2.9$, $SD=0.4$). Large families were close behind ($M=2.8$, $SD=0.5$). Among single parents, we found the lowest levels parental educational, albeit with only a slight difference ($M=2.7$, $SD=0.6$). On average, the families largely describe their financial situation before COVID-19 as unproblematic.

3.2. Measures

3.2.1. Family type

In order to identify different family types, we established family type criteria. Due to the data situation, we are not able to depict all family types living in Germany. We defined the following family types: The "two-parent family" describes cases in which two parents lived together as a couple with one to three children as a family unit in a common household. "Large families" are cases in which two parents lived together as a couple with four or more children as a family unit in a common household (Toth et al., 2019). "Single parents" were defined in the study via cases where the respondent stated that he or she lives alone with his or her child(ren) in a common household. For our approach, the number of children living in the single-parent household was not relevant. We statistically excluded a crossing of the categories.

3.2.2. Family adaptability

In order to be able to make statements about the current adaptability in families, we generated a change variable of the HLA-quantity compared to the time before the lockdown, which formed the dependent variable within our model specification. Using a 7-point response scale (1 = considerably less frequent; 4 = the same; 7 = considerably more frequent) we asked parents about the frequencies of educational activities (e.g., reading aloud or handicrafts) that they or another family member engaged in with the target child, compared to the time before the lockdown ($\alpha=0.85$). The focus of the survey was kindergarten

children. Thus, the parents indicated how many children between 0 and 6 years of age live in their household. If there were several children belonging to this age group in a family, the parents were asked to self-report reading aloud or doing handicrafts with the oldest child within this age group.

3.2.3. Predictors of changes in HLA

We measure *changes in employment at the household level* (-1 = less, 0 = no change, 1 = more) and *changes in hours of childcare outside the home* (-2 = significantly less, -1 = less, 0 = no change, 1 = more, 2 = significantly more) compared to the time before the lockdown as reported by the families as predictors. Parental stress comprised four items, which indicated the level of perceived stress (e.g., "I often feel unable to cope with the new tasks and demands, e.g., home schooling, keeping the child occupied") by using the scale mean from 1 to 4 with higher values indicating a higher parental stress level, ($\alpha=0.85$). To investigate the relation between parental stress and adaptability in detail, we followed the threshold concept of Oppermann et al. (2021) and additionally measured parental stress as dummy variables to include these in multiple group regressions: With the help of a quartile split, medium-stress and high-stress limits were determined. Parents between a value of 2.33 (2 = tend to disagree) and 3.0 (3 = tend to agree) on the linear stress scale are labelled with 1 in the dummy variable *medium stress* (1 = medium stress, 0 = low or high stress). Parents whose stress perception on the linear stress scale is at least 3.25 are labelled with 1 in the dummy variable *high stress* (1 = high stress, 0 = medium or low stress). We define *low stress* from a scale value of 2.25 or lower and use this variable as a reference group in later analyses. Four items assessed *social support*, which described how strongly the respondent felt supported by his or her social environment during the lockdown (e.g., "Is there someone who can give you good advice when you have problems?"). On a 5-point response scale, respondents could indicate the perceived availability of social support (1 = never, 5 = always). The reliability test resulted in a Cronbach's alpha of 0.89. *Supportive role distribution within the partnership* consisted of four items, e.g., if the respondent felt sufficiently supported by his or her partner in childcare or in the household. A 4-point response scale was used to measure agreement with these statements (1 = strongly disagree, 4 = strongly agree). Single parents could not answer this scale because of their single status. The scale proved to be reliable ($\alpha=0.86$).

3.2.4. Control variables

As control variables, we implement parental education (ISCED level: *low* = 0–2, *medium* = 3–5, *high* = 6–7), the perceived financial problems before COVID-19 (1 = we had no financial problems, 5 = we had great financial worries), the gender of the respondent (0 = female, 1 = male), as well as the child's age (in months) at the time of the interview and the gender of the target child (0 = female, 1 = male).

3.3. Statistical analyses

To investigate the impact of the first COVID-19 lockdown on the adaptability of parental HLA in different family types (RQ1), we compute descriptive statistics and use analyses of variance with *post hoc* analyses. Thus, we test the extent to which the mean values of parents' HLA, the change in employment as well as in external childcare differ significantly among the three family types. To test, whether the changes in employment and in external childcare are related to the

adaptability of families, we conduct multiple group regressions in Mplus, with the family type being the grouping variable (Version 8.3; Muthén and Muthén, 1998–2012). Multiple group analysis allows us to test if pre-defined data groups (family type) have significant differences in their group-specific parameter estimates (e.g., standardized regression coefficients, standard errors and significance for family resources, perception of parental stress and social support). To answer the research question regarding the importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment (RQ2), we initially compute descriptive statistics and analyses of variance. In addition, we investigate relations between the supportive distribution of roles within the partnership and changes in parents' HLA using further multiple group regressions combined with post hoc analysis of the regression coefficients (Wald-Test). We survey relations between social support and changes in parental HLA in a similar way. To test the importance of parental stress for changes in the home learning environment we additionally use further multiple group regressions combined with post hoc analysis of the regression coefficients.

To verify whether the data of the relevant variables were systematically missing, we conducted a missing data analysis in all cases. We used Little's (1988) test for completely missing values at random (MCAR). The results of the MCAR test showed that data were not missing at random (MNAR) in the continuous variables relevant to us (e.g., perceived financial problems, changes in employment, or in hours of childcare outside the home: $\chi^2 = 141.71$, $df = 54$, $p = 0.000$). However, Shin et al. (2009) argue that even under MNAR, the full information maximum likelihood (FIML) approach yields the least biased parameter estimates and the lowest parameter estimation error. To make full use of the data, we used FIML in all our analyses to answer our research question. The model fit was assessed with reference to the Yuan-Bentler scaled χ^2 (YB χ^2 , mean-adjusted test-statistic robust to non-normality), the root mean square of approximation (RMSEA), the comparative fit index (CFI), the Tucker and Lewis index (TLI), and the standardized root mean residual (SRMR) values according to the criteria recommended by Hu and Bentler (1999). CFI and TLI values >0.95 , RMSEA values lower than 0.06, and SRMR lower than 0.08 were accepted as indicators of a good model fit (Hu and Bentler, 1999).

4. Results

4.1. Descriptive findings

In all three family types, there were hardly any changes in employment during the first lockdown. This does not mean that families were not burdened by changes. Even though the amount of employment did not change noticeably, the percentage of respondents working from home increased from 28% to 38% during the first lockdown. In all families, there was a noticeable decrease in hours of care outside the home during the lockdown. Single parents ($M = -1.4$, $SD = 0.9$) were slightly less affected by these changes than two-parent families ($M = -1.7$, $SD = 0.7$). We can explain this in part by the fact that single parents had a special entitlement to emergency daycare. Also, large families ($M = -1.5$, $SD = 0.9$) were slightly less affected by these changes than two-parent families ($M = -1.7$, $SD = 0.7$). All families, regardless of family type, were equally affected by parental stress. We observe the same for the perception of social support: All families reported an intermediate level of social support. Two-parent families and large families alike reported living in a partnership with a tendency toward a

supportive distribution of roles. In all three family types, parents provided HLA somewhat more frequently on average, which corresponds to the value 5 on the response scale, during the first lockdown (see Table 1). Here, however, in comparison, large families offered the least ($M = 4.6$, $SD = 1.0$), less than single parents ($M = 4.9$, $SD = 0.8$) and two-parent families ($M = 5.0$, $SD = 0.8$).

4.2. Predicting changes in parents' HLA in different family types

First, we consider the relations of the interventions taken during the COVID-19 pandemic (aA component: pile-up of demands): The changes in employment and in hours of childcare outside the home are additional stressors that add to the stress that families already face in their daily lives. Taking into account control variables, we examine the relations changes in employment and in hours of childcare outside the home exhibit with HLA (Model 1). The interventions taken during the COVID-19 pandemic may increase parents' perception of stress (aA component: pile-up of demands). Model 2 tests relations between parental stress and HLA, focusing on particularly stressed families. To understand more about the relevance of available external resources (bB), we analyze relations between social support and HLA in Model 3. This allows us to explore the extent to which the availability of social support mitigates stress relations. In order to gain more knowledge about the importance of available internal resources (bB), we examine the relation between supportive role distribution and HLA in Model 4. The question as to the extent to which supportive role distribution functions as a family-internal protective factor during times of crisis can thus be investigated. Using this model specification, we explain relations between the relevant variables and the adaptability of families (maintaining or increasing HLA provision) in times of crisis. We must point out that we do not have assessable data for the component cC "familial appraisal."

4.2.1. RQ1: The impact of the first COVID-19 lockdown on adaptability of parents' HLA in different family types

To analyze differences in adaptability of parents' HLA based on the family type (H1a), we computed analyses of variance, which revealed differences in changes in parents' HLA with their children ($F(2, 7,549) = 12.93$, $p < 0.010$, $\eta^2 = 0.00$). Changes were significantly higher in two-parent families than in large families ($p = 0.000$). During the lockdown, parents from two-parent families offered HLA significantly more often to their children than parents from large families. Also, single-parent families offered HLA significantly more often than parents from large families ($p = 0.010$). We found no significant differences between two-parent families and single parents ($p = 0.335$). This confirms the established assumption.

To test hypothesis H1b, we investigated potential relations between changes in employment as well as in hours of childcare outside the home and the adaptability of families. Taking the control variables into account, the analysis of variance revealed significant differences between the groups with regard to changes in employment ($F(2, 8,443) = 8.57$, $p < 0.010$, $\eta^2 = 0.00$). In two-parent families, changes (reduction in hours worked) were significantly greater than in single-parent families ($p = 0.000$). In large families, changes (reduction in hours worked) were significantly greater than in single-parent families ($p = 0.000$), too. We found no differences between two-parent families

TABLE 1 Descriptive statistics for family types.

	Single parents (<i>n</i> =429)		Two-parent families (<i>n</i> =7,911)		Large families (<i>n</i> =173)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age of child (in months)	37.0	5.4	37.0	4.5	39.0	4.2
Perceived financial problems before COVID-19 (1 = no financial problems; 5 = major financial problems)	2.0	1.0	1.4	0.7	1.7	0.9
ISCED	2.7	0.6	2.9	0.4	2.8	0.5
Change in employment (household level; 1 = more, 0 = unchanged, -1 = less)	-0.2	0.4	-0.3	0.5	-0.3	0.5
Change in hours of childcare outside the home (2 = considerably more, 0 = unchanged, -2 = considerably less)	-1.4	0.9	-1.7	0.7	-1.5	0.9
Parental stress (1 = totally disagree, 4 = totally agree)	2.7	0.8	2.7	0.7	2.7	0.7
Low stress (0 = medium or high stress, 1 = low stress)	0.3	0.5	0.3	0.5	0.3	0.5
Medium Stress (0 = low or high stress, 1 = medium stress)	0.4	0.5	0.4	0.5	0.4	0.5
High stress (0 = medium or low stress, 1 = high stress)	0.3	0.5	0.3	0.5	0.3	0.5
Social support (1 = never, 3 = sometimes, 5 = always)	3.3	1.0	3.3	1.0	3.2	1.1
Supportive role distribution partnership (1 = totally disagree at all, 4 = totally agree)	-	-	3.1	0.7	3.1	0.8
Changes in parents' HLA with their children (1 = considerably less frequent, 4 = Same, 7 = considerably more frequent)	4.9	0.8	5.0	0.8	4.6	1.0

and large families ($p=0.734$). The ANOVA further shows differences in changes in hours of childcare outside the home between the family types ($F(2, 5,556) = 25.98, p < 0.010, \eta^2 = 0.01$). In two-parent families changes were significantly greater than in single-parent families ($p=0.000$). We found neither differences between two-parent families and large families ($p=0.192$) nor between single parents and large families ($p=0.322$). Table 2 shows the results of the multiple group regression analyses. Including the control variables, changes in employment and in hours of childcare outside the home model 1 does not support our hypothesis H1b that changes in employment as well as in hours of childcare outside the home are related to the adaptability of families. In two-parent families, we found significant relations between all variables and changes in parents' HLA. However, the relations are too small to interpret. Moreover, the large sample of 7,884 two-parent families is the reason for the significance of the findings. At 2%, the model explains little variance. In large families, we found no predictions of changes in parents' HLA during lockdown by the control variables, changes in employment, or in hours of childcare outside the home. For large families, the model explains 5% of variance. For single parents, the model showed small relations between the gender of the parent and changes in HLA: Single fathers ($n=19$) reported greater increases in HLA during the first lockdown than single mothers did. The model explains 5% of the variance. With the exception of the CFI/TLI values, the model fit was acceptable ($\chi^2 = 203.32, df = 30, RMSEA = 0.05, CFI = 0.00, TLI = 0.00, SRMR = 0.03$). This does not confirm the assumption made.

4.2.2. RQ2: The importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment

The surveyed families were slightly affected (2 = not at all stressful; 3 = somewhat stressful) by general stressors caused by the COVID-19 interventions, such as worries about children's development ($M=2.8, SD=1.3$) or family health ($M=2.6, SD=1.2$). We used analysis of variance to examine differences in parental perception of stress between the family types: It revealed no significant differences between the families for linear parental stress ($p=0.727$), low parental stress ($p=0.877$), medium parental stress ($p=0.516$), or high parental stress ($p=0.637$). Then we included parental stress in our multiple group regression (see Table 2, model 2). In order to include particularly stressed parents among the families, we computed two dummy variables: one indicating intermediate levels of stress and one indicating high levels of stress. The analyses show no statistically significant relations for intermediate stress and changes in HLA among the families. Still, in large families there is a tendency toward a significant, but slightly negative relation between medium stress and changes in HLA ($p=0.082$). Regarding high stress, the analysis reveals that the more stressed single parents were, the less they were able to offer their children the same level of HLA as before the lockdown. The gender differences among single parents disappear when we considered stress. The Mann-Whitney-*U* Test shows differences in the mean values for medium and high stress of single mothers and single fathers. Fathers ($M=0.6, SD=0.5$) are more affected by medium stress than mothers ($M=0.4,$

TABLE 2 Multi-group regression: changes in parents' HLA in different family types.

	Model 1	Model 2	Model 3	Model 4
	β (SE)	β (SE)	β (SE)	β (SE)
Single parents ($n = 428$)				
Gender respondent (0 = female, 1 = male)	0.11 (0.05)	0.09 (0.05)	0.09 (0.05)	
Age child (in months)	−0.11 (0.06)	−0.09 (0.06)	−0.10 (0.06)	
Gender child (0 = female, 1 = male)	−0.09 (0.05)	−0.09 (0.05)	−0.09 (0.05)	
Perceived financial problems COVID-19	−0.04 (0.06)	−0.02 (0.06)	−0.02 (0.06)	
ISCED	0.07 (0.07)	0.06 (0.07)	0.06 (0.07)	
Change in employment at household level	−0.05 (0.05)	−0.04 (0.05)	−0.03 (0.05)	
Change in hours of childcare outside the home	−0.09 (0.08)	−0.10 (0.08)	−0.10 (0.08)	
Medium stress (0 = Low or high stress, 1 = Medium stress)		−0.04 (0.05)	0.04 (0.05)	
High stress (0 = Medium or low stress, 1 = High stress)		−0.18 (0.06)	−0.19 (0.06)	
Social support			−0.03 (0.06)	
R^2	0.05	0.08	0.08	
Two-parent families ($n = 7,884$)				
Gender respondent (0 = female, 1 = male)	0.03 (0.01)	0.03 (0.01)	0.03 (0.01)	0.03 (0.01)
Age child (in months)	−0.06 (0.01)	−0.06 (0.01)	−0.05 (0.01)	−0.05 (0.01)
Gender child (0 = female, 1 = male)	−0.04 (0.01)	−0.04 (0.01)	−0.04 (0.01)	−0.04 (0.01)
Perceived financial problems COVID-19	−0.06 (0.01)	−0.05 (0.01)	−0.05 (0.01)	−0.05 (0.01)
ISCED	0.03 (0.01)	0.04 (0.01)	0.04 (0.01)	0.04 (0.01)
Change in employment at household level	−0.04 (0.01)	−0.04 (0.01)	−0.04 (0.01)	−0.04 (0.01)
Change in hours of childcare outside the home	−0.07 (0.02)	−0.08 (0.02)	−0.09 (0.02)	−0.09 (0.02)
Medium stress (0 = Low or high stress, 1 = Medium stress)		−0.03 (0.01)	−0.02 (0.01)	0.01 (0.01)
High stress (0 = Medium or low stress, 1 = High stress)		−0.14 (0.01)	−0.11 (0.01)	−0.11 (0.01)
Social support			0.08 (0.01)	0.08 (0.01)
Supportive role distribution				0.02 (0.01)
R^2	0.02	0.04	0.04	0.04
Large families ($n = 172$)				
Gender respondent (0 = female, 1 = male)	0.03 (0.05)	0.04 (0.04)	0.04 (0.05)	0.03 (0.05)
Age child (in months)	0.04 (0.09)	0.04 (0.08)	0.02 (0.08)	0.02 (0.08)
Gender child (0 = female, 1 = male)	−0.03 (0.08)	−0.02 (0.08)	−0.01 (0.08)	−0.01 (0.08)
Perceived financial problems COVID-19	0.06 (0.09)	0.09 (0.09)	0.11 (0.09)	0.11 (0.09)
ISCED	−0.12 (0.09)	−0.16 (0.10)	−0.17 (0.09)	−0.17 (0.09)
Change in employment at household level	−0.10 (0.07)	−0.04 (0.07)	−0.04 (0.07)	−0.04 (0.07)
Change in hours of childcare outside the home	−0.13 (0.14)	−0.07 (0.13)	−0.13 (0.15)	−0.14 (0.14)
Medium stress (0 = Low or high stress, 1 = Medium stress)		−0.14 (0.08)	0.10 (0.08)	0.10 (0.08)
High stress (0 = Medium or low stress, 1 = High stress)		−0.38 (0.07)	−0.27 (0.09)	−0.27 (0.09)
Social support			0.25 (0.09)	0.25 (0.10)
Supportive role distribution				0.01 (0.07)
R^2	0.05	0.19	0.23	0.24

Displayed are standardized regression coefficients, standard errors in brackets, significance and explained variance. The bold values represent the significant results. The dataset contains 29 cases with missing on x-variables. These cases were not included in the analysis.

$SD = 0.5$). There was a tendentially statistically significant difference between the groups ($U = 2,529$, $Z = -1.80$, $p < 0.10$). Mothers ($M = 0.3$, $SD = 0.5$) are more affected by high stress than fathers ($M = 0.1$, $SD = 0.2$). There was a statistically significant difference in high stress between them ($U = 2,468$, $Z = -2.11$, $p < 0.05$). The model explains slightly more

variance (8%) for this family type. For traditional two-parent families, due to the sample size, again almost all relations were statistically significant, but with very little to no relations. Only for relations between high parental stress and changes in HLA did the regression show that the more stressed traditional two-parent families were, the less the

frequency of HLA changed. The model still explains little variance (4%). In large families compared to the other family types, the level of parental stress was of greater importance for an adequate adaptability of the HLA during the first lockdown. We found an intermediate negative relation between high stress and changes in parents' HLA. This model explains significantly more variance (19%) than Model 1. The model fit was acceptable ($\chi^2=259.47$, $df=27$, $RMSEA=0.15$, $CFI=0.00$, $TLI=0.00$, $SRMR=0.07$). *Post hoc* analysis of the regression coefficients of high parental stress between the groups shows no differences between traditional two-parent families and single parents ($\chi^2(1)=0.865$, $p=0.352$, $d=0.021$). We also find no differences between single parents and large families ($\chi^2(1)=2.929$, $p=0.087$, $d=0.038$). Only between two-parent families and large families do the regression coefficients of high stress experience differ ($\chi^2(1)=6.247$, $p=0.012$, $d=0.056$). In general, the results confirm hypothesis H2b, according to which parental stress influences the adaptability differently in the family types. However, hypothesis H2c assumed that the negative relations of perceived stress and adaptability are strongest in single-parent families because of their lower personal resources. Our results refute this. When we considering the regression coefficients, it becomes clear that negative relations between parental stress and changes in HLA are significantly greater in large families than in traditional two-parent families. Accordingly, we must reject the assumption that the negative relation between perceived stress and adaptability are lowest in large families (H2d).

To test hypothesis H2a2, we investigated relations between social support and family adaptability. In general, we found no statistically significant differences between the groups for social support ($p=0.479$). When we included social support to the multiple group regression, we found no significant relations between social support and changes in parents' HLA compared to the time before the lockdown for single parents (see Table 2, model 3). The variance reached its maximum at 8%. Although in traditional two-parent families the regression coefficient for social support is relatively small, the relations between high levels of stress and changes in HLA decrease when we consider social support. The variance remains at 4%. In large families, the availability of social support was more important for changes in HLA during the first lockdown compared to the other family types. For social support, the negative relations between high levels of stress and changes in HLA decrease (see Table 2, model 3). This model explains 23% of the variance. The model fit was acceptable ($\chi^2=296.30$, $df=30$, $RMSEA=0.14$, $CFI=0.00$, $TLI=0.00$, $SRMR=0.07$). Comparative *post hoc* analyses of the regression coefficients between the groups show no differences in the perception of social support between two-parent families and single parents ($\chi^2(1)=1.803$, $p=0.179$, $d=0.031$). However, perceptions of social support differs statistically between two-parent families and large families ($\chi^2(1)=4.612$, $p=0.032$, $d=0.049$), as well as between single parents and large families ($\chi^2(1)=6.558$, $p=0.010$, $d=0.058$). For traditional two-parent families and large families, the results confirm hypothesis H2a2, according to which positive relations exist between social support and the adaptability of families.

Hypothesis H2a1 assumes positive relations between the supportive distribution of roles within the partnership and family adaptability. Analysis of variance revealed no statistically significant differences between the groups in the distribution of the supporting role ($p=0.691$). In our regression Model 4 (see Table 2), we added the perception of a supportive role distribution within the partnership. Due to the relationship status, we only conducted these analyses for traditional two-parent families and large families. Neither in traditional two-parent families nor in large families was the perceived supportive role

distribution within the partnership significantly related to parents' changes in HLA during the first lockdown. For two-parent families the variance remained the same (4%). For large families, Model 4 explains minimally more variance despite significant correlations (24%). Aligned with the SRMR value the model fit was acceptable ($\chi^2=280.06$, $df=22$, $RMSEA=0.15$, $CFI=0.00$, $TLI=0.00$, $SRMR=0.07$). The *post hoc* analysis of the regression coefficients of the perceived supportive role distribution within the partnership between the two family types shows no statistically significant differences ($\chi^2(1)=0.084$, $p=0.772$, $d=0.007$). These results cannot confirm hypothesis H2a1.

5. Discussion

In Germany, restrictions to contain the COVID-19 pandemic led to severe disruptions for parents with children under the age of six. These families were denied centralized care and education services, so they needed to reorganize working and childcare hours, and redistribute childcare at home. Our aim was to examine the adaptability of families with young children in times of crisis, with a special focus on adaptability among traditional two-parent families, single parents, and large families. As an indicator of family adaptability, we examined changes in the frequency of parents' HLA with their children during the first lockdown compared to the preceding time period. Results show, with minor differences, that parents from all three family types offered HLA slightly more often during the first lockdown than before. Since a large proportion of the children spent more time at home due to the closed daycare, this does not, initially, seem surprising. Our results do show that the employment of the surveyed parents hardly changed: Nevertheless, we must note that, whether working from home or not, many families had to organize their employment around childcare and sometimes work early in the morning or late in the evening. To what extent there was enough time for relaxation or family time is questionable. Nevertheless, all parents offered their children HLA more often during the lockdown. It is possible that families tried to compensate for the loss of the influence of early childhood education institutions by providing more HLA. Still, the results revealed significant differences among the groups: Despite fewer personal resources, the single parents in our study, just like families with two parents, managed to offer their children HLA more often compared to before the first lockdown. Adaptability during the first lockdown was comparatively lowest in large families, which identifies this family type as a special risk group in our study.

5.1. Adaptability of families in times of crisis: Risk and protective factors

Toward a deeper understanding of family type-specific conditions for adaptability, the identification of factors that influence the adaptability of families is crucial. How parental stress predicts inadequate parenting behavior is well established (Crnic and Greenberg, 1990; Crnic et al., 2005). Overall, studies showed that parental stress is negatively associated with changes in the provision of HLA, in general and especially during the first lockdown in Germany (Barnett, 2008; Oppermann et al., 2021). We were able to confirm this and even show that in large families the tipping point for negative relations between stress and parents' provision of HLA, as documented by Oppermann et al. (2021), occurs earlier and is stronger overall. Single parents and

two-parent families are still relatively adaptable when exposed to the medium stress level. The adaptability of large families, on the other hand, already seems to be vulnerable at a medium stress level. Since these findings just fail the level of significance, follow-up studies are required. Our study initially confirms that high stress restricts the ability to provide HLA in all three family types. There is hardly any variance in our data for child age. We can therefore conclude that the surveyed families were affected by comparable stress when it comes to providing care activities toward their children. We see intermediate negative correlations especially in large families. In the other two family types, the relations are smaller. In large families, the level of parental stress was the best predictor of lower adaptability. Thus, the adaptability of the HLA is significantly more susceptible to stress in large families. This raises the question of whether large families, considered as a special risk group in times of crisis, need special support to compensate for parental stress and thus ensure supportive parenting behavior. In order to make more precise statements about changes in HLA and the associated adaptability of families, it is necessary to have further information on the general extent of HLA before the lockdown. In general, we were able to show that the relation between stress and the provision of HLA is smallest in two-parent families. It seems that this type of family in particular is the – comparatively – most stress-resistant. This is possibly due to a more balanced distribution of parents and children within this family setting. Compared to the adaptation performance in single-parent families, the availability of parental resources was not a decisive factor for stress management during the lockdown. Of more importance perhaps was how families organized their everyday life, or whether new routines developed during this time. Last but not least, it would also be interesting to analyze the extent to which our results on the stress level of families would be applicable if the target children were older or younger.

As already outlined, social support is crucial to successful adaptability because the extent to which a family feels supported by its social environment contributes to how strongly the emotional burden of a crisis feels (Dunn et al., 2001; Wierda-Boer et al., 2008; Manning et al., 2011). Our study found that the strongest relations between social support and parents' provision of HLA occur in large families. In line with Oppermann et al. (2021), we thus demonstrate the importance of social support for the adaptability of families and show once again that this predictor seems to be particularly important for an adequate adaptability in large families. If those families receive the level of social support they need for adequate adaptability, this may help to maintain the educational opportunities of children from large families during times of crisis. Moreover, even if the relation between social support and changes in HLA is low in traditional two-parent families, we still see that relations between stress and changes in HLA decrease here. The study by Oppermann et al. (2021) also revealed that social support has a mitigating effect on negative relations between stress and parents' provision of HLA. Although all three family types perceived similar availability of social support, among single parents, we could not demonstrate relations between social support and changes in HLA. Previous findings considered the lack of social support as the greatest risk factor in single parent adaptability (Jackson and Kiehl, 2017; Martin-West, 2019). It is conceivable that the single parents in our study were already making extensive use of social support before the lockdown and therefore we could find no relations. At the same time, our results show that the employment of single parents scarcely changed and changes in hours of childcare outside the home were been less drastic. Due to their single-parent status, many single parents were

entitled to emergency childcare from daycare centers. Problems reconciling work commitments and childcare may have been mitigated in this way, making the importance of social support less relevant during the first lockdown.

As the identification of family resources plays an important role in adaptability (Patterson, 2002), we expected the supportive role distribution within the partnership to be an important predictor of the adaptability of the surveyed families. For changes in HLA during the lockdown, this internal family resource does not seem to have been of importance. The reason for this could be the operationalization of the scale: We surveyed role distribution within the partnership based on self-assessment by the parents. The perception of role distribution alone does not allow any conclusions about the actual distribution of household and care activities. Perhaps it is not the satisfaction with the role distribution that is decisive, but how much parents find fulfillment in their own role.

5.2. Further influencing factors

One relation we did not expect concerns gender differences in single-parent families: Single fathers reported a greater increase in HLA than single mothers. The COVID-19 pandemic has certainly led to single mothers and single fathers spending more time with their children. Concerning the time spent on childcare, single fathers often spend less time on childcare than single mothers (Hook and Chalasani, 2008). The single fathers in our study seem to have caught up in terms of time spent with their children during the lockdown. However, when we consider high stress, the gender differences among single parents disappear. Thus, it is a spurious relation between gender and the change in HLA in single-parent families. Rather, the relation is mediated by the level of parental stress. Compared to other family types, there is hardly any well-founded knowledge about the characteristics of single-father families with young children. Mostly, it is older children who live with single fathers. Our findings provide interesting insights into the group of single fathers in early childhood. The fact that single fathers of young children are represented in the sample at all can be seen as a particularly valuable aspect of the study. On the other hand, the results once again make it clear that single mothers in particular are burdened by parental stress. Studying differences between single mothers and fathers is an important area of research to explore child development in different contexts. However, further research on differences between single mothers and fathers needs to examine other aspects of the family environment. The number and age of other children living in the household must also be taken into account in such comparative studies, or whether both family types employ different strategies in obtaining support from their friends and family.

5.3. Limitations

The data for the present study come from a Germany-wide cross-sectional survey conducted online, resulting in a convenience sample. Accordingly, parents with a low level of education and single parents are underrepresented, within the sample compared to the German average (Statistisches Bundesamt, 2021). Furthermore, it is not possible to map the extent to which job-seeking participants devote time resources to their job search. Therefore, we cannot assume that those respondents have more time to provide HLA for their children. We also

note that some background characteristics of the family situation of the target children (e.g., possible number of younger siblings) cannot be represented. Furthermore, we could not survey changes in HLA directly due to the cross-sectional survey. We asked only for changes in HLA compared to the time before the first lockdown. Consequently, statements can only be made about the changes in HLA as a result of the first COVID-19 lockdown. This also means that no information is available on the initial frequency of HLA. The present findings can therefore be interpreted in terms of how perceived roles in partnership, parental stress, and social support affected changes in HLA, but cannot be generalized to absolute frequencies of HLA. Nor can we make any statements about the quality of the home learning stimulation, such as the atmosphere in a family. The study cannot answer how this changed during the lockdown. The information on changes in HLA is also based on parents' self-reports, which may be biased by social desirability. Further limitations concern the cross-sectional data as well as the sizes of the regression coefficients. On the one hand, cross-sectional data based on a one-time survey do not allow for causal conclusions. On the other hand, most of the results presented have both low effect sizes and small regression coefficients. This does not make them any less interesting, but we must interpret them with caution. Lastly, we want to point out that the situation of families during the first lockdown was different from the later stages of the COVID-19 pandemic. During the early phase of the COVID-19 pandemic, many families experienced the social shutdown as an opportunity to unwind, and optimism about overcoming the crisis was certainly higher than after many months of lockdown. Families were able to use this time to develop a more mindful family life, establish new rituals, and strengthen their own relationships (Weissbourd et al., 2020). This raises the question of whether our findings are also tenable over a longer period.

6. Conclusions and implications

This article contributes to linking the dynamics of HLE more closely to adaptation processes in families. We were thereby able to explain relations between perceived partnership roles, parental stress or social support and the adaptability of families in times of crisis. The present results illustrate that different resources of different types of family were indeed relevant for their adaptability during the COVID-19 lockdown in Germany. This becomes particularly apparent when it comes to the adaptability of families in times of crisis. We were able to show that the adaptation of HLA during the lockdown differed slightly based on family type, and that depending on family type distinct predictors are important for successful adaptability. For two-parent families and single parents, our analyses explained little variance. How these families can be better supported in their adaptability, and which predictors are important here, must be investigated in further studies in depth. Furthermore, follow-up studies should consider statements about the family appraisal component. This would allow links between

the importance of parental self-efficacy for HLE and adaptability in times of crisis. Still, particularly noteworthy here are the results for large families. The study makes clear that special attention should be paid to these families in times of crisis and raises the question of whether the special needs of large families have received enough attention within social and political debates during the first lockdown in Germany. In times of crisis, it is important to ensure that all families receive the support they need to care for their children in the best possible way. To do this, we need further research to give a clear picture of where requirements remain unfulfilled, and what the special needs of individual families are. The characteristics of specific types of family should not be neglected in these considerations; they can further our understanding of the dynamics in different family types, which is essential for the development of effective and needs-oriented family support programs and policies.

Data availability statement

The datasets presented in this article are not readily available because the data are currently reserved for scientific qualifications (Ph.D. and masters' theses). Requests to access the datasets should be directed to EO, elisa.oppermann@uni-bamberg.de.

Author contributions

LP: conceptualization, methodology, formal analysis, writing—original draft, and visualization. FC: conceptualization, methodology, data collection, and writing—review and edit. EO: conceptualization, methodology, data collection, writing—review and editing. YA: conceptualization, methodology, writing—review and editing, supervision, and resources. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix

Pearson correlations								
	Age of child	Perceived financial problems before COVID-19	ISCED	Change in employment (household level)	Change in hours of childcare outside the home	Parental stress	Social support	Supportive role distribution partnership
Perceived financial problems before COVID-19	−0.104**							
ISCED	0.156**	−0.172**						
Change in employment (household level)	0.032**	−0.045**	0.050**					
Change in hours of childcare outside the home	−0.056**	0.054**	−0.150**	0.087**				
Parental Stress	0.029*	0.084**	0.035**	0.040**	−0.095**			
Social support	−0.065**	−0.084**	0.008	0.005	0.079**	−0.374**		
Supportive role distribution partnership	0.007	−0.119**	0.052**	0.019	−0.018	−0.161**	0.199**	
Changes in parents' HLA with their children	−0.048**	−0.060**	0.038**	−0.046**	−0.082**	−0.134**	0.105**	0.056**

**The correlation is significant at the 0.01 level (2-sided).

*The correlation is significant at the 0.05 level (2-sided).

Appendix B

Prokupek, L., Erdem Möbius, H., & Kluczniok, K. (resubmitted to the Journal of Child and Family Studies). Parental stress and the home learning environment in German single-parent families: A mixed-method study.

Parental stress and the home learning environment in German single-parent families: A mixed-method study

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Abstract

Perceived parental stress negatively impacts the home learning environment (HLE), with single parents facing even greater challenges. Through this mixed-methods study, we identify stressors affecting single parents with children aged 3-7 in Germany and explore associated risk and protective factors. Quantitative analysis of 116 single-parent and 972 two-parent families from the German National Education Panel Study (NEPS) shows that financial burdens and family background significantly influence parent-child interactions. In single-parent families, a more favourable economic situation was associated with greater engagement in learning-stimulating activities. Qualitative interviews with 11 single parents highlighted various stressors, with financial burdens being the most significant. Additional interparental conflicts or a lack of parental self-efficacy (PSE) further contribute to stress. Despite these challenges, respondents draw on protective factors to manage stress and sustain a stimulating HLE. The results offer evidence-based guidance for developing targeted interventions to enhance HLE in early childhood.

Keywords: Single parents, parental stress, protective factors, home learning environment, mixed-method

Highlights

- Parental stress in single-parent families is driven by multiple interacting stressors—not financial burden alone.
- Parental resources (PSE, coping, co-parenting, and social support) buffer stress and help sustain a stimulating home learning environment.
- A mixed-methods design reveals both the statistical associations and the everyday mechanisms linking parental stress to the HLE.

1. Introduction

To understand conditions that promote learning in families, many studies have examined the home learning environment (HLE) (Kluczniok et al., 2013). This involves the quality of stimulation in families and defines parent-child interactions that promote children's learning as crucial for children's development (Linberg, 2017). Research indicates that parental stress influences the extent to which parents provide learning opportunities (Gershoff et al., 2007). Additionally, single parents face greater financial burdens and challenges in coping with daily demands than two-parent families, which contribute to parental stress (Masarik & Conger, 2017; OECD, 2018). However, research has also indicated

that social support, as well as specific parental resources, can help single parents cope with parental stress (Taylor & Conger, 2017).

As highlighted by scholars, being a single parent can be particularly demanding (Harknett & Hartnett, 2011; Taylor & Conger, 2017), and children from single-parent families often face adjustment problems due to factors like poverty and inadequate parenting practices, including limited parent-child interactions (Taylor & Conger, 2014). Additionally, various family risk factors (e.g., family income, occupational status, and the mother's formal qualifications) also affect child development (Hall et al., 2010).

By building on the family stress model (Masarik & Conger, 2017), we examine parental stress among single parents. Applying a mixed-methods approach, we aim to identify specific stressors that single parents are exposed to, their risk and protective factors, and how these affect HLE. Understanding the relationship between parental stress and HLE, as well as recognising the potential benefits of protective factors, could enhance children's learning and development in single-parent families. In Germany, various family policy measures have been taken that reflect the heterogeneity of families and their different needs. This makes Germany an interesting context for analysing single parents' stress and potential impact on HLE.

2. The context of the study: Single-parent families in Germany

Single parents are defined as individuals living with their minor or adult children without a partner in the household, typically due to circumstances such as divorce or marital separation (Bhayana, 2023). In Germany, there are approximately 2.8 million single parents, with about 1.6 million having underage children (FMFSWY, 2023). Single-parent families face greater challenges and have a higher risk of poverty, with 42.9% living below the poverty line, compared to 8.4% of two-parent households (FMFSWY, 2023; OECD, 2018). Germany considers itself a democratic, social federal state with a robust social welfare system (Trzcinski & Camp, 2014). For single parents in particular, there are additional financial support options such as tax relief and further government cash benefits. German family policy also invests in social services such as daycare and child-rearing assistance. These services are part of child and youth welfare, largely financed from public funds, with many provided free of charge.

3. Literature review: Family stress and single parenting

3.1. Challenges in the home learning environment

The family represents the primary and most influential learning environment and is, therefore, crucial for children's development (Bronfenbrenner & Morris, 2006). Early childhood research utilises a multi-dimensional concept of the HLE, which defines three interrelated dimensions: structural characteristics, parental beliefs, and processes (Kluczniok et al., 2013). Structural characteristics (e.g., household income and parental education) shape parental beliefs, which in turn influence HLE processes such as parent-child interactions and learning-stimulating activities that directly support children's learning. HLE processes are central to children's development but vary considerably between families (Anders et al., 2012; Niklas et al., 2020). Structural characteristics such as parental education, income, and migration history influence these processes directly and indirectly

through parental stress, which may reduce learning-stimulating activities (Masarik & Conger, 2017; Novita & Kluczniok, 2021).

According to the Family Stress Model (Masarik & Conger, 2017), limited material, social, and emotional resources increase parental stress, which can negatively affect parenting practices, including parent-child interactions and learning-stimulating activities. Single-parent families are particularly vulnerable because they often experience greater financial strain and fewer household resources (Dunst, 2022; Masarik & Conger, 2017).

Although financial burden is a major source of family stress (Masarik & Conger, 2017; Shelleby, 2018), parental stress is also associated with single parenthood, larger family size, work-related time pressure, and post-separation challenges (Algarvio et al., 2018; Leach et al., 2020; Taylor & Conger, 2017). Moreover, financial stability alone does not fully protect single parents from stress, and children's development is shaped by the cumulative interplay of family structure, SES, and other familial risks (Hall et al., 2010; Taylor & Conger, 2017).

3.2. Risk and protective factors

Research on family stress suggests that certain protective factors help mitigate the negative effects of parental stress on parenting practices (Oppermann et al., 2021).

Parental self-efficacy

According to Bandura (1997), parental self-efficacy (PSE) refers to parents' beliefs in their ability to effectively support their child's development. Higher PSE is associated with more effective coping, more enriching parenting practices, and lower everyday stress, whereas lower PSE is more common among parents with low income, limited education, or a migration history (Gessulat, 2022; Peacock-Chambers et al., 2017).

Coping and appraisal

Coping refers to the cognitive and behavioural strategies individuals use to manage demands that exceed their available resources (Folkman & Moskowitz, 2004; VandenBos, 2007). In parents, effective coping is associated with lower stress, more positive parent-child interactions, and better children's socio-emotional development (Oppermann et al., 2021; Taylor & Conger, 2017). In particular, problem-oriented coping serves as a protective factor by reducing parental stress (Cheng & Lai, 2023). In addition, the cognitive appraisal of stressful events shapes how parents perceive and respond to these stressors (Lazarus & Folkman, 1984).

Co-Parenting

Co-parenting refers to the cooperation between separated parents in child-rearing and can function as either a protective or a risk factor depending on the degree of support and conflict (Feinberg et al., 2012; Fagan & Kaufman, 2015). Supportive co-parenting is associated with lower parental stress, more stimulating parenting, and better child adjustment, whereas conflictual co-parenting predicts poorer outcomes (Camisasca et al., 2022; Nunes et al., 2021). However, many single-parent families experience persistent

post-separation conflict, increasing their vulnerability alongside financial strain (Reim et al., 2025).

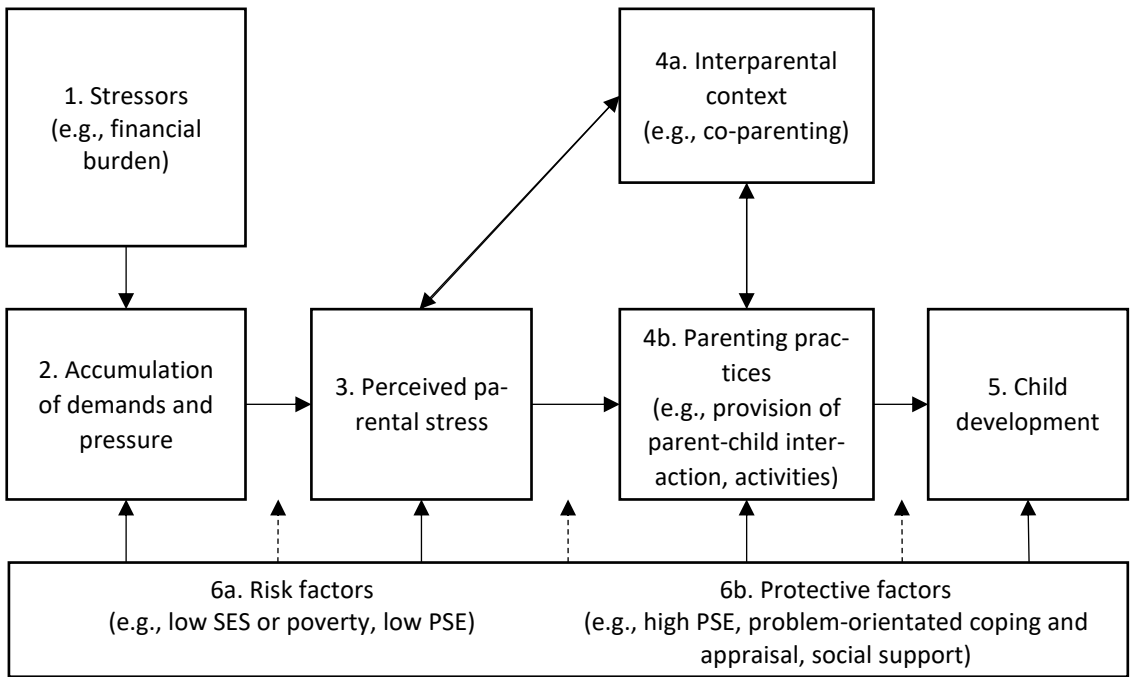
Social support

According to Cohen (2004), social support refers to resources available through social networks that help individuals cope with stress. It is associated with successful stress adaptation, more positive parent-child interactions, and fewer ineffective parenting practices (Masarik & Conger, 2017; Oppermann et al., 2021). In single-parent families, limited social support increases vulnerability to stress and represents an important risk factor (Jackson & Kiehl, 2017).

4. Theoretical framework

We consider the HLE to be the relationship between structural characteristics, parental beliefs, and educational processes (Kluczniok et al., 2013). In addition, we use Masarik and Conger’s (2017) model of parental stress to examine the influence of various stressors and their possible accumulation on parental practices (e.g., parental provision of educational processes), considering risk factors and protective factors within the HLE (Figure 1).

Figure 1
Family stress in the context of HLE (own depiction, adapted from Masarik & Conger, 2017)



5. The current study

In the present study, focusing on single parents in Germany, we examine the following questions:

RQ1: How are learning-stimulating activities shaped in single-parent families compared to two-parent families, taking into account family background characteristics and potential financial burdens?

RQ2: What are the main stressors and risk factors for single parents of young children, and which protective factors are relevant for them to deal with parental stress and maintain a stimulating HLE for their children?

Based on previous findings relating to the family stress model (Masarik & Conger, 2017) and the challenges of single parenting, we expect the quantitative analysis for RQ1 to show that a poor perception of economic household conditions associates with a lower frequency of learning-stimulating activities, particularly in single-parent families compared to two-parent families. Furthermore, as studies have shown (Masarik & Conger, 2017; Shelleby, 2018), it can be assumed that, in addition to financial burdens, other burdens on single parents' parenting practices can be identified. Therefore, based on the qualitative data, RQ2 aims to explain or expand on the results of RQ1, identify relevant protective factors for coping with parental stress, and examine possible effects on HLE.

6. Method

6.1. Research design and procedure

To examine the relationship between parental stress and the HLE in single-parent families, we used an explanatory sequential mixed-methods design (Creswell & Clark, 2017), combining quantitative data from the German National Educational Panel Study (NEPS; Blossfeld et al., 2011) with qualitative interviews with 11 single parents. Quantitative findings informed the subsequent qualitative data collection and analysis, enabling triangulation and a more comprehensive interpretation of the results (Flick, 2020).

The quantitative analyses were based on waves 1 and 2 of the NEPS kindergarten cohort, a nationally representative survey of parents of kindergarten children conducted in 2012. Wave 1 provided family background information, and wave 2 assessed learning-stimulating activities.

To complement the quantitative findings, we interviewed 11 single parents recruited through personal contacts, social media, and advertisements in childcare centres and family support organisations. Purposive sampling ensured variation in migration history and SES. Although based on a convenience sample, participants closely resembled the NEPS sample regarding family situation, target child's age, and family background. Interviews were conducted online between January and March 2024, recorded, transcribed verbatim, and pseudonymised.

Both study components received ethics approval in accordance with local regulations and institutional requirements.

6.2. Participants

Quantitative sample

The quantitative sample consisted of $N = 1088$ parents with children aged three to six years. Of these, 116 are single-parent families (N_1), and 972 are two-parent families (N_2).

The average household size for single parents was 2.7 people ($SD = 0.8$, range from 2 to 5). 98% of the single parents surveyed were mothers of the target children, and on average, they were 36 years old ($SD = 6.2$, range from 24 to 50 years). Most parents are considered rather educationally privileged and show a somewhat higher level of education than the general German population (German Federal Statistical Office, 2024): 41% have a secondary school leaving certificate (general population: 23,1%) and 32% a high school diploma. Their monthly net household income was EUR 1729 ($SD = 841$ EUR). 29% of single parents stated that their family language is another language than German. The average household size of the two-parent families surveyed comprised 4.2 people ($SD = 0.9$, range from 2 to 10). 92% of these parents were mothers of the target children, and on average, they were 38 years old ($SD = 5.6$, range 22 to 50 years). Among the two-parent families, 40% had a secondary school leaving certificate and 49% a high school diploma. The monthly net household income in two-parent families was 3697 EUR ($SD = 3668$ EUR). 24% of two-parent families stated that their family language is not German. In both family groups, 99% of the target children attended a day care centre.

Qualitative sample

Qualitative data stemmed from 11 single parents. The average age of their children was 4.3 years ($SD = 1.4$ years, range 2-7 years). The average household size in the qualitative sample was 2.5 members ($SD = 0.5$, range 2 to 3 people). 9 single parents were mothers, and 2 were fathers. On average, parents were 36 years old ($SD = 4.9$ years, range 28 to 42 years). 1 of the parents reported having a migration history, meaning that they were born in a country other than Germany. 7 parents completed higher education (bachelor's and/or master's degree). All children of the parents in the qualitative sample were involved in childcare. 3 parents rate their SES as low, partly because they receive government support, such as housing benefit. 5 parents rate their SES as medium. 3 parents rate their SES as high because, for example, they have sufficient living space, can easily afford regular holidays and maintain a car.

6.3. Variables and data analysis

Variables of the quantitative analysis

HLE: We formed a frequency scale from 5 learning-stimulating activities of the HLE, which do not necessarily require financial resources (Caldwell & Bradley, 1984) as a dependent variable (e.g., reading aloud, activities with letters or numbers). The parents were asked to rate, on an 8-point scale (1 = never; 8 = several times a day), how often these activities take place with the child. We classified the Cronbach's alpha of 0.7 as acceptable (Blanz, 2015).

Potential Financial Burdens: parental self-disclosure regarding the perception of the economic household situation was considered as a predictor of the extent of learning-stimulating activities. On a 5-point scale, parents indicated their perceived situation (1 = very poor; 5 = very good).

Control Variables: Using the highest International Socio-Economic Index at Household level (HISEI-08, Ganzeboom & Treiman, 2003), the SES of the surveyed families was considered. The HISEI-08 values ranged from 12 (low index, e.g., farmer) to 89 (high index,

e.g., judge). Family language as a construct of migration history (0 = German; 1 = not German), the age of the target child at the time of the survey, the gender of the target child (0 = male, 1 = female), the parent's gender (0 = male, 1 = female), the extent of the parent's working hours (1 = not working; 3 = working full-time). We used the variable 'full-time employment' as the reference group in subsequent analyses. Finally, we included the number of siblings living in the household as a control variable.

Analysis of the quantitative data

We conducted multiple group regressions in IBM® SPSS between single- and two-parent families to identify relations between the families' perception of their economic household situation and the frequency of learning-stimulating activities. Analysis of measurement invariance showed, in summary, both partial metric and partial scalar measurement invariance could be assumed. We considered the relations between family background characteristics and the frequency of learning-stimulating activities in both families and added the families' perception of their economic household situation as a stressor and further predictor of the frequency of learning-stimulating activities. Model fit was proved using the Yuan-Bentler scaled χ^2 values (YB χ^2 , mean-adjusted test statistic that is robust to non-normality), root mean square of approximation (RMSEA), comparative fit index (CFI), Tucker and Lewis index (TLI) and standardised root mean residuals (SRMR) using the criteria proposed by Hu and Bentler (1999). CFI and TLI values greater than 95, RMSEA values less than 0.06, and SRMR values less than 0.08 are accepted as indicators of good model fit (Hu & Bentler, 1999). Results of the MCAR test revealed that, for the continuous variables relevant to us, data were missing by chance only for one variable (MCAR: HISEI-08, $\chi^2 = 1.186$, $df = 4$, $p = 0.880$). Results like these often occur when surveying SES.

Qualitative interview instruments

The interview guide for the semi-structured interview included the following topics: (1) background characteristics like age, country of birth, family situation (married, single, etc.), relationship to the target child, gender and age of the target child. Further, we asked about (2) everyday routines and their impact on HLE (e.g., parents' employment, children's attendance at the daycare centre, a typical family day during the week and on the weekend). The interview guide also addressed (3) the HLE (type and frequency of joint activities), (4) parental or family aspects that influence parent-child interaction and activities (parental beliefs like PSE, effects of being a single parent on HLE), (5) the perception of the own financial situation and how this affects parent-child interaction and activities (e.g., socioemotional support, learning-stimulating activities) as well as financial burden as a family stressor. Finally, the instrument focused on (6) further stressors, (7) protective factors and (8) personal needs and wishes as a single parent. All interviews were recorded, transcribed verbatim and anonymised. Finally, we tested intercoder reliability (IR = 94.8%) using 18% of the material to validate and subsequently apply the categorisation system.

Analysis of the qualitative data

We analysed the data using MAXQDA in combination with the qualitative content analysis method (Mayring, 2014). While creating our coding scheme, we combined concept-driven

and data-driven approaches. In the concept-driven phase, we applied categories to cover aspects of parent-child interaction and activities, as well as parental stressors and risk and protective factors in single-parent families. Following Schreier (2012), to generate our data-driven categories, we adopted an open coding strategy, developing codes from a line-by-line reading of the interview transcripts. These inductively generated codes were then transformed into categories of our content analytical coding scheme (Schreier, 2012). In contrast, the inductive codes ensured that all perceived aspects related to parent-child interaction and activities, as well as parental stressors and risk and protective factors in single-parent families, were covered by the coding scheme (see supplementary material for further details).

5. Results

5.1. Quantitative results

Descriptive analysis

We used descriptive analyses to examine family background characteristics of single-parent and two-parent families (Table 1). Regarding the HISEI-08, the group of single parents had a mean value of 48 ($SD = 18.6$; range from 14.2 to 88.7). The HISEI-08 for two-parent families averaged 58 ($SD = 19.9$, range 14.2 to 89). In both families, learning-stimulating activities took place several times a week (single parents: $SD = 0.9$, range 4 to 8; two-parent families: $SD = 0.9$, range 2 to 8). Regarding the perception of the economic household situation, single parents rated their situation on average neither particularly good nor particularly bad ($M = 3$, $SD = 0.9$, range from 1 to 5). Two-parent families rated their economic household situation on average as rather good ($M = 4$, $SD = 0.9$, range from 1 to 5).

Table 1*Descriptive results of the quantitative sample*

	Single-parent families ($N_1 = 116$)					Two-parent families ($N_2 = 972$)				
	Min	Max	<i>M</i>	<i>SD</i>	%	Min	Max	<i>M</i>	<i>SD</i>	%
Child's gender										
<i>Male</i>					57					47
<i>Female</i>					43					53
Child's age (in months)	42.0	72.0	68.5	3.5		44.0	72.0	68.9	2.4	
Employment										
<i>Not employed</i>					30					25
<i>Secondary or Part time employment</i>					44					55
<i>Full-time employ- ment</i>					26					20
Family language (0 = German 1 = not Ger- man)					25					24
Number of siblings (household)	0.0	4.0	0.6	0.8		0.0	7.0	1.1	0.9	

Note. NEPS: Starting cohort kindergarten [doi:10.5157/NEPS:SC2:6.0.0](https://doi.org/10.5157/NEPS:SC2:6.0.0) (own calculations), $N = 1088$.

RQ1: How are learning-stimulating activities shaped in single-parent families compared to two-parent families, taking into account family background characteristics and potential financial burdens?

Group comparisons of mean values demonstrated that single parents rated their economic household situation significantly worse than two-parent families ($U = 31993.0$; $Z = -8.06$; $p < 0.001$). There were also significant differences between the groups regarding the child's gender ($U = 51038.0$; $Z = -1.93$; $p = 0.054$), SES ($U = 36825.0$; $Z = -5.10$; $p < 0.001$), and number of siblings ($U = 35264.0$; $Z = -7.27$; $p < 0.001$). Further, multiple group regressions (Table 2) revealed that the better single parents rated their economic household situation, the more frequently learning-stimulating activities occurred ($\beta = 0.25$; $SE = 0.09$; $p < 0.01$). Additionally, secondary or part-time employment tends to be significantly negatively related to the frequency of learning-stimulating activities ($\beta = -0.19$; $SE = 0.11$; $p < 0.10$). In two-parent families, on the other hand, there were no statistically significant relations between the perception of one's own economic household situation and frequency of learning-stimulating activities. Rather, the target child's gender appeared to be related to the dependent variable: According to this, girls in two-parent families were offered learning-stimulating activities more often than boys in the

same family setting ($\beta = 0.07$; $SE = 0.03$; $p < 0.05$). The results indicated that the perception of one's own economic household situation remains the most significant stressor for single parents in Germany. At 10%, the model explains little variance in single-parent families. The findings thus confirm our hypothesis, namely, that a poor perception of the economic household situation is associated with a lower frequency of learning-stimulating activities in single-parent families. Moreover, this relation is only visible in single-parent families but not in two-parent families.

Table 2

Multiple group regressions. Prediction of the frequency of learning-stimulating activities by perception of the economic household situation

	Single-parent families ($N_1 = 116$)		Two-parent families ($N_2 = 972$)	
	β	SE	β	SE
<i>Control variables</i>				
Gender target child (0 = male, 1 = female)	0.03	0.09	0.07 *	0.03
Age target child (in months)	-0.06	0.08	-0.01	0.03
SES/HISEI-08	-0.15	0.11	0.01	0.04
Not employed (0 = secondary, part-time or full-time employment, 1 = not employed)	-0.12	0.11	0,03	0,04
Secondary or part-time employment (0 = not employed or full-time employ- ment, 1 = Secondary or part-time em- ployment)	-0.19 +	0.11	-0.03	0.04
Family language (0 = German, 1 = not German)	0.01	0.09	-0.03	0.073
Number of siblings (household)	0.00	0.09	-0.05	0.04
<i>Predictor: Parental stressor</i>				
Perception of economic household sit- uation (1 = very poor, 5 = very good)	0.25 **	0.09	-0.02	0.04
R^2		0.10		0.01

Note. In this analysis, we used the variable ‘full-time employment’ as the reference group. Displayed are standardised regression coefficients, standard errors and the explained variance. NEPS: Starting cohort kindergarten [doi:10.5157/NEPS:SC2:6.0.0](https://doi.org/10.5157/NEPS:SC2:6.0.0) (own calculations), $N = 1088$. * $p < 0.05$, ** $p < 0.01$.

5.2. Qualitative results

RQ2: What are the main stressors and risk factors for single parents of young children and which protective factors are relevant for them to deal with parental stress and maintain a stimulating HLE for their children?

Following the narratives, the most prominent main stressors relied on a low perception of economic household situation, which consisted of 3 subcategories (lack of enriching parent-child interaction and activities, multifactorial burdens due to financial stress, and financial stress and anxiety). In addition, time constraints represented an additional stressor for single parents. Respondents also described further factors, like the lack of PSE

and ineffective co-parenting, that influenced their perception of stress. These were divided into two types of risk factors (Table 3). The identified protective factors could be aggregated into 3 categories: parental resources, supportive co-parenting and social support. Within parental resources, 2 subcategories were formed (high PSE, problem-oriented active coping and positive appraisal). Protective factors identified under the category of social support could be differentiated into social and structural support networks.

Categories and subcategories previously outlined functioned as ‘lenses’ through which to interpret the data, or as heuristic tools to facilitate understanding (Laudan, 1977). These lenses enabled novel insights into the HLE of single-parent families in Germany.

Table 3

Categories and subcategories of main stressors, risk and protective factors in the HLE of single parents

Concept	Category	Subcategories
Main stressors	<i>Low perception of the economic household situation</i>	• Lack of enriching parent-child interaction and activities • Multifactorial burdens due to financial stress • Financial stress and anxiety
	<i>Time constraints</i>	
Risk factors	<i>Lack of PSE</i>	
	<i>Ineffective co-parenting (e.g., conflicts with the other parent)</i>	
Protective factors	<i>Parental resources</i>	• Problem-oriented coping and positive appraisal • High PSE
	<i>Supportive co-parenting</i>	
	<i>Social support</i>	• Social networks • Structural networks

Main stressors

In terms of SES, the qualitative sample appears to be quite heterogeneous. However, 5 parents with low to medium SES report that they were often only able to offer their children a limited range of varied and enriching parent-child interactions and activities due to their own perceived low or insufficient economic household situation.

“There have been days when I’ve said we can’t go bouldering now [...] because it costs money, it’s expensive, it’s just not possible. [...] Then we just go to the playground and climb a bit. That doesn’t cost anything.” (Maja, 28)

Further, some single parents ($n = 6$) suffered from considerable multifactorial burdens due to financial stress. Discrepancies arose for some single parents, for example, because

it was not possible to increase their working hours to earn a higher household income due to a lack of childcare facilities. Parents reported that they had considered additional childcare but ultimately had to forego this type of support because they could not afford the additional costs.

“The problem is that even if I do three more hours now and work full-time. That wouldn’t work with the childcare situation, with the hours. With the costs for the extra [childcare] hours, I would have less money. So we could not do that.” (Tatjana, 40)

Further, the results demonstrated that most single parents, regardless of whether low, medium or high SES ($n = 9$), suffered from a significant emotional burden of financial stress and anxiety or existential worries about the future of their family.

“For example, this long route to school, which is simply impossible to get to by public transport because it takes so long that I could no longer keep to my working hours. So, we needed some form of transport to get to school. I couldn’t afford a car with my salary. Even if someone gave me a car, I wouldn’t be able to pay for it. So, I borrowed money from my mum to buy an electric cargo bike to get the child to school.” (Julia, 33)

Besides financial factors, however, the results indicated other stressors affecting single parents. Narratives from 9 single parents showed that time constraints hindered their ability to provide meaningful parent-child interactions and activities. They experienced sadness and frustration at missing opportunities for socioemotional support and learning-stimulating activities because of these limitations.

“A lot of things aren’t possible for me. Of course, some [families] of the daycare group go to children’s gymnastics on Tuesday afternoons at 3 o’clock. That just doesn’t work for me. Things like that are out of the question [because of my working hours]. It’s somehow very sad.” (Michael, 28)

In conclusion, the identified categories of main stressors reveal that, alongside financial burdens, additional stresses influence the parenting practices of single parents. Considering the theoretical framework, it can be confirmed that the main stressors negatively impact the different dimensions of HLE. Processes such as enriching learning activities and meaningful parent-child interactions were often limited or absent due to time constraints, while structural characteristics, including material provisions, were also affected.

Risk factors

According to risk factors, however, the results indicated that parenting practices of some single parents ($n = 3$) were also significantly influenced by a lack of PSE in addition to the basic organisation of family life, a tightly planned daily routine and pressure of single parenting, as reported by one of the parents:

“So, for our everyday life to work at all, everything really is timetabled. And that’s something that has to succeed first, of course. It’s not easy to reconcile all of this and then try to somehow fit in something educational.” (Michael, 28)

Emotional constraint, especially after a separation, also contributed to the fact that single parents initially felt less self-efficacious or even unable to adapt to the demands of raising children and caring for them alone. They reported feeling inferior to two-parent families and interpreted the status of ‘single parent’ as proof of their own failure.

“It was a really difficult situation for me at the beginning because I always thought: ‘Well, everyone has their happy partner and he’s taking such great care of them and I’m not. [...] I’ve somehow failed.’” (Nicole, 36)

Finally, the results indicated that the perception of stress of some single parents ($n = 4$) was significantly influenced by a risk factor that was primarily attributable to conflicts with the ex-partner after separation, which can be defined as ineffective co-parenting.

“What stresses me out in everyday life is still discussions with the child’s father. I still find it difficult to coordinate with someone who is otherwise not part of my life.” (Nicole, 36)

These results suggest that risk factors such as limited PSE and conflictual relationships between parents increase the perception of stress and thus also negatively influence HLE in single-parent families. Protective factors are therefore crucial to mitigate these risks and strengthen the stimulating character of HLE in such families.

Protective factors

The narratives clarified that single parents benefit from diverse protective factors to cope with parental stress. 10 parents highlighted problem-oriented active coping and positive appraisal as effective ways to cope with the stress of being a single parent.

As part of problem-oriented coping strategies, male reference figures are, for instance, sought as father surrogates in order to actively compensate for feelings of inferiority resulting from the absence of a father figure.

“[Her] grandfather, [...] he’s here very often [...] and he’s kind of a male role model [...], thankfully. [...] I think that’s really important — that she [...] also has some kind of male role models.” (Anna, 42)

Specifically, regarding their parental resources some parents reported that they were able to re-evaluate their individual family situation with the help of positive appraisal, e.g., by beginning to appreciate the diversity of family forms ($n = 9$).

"I started to accept my situation as it is [...] I explained to her [...] in a child-appropriate way: 'There are different types of families and that's just the way it is for us.' Then she was totally ok with it." (Nicole, 36)

The interviews also revealed that parental beliefs like high PSE were important aspects for dealing with parental stress among single parents.

"I think I can deal with some things a bit better because I know I don't have anyone in the back who I can rely on. So it must work somehow and I'm somehow better organised as a result." (Tatjana, 40)

The narratives further suggest that cooperation and mutual support through supportive co-parenting function as potential protective factors.

"I also try to delegate certain things whenever possible. For example, we currently have a problem at the kindergarten that isn't going well, so I simply asked my ex-husband to take care of it completely and handle it himself, because I simply don't have the energy or capacity to deal with it right now." (Lisa, 35)

According to the single parents, one of the most important protective factors against stress and to offer enriching, learning-stimulating activities was social support. This was also reflected in the way they built up their social support networks. As mentioned, two types of social support could be derived here: (1) social networks included, for example, friends, neighbours or the immediate family, who provide support with childcare, were essential for most of the single parents surveyed ($n = 10$).

"There are neighbours we get on well with. And then I can [...] leave [my daughter] there for a couple of hours now and then." (Fernanda, 40)

Lastly, single parents built up (2) structural networks that include, for example, support for care work from a babysitter or in the case of a interviewed single parent with high SES an au pair ($n = 5$) and regular contact with support initiatives such as family centres, in which their children are offered additional learning-stimulating activities ($n = 3$).

"I always felt so welcome [at the family centre]. [...] All these programmes: Crafts, free play or parent-child courses. We did so much there. [...] I always find that really nice." (Nicole, 36)

The responses also highlighted the importance of structural support from employers, particularly in terms of increased flexibility in work duties. Their support networks also included financial and organisational assistance, such as government housing benefits, child benefits, household help, and support from family. Overall, these findings emphasise that single parents benefit from a variety of protective factors that help them manage parental stress and maintain a stimulating HLE.

6. Discussion

6.1. Main findings

We examined the relationship between parental stress and the HLE by considering potential financial burdens, other major stressors, and risk and protective factors in single-parent families in Germany, using a mixed-methods approach. Our quantitative findings indicated that family background characteristics and financial burdens influenced learning-stimulating activities differently in single-parent versus two-parent families, particularly in relation to perceptions of economic household situations and the target child's gender. However, interpreting these results requires careful consideration of the income of single parents in our quantitative sample. According to available data, a net income of 1691 EUR per month is considered typical for a single parent with a child under 14 years of age in Germany (1015 EUR per month is defined as at risk of poverty). However, the last survey of this figure dates back to 2008. However, findings from the German Socio-Economic Panel study (SOEP) indicate that the situation of single parents hardly improved between 2002 and 2012 and that the rates of asset poverty among single parents have tended to rise. One explanation for this is that raising children is very time-consuming for parents. For some single parents, this could mean working less or staying at home (Köhler, 2016). Even though the data from the quantitative sample itself dates back to 2012, the following must be taken into account when transferring the results to single parents in 2026. Given the significant increase in the cost of living and ongoing inflation in Germany, it can be predicted that a monthly net income of 1691 EUR in 2026 will no longer be considered typical for single parents.

Single parents in the NEPS reported an average monthly net household income of 1729 EUR, significantly lower than that of parents from two-parent families. Moreover, in single-parent families, a better perceived economic household situation was associated with a higher frequency of learning-stimulating activities in the HLE, confirming previous research that indicates a better economic situation increases the likelihood of such activities (Masarik & Conger, 2017; Oppermann et al., 2021). In contrast, no such relationship was observed in two-parent families, where the target child's gender was more relevant, with girls receiving slightly more learning-stimulating activities than boys. The findings on perceived economic household situation are consistent with other findings showing that single parents face significantly greater challenges in some areas of life compared to two-parent families (FMFSWY, 2023; OECD, 2018). Nevertheless, single parents manage to offer learning-stimulating activities several times a week, similar to two-parent families, demonstrating their adaptability despite the challenges they often face. In conclusion, the findings highlight the critical role of financial burdens as a significant determinant of HLE processes in single-parent households in Germany, reaffirming how structural characteristics, particularly the perception of economic situation, influence these processes (Linberg et al., 2020).

Our second research question focused on the key stressors and risk factors for single parents with young children and on protective factors that are relevant for them in coping with parental stress and thus maintaining a stimulating learning HLE. Qualitative results highlighted that single parents of young children faced multifaceted stressors, with financial burdens being the most significant. These financial burdens were associated with less

enriching parent-child interactions, supporting previous findings that parental stress negatively affects the HLE (Masarik & Conger, 2017; Oppermann et al., 2021). Additionally, financial stress led to complex burdens that could not be resolved merely by increasing work hours, as this would require reorganising daily family life and childcare. Here, our results suggest that simple 'if-then' solutions –meaning simple decision-making logic that promises a quick solution to a problem– are insufficient in the everyday family life of single parents, whose situations demand a careful analysis of their specific stressors to develop tailored, effective support services.

Nearly all interviewed single parents reported perceived financial stress and anxiety, regardless of their economic household situation. This aligns with Masarik and Conger (2017), who also reported that financial burdens negatively impact parents' mental health and increase susceptibility to stress. Nevertheless, it must be considered that the findings are based on the personal perceptions of single parents, some of whom are financially privileged. In this context, it must be considered that one's own perception and the associated narrative of one's own situation can influence feelings of stress and exhaustion, as those experiencing stress-related fatigue often describe their circumstances more negatively (Kowalska et al., 2021).

In addition, as advocated by Taylor and Conger (2017), we also capture the concerns and needs of single parents with middle- or higher-income. In this regard we found that higher-income single parents also face financial burdens.

Further, our results are consistent with findings from other studies, emphasising the relevance of stressors beyond financial burden (Algarvio et al., 2018; Taylor & Conger, 2017). Time constraints were another major stressor in the HLE of single parents, as they struggled to balance various demands of family life, often leading to feelings of frustration over missed opportunities for diverse learning-stimulating activities. Like previous research, we suggest that inequalities in HLE are caused by poverty and further stressors that ultimately negatively affect parent-child interactions in frequency or variety (Gershoff et al., 2007; McLanahan & Percheski, 2008). Moreover, in line with Gessulat (2022) and Reim and colleagues (2025), emotional constraints, such as conflicts with the other parent or a lack of PSE, proved to be significant risk factors and further exacerbated the pressure of single parenting. This finally emphasises how the accumulation of demands and pressure leads to parental stress, especially in single-parent families.

Furthermore, our results indicate how single parents benefit from diverse protective factors, often relying on parental resources, supportive co-parenting and social support networks. High PSE and problem-oriented active coping emerged as protective factors in managing parental stress. This corroborates earlier research, as indicated by Kluczniok and colleagues (2013), which stresses the relevance of parental beliefs. Previous findings also highlighted the importance of parental adaptation abilities and that effective coping is crucial for dealing with parental stress and promoting young children's development, regardless of income and ethnicity (Oppermann et al., 2021). Taylor and Conger (2017) also point out that prenatal resources are changeable and therefore represent a potential approach for family support programmes.

As parental adaptation abilities are not considered in the HLE model (Kluczniok et al., 2013), we therefore advocate integrating previously unconsidered aspects of parental resources into future modelling approaches, especially in the case of the HLE of single-parent families. Additionally, supportive co-parenting was found to be another protective factor. In line with recent research by Nunes and colleagues (2021), the narratives highlighted that positive aspects of co-parenting (e.g., support and cooperation) were associated with lower parental stress. This may be an important approach for family support measures aimed at strengthening the HLE of families with young children.

In line with other studies, many single parents valued social support in various ways from friends, family, or other single parents (Oppermann et al., 2021). These findings confirm evidence of the underlying mechanism of social support in successful stress management (Masarik & Conger, 2017; Oppermann et al., 2021). Since empirical evidence indicates that social support protects single parents from stress (Jackson & Kiehl, 2017), interventions aimed at strengthening the HLE of these families should always focus on strengthening family-related social networks. Structural support, such as childcare services and flexible work arrangements, is also crucial. This aligns with previous research emphasising social support as a vital protective factor for families (Oppermann et al., 2021), linking it to positive parenting (Taylor & Conger, 2017). Perceived social support, as seen in our data, is associated with positive adaptation to stress in single-parent families, regardless of income and ethnicity, highlighting its significance for those with higher SES and a migration history. In summary, the results underscore the importance of addressing both social and structural support in fostering positive parenting practices and strengthening the HLE in single-parent families.

6.2. Mutual complementarity and enrichment of quantitative and qualitative results

Through this study, we provide evidence for research on parental stress and HLE by applying a rare mixed-methods approach to examine stressors, risk and protective factors, and their influence on the HLE in single-parent families while integrating families' lived experiences with existing evidence. Quantitative analyses of a representative sample showed that the perceived economic household situation was associated with parenting practices in single-parent families, although the small explained variance suggests additional determinants. Qualitative findings revealed a multifaceted pattern of stressors—including financial burden, time constraints, and separation-related conflicts—and showed that time pressure particularly limited opportunities to provide a stimulating HLE. They also highlighted protective resources, including PSE, problem-oriented coping, positive appraisal, and social and structural support networks, which enabled many single parents to foster a stimulating HLE despite financial burden. Together, the quantitative findings identified broad patterns, whereas the qualitative data explained how these patterns shaped everyday parenting and children's learning opportunities. Overall, combining qualitative and quantitative data provided both contextual depth and generalisable evidence.

6.3. Limitation

The cross-sectional nature of the NEPS data restricts the analysis to a single time point, precluding conclusions about the stability of the HLE over time. Second, we assessed only the frequency, but not the quality, of learning-stimulating activities, while relying on self-reports that may be affected by social desirability bias. Furthermore, the NEPS data do not capture the influence of non-resident parents in single-parent households. The sample is also likely biased towards families with higher SES, as higher-educated parents are more likely to participate in longitudinal studies, resulting in an underrepresentation of lower-SES families (German Federal Statistical Office, 2024; Wilke et al., 2014). In addition, ambiguities in the reported household composition make it difficult to determine whether some single parents cohabit with another adult. Finally, the quantitative data were collected in 2012, whereas the qualitative data were collected in 2024; therefore, the findings should be interpreted within their respective temporal contexts. These limitations should be considered when interpreting and generalising the findings.

7. Conclusions and implications

We examined the stressors, risks, and protective factors shaping the HLE of single parents with young children in Germany. Our findings show that considering these factors improves understanding of the challenges single parents face and their implications for child development. Although Germany provides a highly supportive social context, single parenting remains associated with significant challenges affecting the HLE, highlighting the need for research across different national contexts. Future studies should also consider the diversity within single-parent families, as stressors, resources, and support systems vary considerably. At the same time, our findings underscore the strengths and resilience of single parents, providing a basis for promoting positive parenting practices and strengthening the HLE.

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Appendix C

Prokupek, L., Hummel, T., Blaurock, S., Cohen, F. & Anders, Y. (2025). Potential of a digital parenting app to support parents of toddlers: Relations between the intensity of app use, language-related parental self-efficacy and the home literacy environment. *British Educational Research Journal*, 00, 1–24.
<https://doi.org/10.1002/berj.70022>

Potential of a digital parenting app to support parents of toddlers: Relations between the intensity of app use, language-related parental self-efficacy and the home literacy environment

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Funding information

This research was funded by the CARINA Foundation (www.carina-stiftung.de/chancenreich).

Abstract

The home literacy environment (HLE) has a considerable influence on children's language development. How parents perceive their own parenting abilities (e.g., how well they encourage their children's language development) is particularly important when it comes to guiding their children appropriately through different stages of development. This self-perception, referred to as parental self-efficacy (PSE), is an important aspect of the home learning environment that has been shown to be a significant predictor of beneficial parenting practices and ultimately successful child development. However, families exhibit differences in how they encourage their children's language development and need support to feel confident in their parenting abilities. Furthermore, the family environment is becoming increasingly digitalised. Thus, there is great potential for the HLE to be enhanced via digital family support. The present study empirically tests relations between the intensity of use of a family support app, language-related PSE and HLE based on data from 184 German families with toddlers. Results of mediation analyses showed that the intensity of app use was positively related to increases in

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language-related PSE, which again was positively associated with an increased frequency of language-stimulating activities in the HLE. There was no direct association between the intensity of app use and language-stimulating activities. The findings illustrate that parenting apps offer a promising approach to strengthening PSE. The results also reflect more broadly the relevance of language-related PSE for the HLE of families with toddlers.

KEYWORDS

digital family support, home literacy environment, parental self-efficacy, parenting app

Key insights**What is the main issue that the paper addresses?**

The main issue of the paper is the potential of a digital parenting app to increase parental self-efficacy and improve the home literacy environment in families with young children by increasing parental engagement in language development activities.

What are the main insights that the paper provides?

The paper reveals that the intensity of app use is positively related to an increase in language-related parental self-efficacy, which in turn increases the frequency of language-stimulating activities in the home literacy environment, emphasising the importance of digital support tools (e.g., parenting apps) for parenting abilities.

INTRODUCTION

In the context of early childhood development, the family constitutes the primary and most influential learning environment. In terms of language stimulation, activities or interactions in the home learning environment are of crucial relevance for children's language development (Bronfenbrenner & Morris, 2006; Niklas & Schneider, 2017). Furthermore, national and international studies highlight the importance of the home learning environment for early childhood education (Kluczniok et al., 2013; Melhuish et al., 2008; Sammons et al., 2008). A prominent model for gaining insights into early childhood education in the family is the structure–process model of the home learning environment (Kluczniok et al., 2013; Melhuish et al., 2008). This model differentiates between three dimensions: structural characteristics (e.g., household income, parental education level), parental beliefs like parental self-efficacy (PSE) and processes. Processes here are defined as parent–child activities or interactions which have a direct impact on children's formal and informal learning outcomes (e.g., their language and literacy skills) (Kluczniok et al., 2013).

Toddlers who have not yet experienced institutional education outside the family are highly dependent on a stimulating home learning environment. Considering this, the World Health Organisation (WHO) emphasises the relevance of parental engagement for early learning in the first 3 years of life (the first 1000 days) and sees this period as crucial for effective interventions (WHO, 2020). At the same time, research findings indicate that there are considerable differences in the ways families encourage children's language and literacy skills (Lehrl et al., 2020; Morgan, 2005; Wirth et al., 2023) and that these are already evident in early childhood (Ginsborg, 2006; Hirsh-Pasek et al., 2015). One approach to counteract this inequality could be to implement family support services that promote children's language development as early as possible (Niklas et al., 2024), and thus increase the quantity and quality of children's early literacy experiences in the home learning environment (Ebert et al., 2012; Linberg et al., 2020; Melhuish et al., 2008; Son & Morrison, 2010).

However, many family support programmes fall short of their potential in terms of fostering an effective home learning environment through parent–child activities that stimulate learning (Anders et al., 2019); consequently, a further valuable approach would be to implement programmes to enhance PSE, which has been shown to be an important predictor of successful child development (for an overview, see Gessulat, 2021; Wittkowski et al., 2016). Furthermore, as digital media only continue to grow in relevance, programmes aimed at supporting the family environment can use this development as an opportunity to make existing services more flexible. In addition, via digital forms of family support, information can be made available more quickly and new knowledge can be obtained faster (Biber et al., 2019). At the same time, studies demonstrate that supporting parents with notifications on digital devices is a promising approach for family support programmes: on the one hand, they help parents provide early language stimulation and, on the other hand, they strengthen the perception of PSE (Jelley & Sylva, 2018; Jelley et al., 2016; York et al., 2019).

The Carina Foundation, a German charitable organisation, has begun to address the promising potential of digital family support by developing a parenting app for their family support programme *Chancenreich* (www.carina-stiftung.de/chancenreich). In Germany, empirical evidence regarding family support programmes is still limited, and especially so for programmes that use digital approaches to support families (Cohen et al., 2020; Prokupek & Cohen, 2020). Furthermore, studies often do not examine long-term relations between programmes and their results (Van der Stede, 2014). Therefore, the present study tested, in families with toddlers, the longitudinal relations between the intensity of parents' use of the *Chancenreich* app, language-related PSE and language-stimulating activities in the home literacy environment (HLE).

THEORY AND RESEARCH STATUS

The home learning environment as a place of early language development

In early childhood research, various conceptualisations of the home learning environment exist. The model of the home learning environment (Kluczniok et al., 2013; Melhuish et al., 2008) on which this paper is based is a multidimensional concept that defines three different dimensions and their relationship to each other: structural characteristics, parental beliefs and processes.

Structural characteristics describe stable, enduring aspects of a family (e.g., household income or parental education level). The second dimension comprises parental beliefs (e.g., self-reported perceptions of PSE). It is assumed that parental beliefs develop over the course of a lifetime, are mediated by enculturation processes and are stable in the medium term

(Melhuish et al., 2008). Therefore, they are subject only to slow changes. A central assumption in this model is that both a family's structural characteristics and the parents' beliefs are directly related to the third dimension—the processes within a family. Processes, which in turn directly influence the child's development (Melhuish et al., 2008), include not only global processes in a family, like warmth and parental responsiveness (Foster et al., 2005; Lehl et al., 2020), but also domain-specific processes (e.g., home literacy activities, like the frequency of reading aloud, which are considered key characteristics for successful language development in childhood) (de Bondt et al., 2020; Niklas & Schneider, 2013).

Early cognitive skills are among the most crucial determinants of children's successful participation in education, and the first years of life are particularly important in their development. Studies, including longitudinal analyses, show that cognitive skills correlate strongly with literacy skills and can be influenced by various factors such as a family's household income. The targeted promotion of these skills can be encouraged in the family, for example by focusing the child's attention on a specific task or by offering learning-stimulating activities (for an overview, see Birtwistle et al., 2025).

In the literature, learning-stimulating activities are often categorised according to their actual subject matter (Niklas & Schneider, 2013; Sénéchal & Young, 2008)—a valid approach, as the development of different competence areas in early childhood is domain-specific (Wellman & Gelman, 1998). Accordingly, a differentiated model of the home learning environment, one that includes a home literacy model referring specifically to early literacy acquisition, is widely accepted in domain-specific early childhood research (Raikes et al., 2006; Sénéchal et al., 1998). This distinction is also used in German-language studies on the home learning environment (e.g., Lehl et al., 2013; Niklas & Schneider, 2013).

The theoretical framework of the home literacy model, proposed by Sénéchal et al. (1998), is an empirically tested model that explains the relations between certain children's development and learning-stimulating activities in the family environment. In categorising the processes within the family, the model distinguishes between formal and informal literacy activities at home. Formal activities involve activities with printed material (e.g., learning letter sounds), while informal activities (e.g., reading aloud) focus on the content of the material rather than on the printed word itself. Accordingly, a central assumption of the home literacy model is that experiences of informal activities, especially with books and shared reading in the first years of life, play a crucial role in furthering children's language skills and vocabulary, again underlining the importance of language-stimulation activities in the first years of life for subsequent language development (Niklas et al., 2024).

There are also a number of theoretical assumptions about the relationships between processes and child development, with studies showing that informal literacy experiences—such as reading aloud, singing songs or reciting rhymes—can be of particular importance for language development at a very early stage (Baker, 2013; de Bondt et al., 2020; Niklas et al., 2016). The positive effects of reading aloud on children's language and reading skills have been established by numerous studies (Raikes et al., 2006; Sénéchal & Young, 2008; Sénéchal et al., 1996; Van Steensel et al., 2011).

Research also shows that it is not only the frequency of reading aloud that is relevant, but also the age at which it first occurs: looking at picture books together with children under the age of three is positively related to their language and reading skills (Attig & Weinert, 2020; Karrass & Braungart-Rieker, 2005; Niklas et al., 2016; Rodriguez & Tamis-LeMonda, 2011), with both the active linguistic input of parents and their responsiveness to their children's vocalisations playing a particularly influential role (Goldstein & Schwade, 2008; Tamis-LeMonda et al., 2014). As Niklas et al. (2016) show, many parents start reading to their children when they reach the age of about 6 months, making it a reasonable and potentially fruitful undertaking to investigate the early HLE of toddlers in depth. Rodriguez and Tamis-LeMonda (2011), for example, examined children's home

learning environments in a low-income sample of 1852 children and families when children were 15, 25, 37 and 63 months; they found that children who grew up in a stimulating learning environment in their first year of life had a significantly richer vocabulary than children who received less language-related stimulation or started later. These findings indicate that learning-stimulating activities have a direct influence on children's language development.

The theoretical assumptions about the relationships between the three dimensions of the home learning environment in early childhood often focus on the influence of structural characteristics on family processes. For instance, the number of adults or siblings living in the household (family setting) serves to explain disparities regarding the resources, such as parental attention or patience, available to each child (Öberg, 2017). Furthermore, educational disadvantage can partly be attributed to insufficiently stimulating learning at home (e.g., language-stimulating activities rarely take place) (Melhuish et al., 2008; Silinskas et al., 2020). Still, research repeatedly shows that structural characteristics have an influence on processes, but they do not fully explain their variance (Bornstein & Bradley, 2008; Sylva et al., 2004): what is important is how committed parents are to their child-rearing tasks and how intensively they engage with their children (Sylva et al., 2004). However, more recent empowerment approaches also focus on parental abilities and PSE. In this regard, growing importance is ascribed to family support programmes that improve the quality of the overall home learning environment by furthering parental abilities, thus also positively influencing children's (language) development (Kuger et al., 2012).

PSE as a significant predictor of language-stimulating activities

Transferring Bandura's theory of self-efficacy to parenting, the concept of PSE refers to parents' beliefs regarding the adequacy of their own parenting abilities. It encompasses parents' self-perception of their parenting role and their beliefs regarding how to engage in specific parenting tasks (e.g., encouraging a child's language development) (Bandura, 1997). Thus, parents who are characterised by a strong sense of PSE find it easier to guide their children competently through different developmental milestones, while those with lower levels of PSE may find it challenging to handle the complex demands of parenting (Gessulat, 2021).

PSE is integrated into the model of the home learning environment as part of the aspect 'parental beliefs'. Following the central assumption of this model, PSE is directly related to processes within a family. In fact, studies show that PSE is a significant predictor of enriching parenting, learning-stimulating activities and ultimately successful child development (Gessulat, 2021; Jones & Prinz, 2005; Peacock-Chambers et al., 2017; Vukovic et al., 2013). Furthermore, Bojczyk et al. (2018) were able to demonstrate that PSE is domain-specific and that language-related PSE must be supported specifically in order to strengthen the HLE. Regarding the relationship between structural characteristics of the home learning environment and PSE, research shows that parents with low income, low educational level or who are of migrant origin have been found to experience low PSE (Ardelt & Eccles, 2001; Peacock-Chambers et al., 2017; Wittkowski et al., 2016). Structural characteristics, such as a family's income and the parents' level of education, are relatively stable characteristics of the home learning environment (Melhuish et al., 2008) and can rarely be changed. Therefore, to improve the quantity and quality of children's early literacy experiences, it is necessary to focus on PSE and to consider how to strengthen it in a domain-specific way.

Family support programmes and emerging digital approaches

Very young children in particular are highly dependent on the stimulating character of the home learning environment. This increases the importance of early interventions that specifically strengthen PSE, to help parents feel competent enough to encourage their children's domain-specific skills (e.g., early language development) (Ereky-Stevens et al., 2019; Kuger et al., 2012). To our knowledge, little research has been conducted into how this can be realised for parents of children in their first year of life.

Family support services can face problems like the lack of accessibility for certain target groups (socially disadvantaged families or families with major language problems) (Anders et al., 2019). Additionally, the content of family support programmes is not always geared towards the actual needs of families (Anders et al., 2019). Lastly, the rigid time structures and 'come and go' nature of traditional family support programmes—with families often having to go to a certain place at a certain time for support—frequently lead to non-participation, so that the transfer of educational content and support into everyday family life is often unsuccessful (Cadima et al., 2017). For these reasons, and because of the rapid development and spread of digital media, parents are increasingly seeking support for parenting issues digitally. This is driven by the fact that digital media offers parents various ways to further their children's education and offer their support, while at the same time providing quick access to information and a potentially huge increase in knowledge (Biber et al., 2019). In this way, the continuing digitalisation of everyday life also extends to the home learning environment (Chaudron, 2015; Cieciura et al., 2019). Moreover, today's parents are naturally familiar with digital media and enjoy engaging with them (e.g., by using it to cope with boredom or stress) (Plowman et al., 2010; Radesky et al., 2015). Digital media have, in sum, become a constant companion, fully integrated into everyday routines and permanently available (Brito et al., 2017).

This development also offers new opportunities for family support programmes, particularly with regard to app-based support. The unique added value of digital media lies in the broad wealth of experience and knowledge that can be accessed flexibly in terms of both time and place, and thus at a low threshold. In addition, digital programmes and products can be used to address specific, potentially hard-to-reach, target groups (Breitenstein et al., 2014). Digital media, such as parenting apps, can therefore be used as an innovative approach to family support programmes, and there is evidence that family support programmes are increasingly making use of this (Prokupek & Cohen, 2020).

Some studies that have investigated the potential of digital media in helping parents promote a stimulating home learning environment have already shown that parenting apps represent a promising approach for providing early language stimulation. York et al. (2019) were able to confirm that notifications on smartphones, laptops or tablets are particularly effective. As part of their study, a text message intervention was conducted for parents of preschool children in a control group design. The notifications addressed a range of topics, comprising knowledge transfer, motivation and reinforcement of parenting, activity suggestions or recognition of progress. Results show that the intervention improved the engagement of parents from the intervention group, and in doing so positively influenced their children's early literacy skills (e.g., awareness of first sounds, vocabulary and rhymes, building quality parent–child book interaction).

It was also found that parenting apps can have an impact not only on parent–child activities, but also on PSE in the specific context of children's literacy development. The parenting app *EasyPeasy* (www.easypeasyapp.com) promotes educationally stimulating parent–child interactions by suggesting joint activities. Parents receive regular reminders via the app that include brief notifications regarding their children's development and appropriate ideas for educationally stimulating activities in different developmental areas (e.g., language and

number skills). Studies reveal a significant positive influence of usage of the app on PSE in terms of a parental sense of control (Jelley & Sylva, 2018; Jelley et al., 2016). As PSE is a broad concept that can include diverse parental tasks and perceptions (Bojczyk et al., 2018), there is a need to examine task-specific measures of PSE more generally, and—following on from the findings on parenting apps like *EasyPeasy*—to investigate the relationship between PSE and usage of parenting apps in a domain-specific context.

In summary, studies indicate that supporting parents through notifications on digital devices is a promising approach for family support programmes. Moreover, findings highlight the realistic potential of parenting apps for both PSE and HLE. However, the relationship between the three components intensity of app use, PSE and language-stimulating activities has not yet been analysed in detail. In addition, the findings presented relate to children aged two to six. Their significance for families with considerably younger children is still unclear. Particularly with regard to parents with toddlers, it is important to take into account that the daily demands of family life can make it quite challenging for families to persevere with support programmes and not drop out prematurely. For the design of need- and reality-based family support, it is therefore also important to determine the minimum intensity of an intervention (threshold value) that must be provided in order for programmes to achieve their goals.

The family support programme *Chancenreich*

The Carina Foundation, a German charitable organisation (www.carina-stiftung.de/chancenreich), in cooperation with the German city of Herford (North Rhine-Westphalia), created the family support programme *Chancenreich* in 2009. The programme specifically addresses the parents of newborns and supports them until their child is 3 years old. It is one of the few family support programmes in Germany that has been extensively and scientifically evaluated for its impact and has been proven to positively influence learning-stimulating activities and PSE in the home learning environment (Anders et al., 2015, 2017, 2023). As part of the *Chancenreich* programme, participating families receive personalised support in caring for their child. In addition to counselling from family visitors, the programme provides parenting courses, a parent handbook and networking opportunities.

As part of the emerging digitalisation of family support and to expand *Chancenreich*, a smartphone app for parents of newborns was developed. It contains organisational elements (e.g., appointment reminders) and an educational component, with the latter aspect of direct relevance for the home learning environment. The educational component was designed to improve children's early literacy experiences in the first years of life by encouraging both parents' own beliefs (like their language-related PSE) and more concretely the type, frequency and quality of the language-stimulating activities they engage in with their children. In light of the strong focus on early language development, the app content was primarily addressed to parents with children at a particularly language-sensitive age (from birth to 24 months).

All parents who participate in the programme can download the app on their own digital devices and log into it. The app contains weekly topics (for an overview, including summaries of the specific message content, see Table A1 in Appendix A) and sends three push messages per week to parents' smartphones or tablets. When parents click on the message, they are taken to a personal dashboard that presents them with an overview of the current weekly topic, weekly tasks that they have already completed and those that can still be done. These tasks encourage parents to engage in specific language-stimulating activities with their child or contain further information regarding language development, stressful experiences or strengthening one's own role as a parent. Parents will then receive a series of push messages throughout the week, with new weekly topics published regularly, and three

corresponding tasks encouraging parents to improve the early literacy experiences of their child.

Based on the study by Doss et al. (2018), different message types were developed as a basic framework for the *Chancenreich* app. Message type 1, referred to as 'FACTS and TIPS', is sent out at the start of every week and provides families with information and tips on everyday language-stimulating activities to promote children's language development. These activities are designed to be effortlessly integrated into parents' daily routines, with a focus on using materials already available in their home. Towards the middle of the week, parents receive a type 2 message—'GROWTH'—that contains suggestions for developing their own language-promoting abilities and strengthening their language-related PSE. Finally, the week concludes with a 'SPECIAL' message (type 3), which expands upon information and practical tips in the 'FACTS and TIPS' message. An input field under each app task also gives parents the opportunity to reflect on their experiences after completing it. Since multisensory experiences can help infants and toddlers acquire new words (Lewkowicz et al., 2015; Yu & Smith, 2012), some of the tasks include activities in which parents encourage their children to associate things they see, feel, hear or taste with new words. The trial lasts 10 weeks in total, in which time parents could complete up to 30 tasks within the app. To maintain motivation to continue using the app, parents can collect pictorial 'language development rewards' in the app for completing tasks. In addition, this allows them to track their progress within the app.

In summary, research has shown that the promotion of PSE can be an important predictor of successful child development, and especially so in the context of early cognitive and language skills (Gessulat, 2021; Wittkowski et al., 2016); equally, the influence of app-based programmes on PSE and learning activities in the HLE has also already been shown to be effective (Jelley & Sylva, 2018; Jelley et al., 2016; York et al., 2019). This paper therefore deals with the potential of parenting apps for both language-related PSE and HLE, using the example of *Chancenreich*. In particular, the focus is on relations between the following three components: intensity of app use, language-related PSE and language-stimulating activities, as well as on their importance for families with toddlers. The investigation of the potential of the *Chancenreich* app for the HLE, especially regarding changes in language-related PSE, represents an important contribution to the differentiation of further research results on digital support for parents. Based on the existing research discussed here, we assume that intensive app use will lead to increased PSE (i.e., that parents will feel more effective in engaging with their child's language development). Such a change in perceived or actual parenting abilities could be particularly relevant for those parents who tend to have low language-related PSE.

Research questions

This study examines relations between the intensity of app use, language-related PSE and HLE of families with toddlers. The research questions (RQs) and hypotheses are as follows:

RQ1 What is the relation between the intensity of use of the *Chancenreich* app and changes in language-related PSE?

We expect the number of completed app tasks in the *Chancenreich* app to be positively related to increases in language-related PSE (*H1a*). Furthermore, we assume that a minimum number of app tasks (i.e., a certain threshold value) must be completed for there to be positive relations with increases in language-related PSE (*H1b*).

RQ2 How are changes in language-related PSE related to changes in the frequency of language-stimulating activities in the HLE?

Based on the empirical research literature, it can be assumed that an increase in language-related PSE is associated with increases in the frequency of language-stimulating activities in the HLE (H2).

RQ3 Are there direct and/or indirect relations between the intensity of use of the *Chancenreich* app and changes in the frequency of language-stimulating activities in the HLE, mediated by changes in language-related PSE?

Based on H1a and H2, we hypothesise that the intensity of use of the *Chancenreich* app is related to increases in the frequency of language-stimulating activities in the HLE, mediated by increases in language-related PSE (H3).

METHOD

Study design

Data come from the DIGIFam study, which examined the different digital approaches of the *Chancenreich* family support programme (Anders et al., 2023). Our analyses are based solely on those surveys that deal with the use of the *Chancenreich* app. The study was conceived as a quasi-experimental comparison group design, conducted longitudinally over three data collection time points. The first online survey (t_1) took place directly before the start of the app intervention to collect information on families' initial situations. After the intervention, all parents answered the second online survey (t_2) to record the direct effectiveness of their usage of the app. After about 3 months, the third online survey (t_3) was administered to all parents to track the longer-term effectiveness of app usage. The following analyses of language-related PSE and language-stimulating activities refer to the results at t_1 and t_2 , and the change between these two measurement points. In addition to the survey, data were collected on app usage behaviour, which permitted the number of tasks completed in the app to be determined. The research project was reviewed and approved by an ethics committee in accordance with local legislation and institutional requirements.

Sample

Between September 2021 and September 2022, parents were recruited through the family support programme *Chancenreich*, at day care centres and family centres, and via social media. In addition, flyers were distributed in public places, resulting in a convenience sample. To enable comparability between the groups and to avoid confounding, and thus distortion of the results, diverse background characteristics of the families (e.g., their child's age, the family's language, the household income) were gathered in the online surveys and taken into account in the analyses. The 220 participating families consisted of an intervention group (app users) and a comparison group. Parents in the intervention group had access to the *Chancenreich* app and received information on their child's language development. Additionally, 69 parents of the intervention group participated in an online parenting course on early language development. Please note that differences between these parents and parents from the app-only group are not the focus of this paper. Parents in the comparison group did not use the app or receive any other language-related family support from *Chancenreich*. We

excluded all cases without children in the household ($n=5$), children who were in quarantine due to the COVID-19 pandemic at t_1 ($n=15$) and households without toddlers ($n=16$).

To answer the research questions, our main sample thus comprises 184 families with children aged 3–24 months ($M=12.5$, $SD=3.5$). Of these, 131 parents belong to the intervention group and 53 to the comparison group. An overlap of the groups was statistically excluded. Some 95% of participating parents were mothers. The average age of parents was 34 years ($SD=4.2$, age range 24–49 years). The majority of parents showed a somewhat higher level of education than the general German population (German Federal Statistical Office, 2024): 75% had a high school diploma (general population: 34%) and 62% a university degree (general population: 19%). This sample information indicates a highly privileged, homogeneous group of parents, which is why the consideration of parental education has little added value for subsequent analyses.

Measures

Language-stimulating activities

Using an eight-point response scale (from 1 = never to 8 = several times a day), we asked parents about the frequency of language-stimulating activities (e.g., reading or looking at picture books together) that they or another family member engaged in with the target child. In the longitudinal questionnaire, we asked parents to refer solely to the child with whom they participated in the *Chancenreich* app programme. This scale consists of nine items (t_1 : $\alpha=0.80$, $\Omega=0.81$; t_2 : $\alpha=0.75$, $\Omega=0.75$). Using the scales of frequency of language-stimulating activities (partly adapted from Caldwell & Bradley, 1984) at t_1 and t_2 , we created a change variable for the frequency of language-stimulating activities. In our analyses, we will consider this change variable as a dependent variable.

Language-related PSE

Because self-efficacy is goal-directed (Bong & Skaalvik, 2003), we constructed a scale for language-related PSE, inspired by Coleman and Karraker (2003). This scale contains five items directing parents to rate their level of confidence in their ability to provide early language support (t_1 : $\alpha=0.84$, $\Omega=0.84$; t_2 : $\alpha=0.90$, $\Omega=0.90$). Using a five-point response scale (from 1 = strongly disagree to 5 = strongly agree), parents agreed or disagreed with statements such as 'I am confident that I can support my child's language development in an age-appropriate manner'. Using the language-related PSE scale at t_1 and t_2 , we created a change variable for language-related PSE.

Intensity of use of the *Chancenreich* app

We measure the intensity of use of the *Chancenreich* app with the number of completed app tasks offered during the 10-week intervention as a predictor (0–30 tasks). Week 2, for example, focused on the topic 'picture books'. Here, parents received suggestions and information revolving around the fact that even in their first year of life, children are sensitive to learning language, emphasising that parents have a great influence on how their children learn to speak. Consequently, the app suggests that—for instance—parents look at books together with their toddlers; in this way, babies can learn new words through play (Table A1). For the comparison group we set the missing values of the app tasks to zero.

This allows us not only to differentiate between the intervention group and the comparison group, but also to differentiate more clearly between the intensity of app use and non-use.

Control variables

As control variables, we included the age of the target child (in months) at t_1 , the family language (1=not predominantly German, 0=predominantly German), socioeconomic status (SES) measured by the family's net equivalent income and the number of children (0–17 years) and adults (18 years and older) living in the household.

Statistical analyses

We computed descriptive analyses and determined interrelations between the intensity of use of the *Chancenreich* app, changes in language-related PSE and changes in frequency of language-stimulating activities with linear regression and mediation analysis in Mplus (Version 8.3; Muthén & Muthén, 1998–2012). Corresponding correlations are included in the online supporting information (Table S1). The mediation model was tested by analysing confidence intervals of the multiple regression to determine the significance of the total, direct and indirect effect. We used bias-corrected bootstrapping with 2000 iterations (MacKinnon et al., 2004) to estimate confidence intervals and inferential statistics. Effects were considered significant if the confidence interval did not include zero. In order to determine the minimum number of app tasks that parents must have completed for there to be positive effects on language-related PSE, a threshold value analysis was carried out in Ggplot/R.

To verify whether data for the relevant variables were systematically missing, we conducted a missing data analysis. We used Little's (1988) test for completely missing values at random (MCAR). The pattern of missing values is included in the online supporting information (Tables S2 and S3). Results of the MCAR test showed that data were not missing at random (MNAR) in the continuous variables relevant to us (6% net equivalent family income in euros [SES], 22% frequency of language-stimulating activities at t_2 and 23% change of language-related PSE: $\chi^2=90.69$, $df=42$, $p=0.000$). Results like these often occur when surveying income. Additionally, the dropout of some parents from the study between t_1 and t_2 ($n=40$) may explain the missing data regarding the frequency of language-stimulating activities at t_2 and changes in language-related PSE. To understand the impact of dropouts on the data and the overall results of the study, we also performed a selection analysis in Mplus. This demonstrated that parents who completed fewer app tasks were more likely to drop out before the second measurement point ($OR=0.9$, $p=0.000$). Also, families who spoke a language other than German appeared to be 4.3 times more likely to drop out at t_2 ($p=0.008$). However, Shin et al. (2009) argue that even under MNAR, the full information maximum likelihood (FIML) approach yields the least biased parameter estimates and the lowest parameter estimation error. Following this, FIML estimation was used in all our following analyses.

RESULTS

Descriptive results

The descriptive results (Table 1) showed that already at t_1 , pronounced ceiling effects were evident in the scales for language-related PSE and language-stimulating activities. A large proportion of participating parents achieved very high or near-maximum scores: before

TABLE 1 Descriptive results.

	App users (N=131)					Comparison group (N=53)				
	Min	Max	M	SD	%	Min	Max	M	SD	%
Age of the child (in months)	3	24	12	3.23	—	4	21	13	3.98	—
Family language										
Predominantly German					86					89
Not predominantly German					14					11
Family's net equivalent income in euros (SES)	446	4063	1998	703	—	385	3182	1958	642	—
Number of people in the household										
Total	2	12	4	1.17	—	2	5	3	0.64	—
Number of adults (18 years and older)	1	8	2	0.61	—	1	2	2	0.24	—
Number of children (0–17 years)	1	5	2	0.89	—	1	3	1	0.56	—
Language-related PSE (1 = strongly disagree; 5 = strongly agree)										
t ₁	2.00	5.00	4.00	0.62	—	3.40	5.00	4.24	0.56	—
t ₂	3.00	5.00	4.29	0.56	—	2.20	5.00	3.90	0.65	—
Change in language-related PSE (from t ₁ to t ₂)	–2.00	2.20	0.26	0.71	—	–2.20	0.60	–0.34	0.53	—
Frequency of language-stimulating activities (1 = never; 8 = several times a day)										
t ₁	2.60	7.80	6.01	1.14	—	3.80	7.70	6.65	0.81	—
t ₂	3.80	8.00	6.60	0.56	—	3.60	8.00	6.94	0.78	—
Change in frequency of language-stimulating activities (from t ₁ to t ₂)	–1.56	4.11	0.63	0.93	—	–1.37	1.78	0.28	0.65	—

Note: According to the Shapiro–Wilk test, variables are mostly not normally distributed.

using the *Chancenreich* app, app users engaged in language-stimulating activities several times a week on average, while parents in the comparison group did so almost daily. At *t*₁, all parents perceived themselves as highly self-efficacious in terms of their confidence in their ability to provide early language support.

After 10 weeks, app users had completed an average of 21 out of 30 tasks in the app (70% of all tasks). Furthermore, the frequency of language-stimulating activities increased on average in both groups. However, this change was more pronounced in the app user group. At *t*₂, app-using parents perceived themselves as even more self-efficacious than before. The language-related PSE of parents in the comparison group decreased slightly over time.

Relations between the intensity of app use, language-related PSE and HLE

RQ1: What is the relation between the intensity of use of the *Chancenreich* app and changes in language-related PSE?

Consistent with H1a, regression analyses revealed positive relations between the intensity of app use and increases in language-related PSE ($\beta=0.36$, $SE=0.08$, $p=0.000$, $d=0.90$)

(Table 2). This means that the more app tasks parents completed, the more their language-related PSE increased; parents felt more self-efficacious regarding early language support. For the control variables, the families' net equivalent income ($\beta = -0.18$, $SE = 0.09$, $p = 0.044$, $d = -0.37$), as well as the number of children living in the household ($\beta = -0.25$, $SE = 0.08$, $p = 0.001$, $d = -0.52$), were negatively related to changes in language-related PSE. Thus, these families showed fewer increases in language-related PSE. However, the family language showed a (slight) positive statistically relevant relationship to changes in language-related PSE ($\beta = 0.15$, $SE = 0.08$, $p = 0.039$, $d = 0.41$). This means that families whose family language was not predominantly German evinced stronger increases in language-related PSE. This regression explained 21% of variance.

In addition, we performed a threshold analysis in Ggplot/R using locally estimated scatterplot smoothing (LOESS). We visually determined the relation between the number of completed app tasks and changes in language-related PSE. The results (Figure 1) showed that even a small number (10–12) of completed app tasks positively influenced changes in language-related PSE. Above this threshold, language-related PSE largely stabilised and a plateau effect with minimal variations can be observed. If respondents had completed between 15 and 25 app tasks, there were also changes in language-related PSE. However, these were too vague to allow any further conclusions to be formulated. Overall, the shape of the LOESS curve indicated an exponential positive relation between the number of app tasks completed and increases in language-related PSE visible when 10–12 tasks are completed, thus confirming H1b.

RQ2: How are changes in language-related PSE related to changes in the frequency of language-stimulating activities in the HLE?

Further analyses indicated that changes in language-related PSE were, in turn, significantly positively related to changes in the frequency of language-stimulating activities in the HLE. It can therefore be seen that an increase in language-related PSE is associated with an increase in the frequency of language-stimulating activities. This relation remained stable even when controlling for the app tasks completed ($\beta = 0.30$, $SE = 0.08$, $p = 0.000$, $d = 0.75$) (Table 3). H2 could thus be confirmed. The analyses also showed that the number of children living in the household ($\beta = 0.20$, $SE = 0.10$, $p = 0.050$, $d = 0.52$) was positively related to changes in frequency of language-stimulating activities. This regression explained 14% of variance.

TABLE 2 Relations between intensity of app use and changes in language-related PSE.

	β	SE
Control variables		
Age of the child (in months)	0.01	0.09
Family language (0=predom. German, 1=not predom. German)	0.15*	0.08
Family's net equiv. income in euros (SES)	-0.18*	0.09
Number of children (0–17 years)	-0.25***	0.08
Number of adults (18 years and older)	0.07	0.04
Predictor		
Number of completed app tasks	0.36***	0.08
R ²	0.21***	

Note: Displayed are standardised regression coefficients, standard errors and the explained variance. N = 184.

* $p < 0.05$. *** $p < 0.001$.

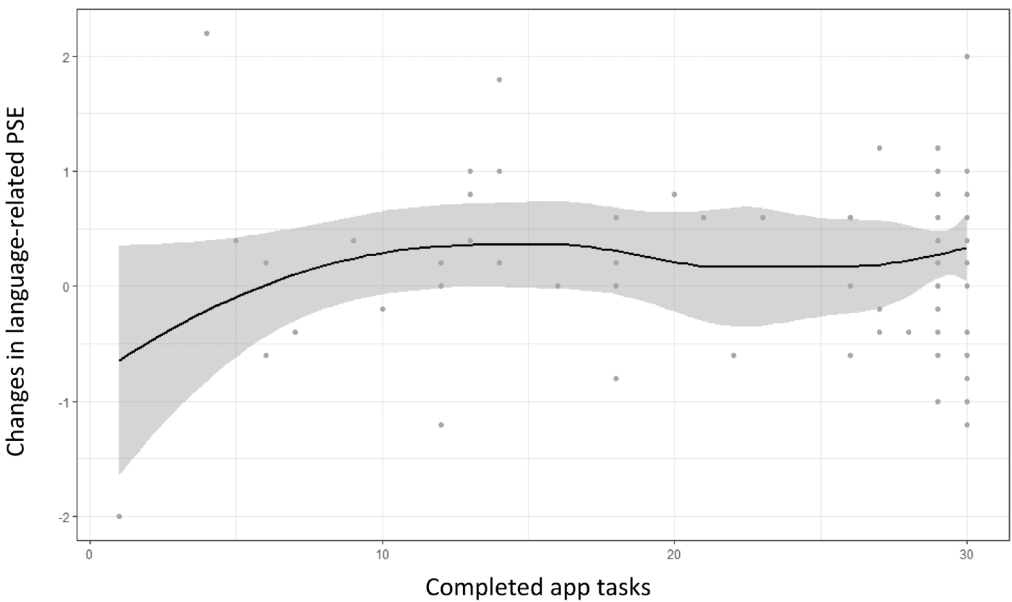


FIGURE 1 LOESS curve showing the relation between completed app tasks and changes in language-related PSE. A total of 41 cases were excluded due to missing values (–999), $N=131$ (only app-using parents).

TABLE 3 Relations between changes in language-related PSE and changes in frequency of language-stimulating activities.

	β	SE
Control variables		
Age of the child (in months)	–0.10	0.08
Family language (0=predom. German, 1=not predom. German)	0.07	0.10
Family's net equiv. income in euros (SES)	–0.08	0.09
Number of children (0–17 years)	0.20*	0.10
Number of adults (18 years and older)	–0.06	0.09
Number of completed app tasks	–0.03	0.08
Predictor		
Changes in language-related PSE	0.30***	0.08
R^2	0.14**	

Note: Displayed are standardised regression coefficients, standard errors and the explained variance. $N=184$.

* $p<0.05$. ** $p<0.01$. *** $p<0.001$.

RQ3: Are there direct and/or indirect relations between the intensity of use of the *Chancenreich* app and changes in the frequency of language-stimulating activities in the HLE, mediated by changes in language-related PSE?

The results of the mediation analysis (Table 4) showed no significant direct effect between the number of completed app tasks and changes in language-stimulating activities ($\beta_{\text{direct}}=0.03$ [95% CI: –0.14, 0.20], $p=0.737$, $d=0.16$). Nevertheless, since the total indirect effect ($\beta_{\text{indirect}}=0.10$ [95% CI: 0.04, 0.17], $p=0.003$, $d=0.30$) was significant, this confirmed an indirect-only mediation. In line with a new mediation approach outlined by Zhao

TABLE 4 Results of the mediation analysis.

Effect	Path	β	SE	95% CI	
				Lower	Upper
Total	Sum app tasks → Change in language-stimulating activities	0.13	0.08	-0.03	0.28
Total/specific indirect	Sum app tasks → Change in language-stimulating activities	0.10**	0.03	0.04	0.17
Direct	Sum app tasks → Change in language-stimulating activities	0.03	0.09	-0.14	0.20

Note: Displayed are standardised regression estimates. Dataset contains cases with missing on all variables except x-variables. These cases were not included in the analysis. Number of cases with missing on all variables except x-variables: 40. Since the model contains only one mediator, the total indirect effect and the specific indirect effect are numerically identical. $N=144$.
** $p<0.01$.

et al. (2010), indirect mediation can be defined as a situation where the mediator construct is responsible for explaining the entirety of the observed relationship between two variables. Our study is an excellent example of this mechanism, as changes in language-related PSE were shown to account for the entire observed relationship between the number of completed app tasks and changes in language-stimulating activities. These findings confirmed that the intensity of app use is related to increases in the frequency of language-stimulating activities in the HLE, mediated by increases in language-related PSE (H3). The effect of the number of completed app tasks on changes in language-stimulating activities was attributable to 77% of the changes in language-related PSE. The diagram of indirect-only mediation is included in the online supporting information (Figure S1).

DISCUSSION

In this study, direct and indirect relations between the intensity of app use, language-related PSE and HLE were analysed, investigating the extent to which digital approaches to family support are able to improve the HLE by increasing the language-related PSE of families with toddlers.

With regard to the first question, as expected, positive relations between the intensity of app use and changes in language-related PSE were found: the more app tasks parents completed, the more their language-related PSE increased. This finding is in line with previous international studies (Jelley & Sylva, 2018; Jelley et al., 2016; York et al., 2019) and confirms the assumed potential of digital parenting apps for strengthening domain-specific PSE. These results also indicate that PSE, particularly in the domain of language development, can be specifically strengthened using digital parenting apps. However, our analyses focused on the overall change in language-related PSE, and as such we need to interpret them more broadly: in the comparison group, descriptive findings showed that this group consists of parents who already assigned themselves high levels of language-related PSE at the beginning of the study. For these parents, we observed that the mean value of language-related PSE decreased between t_1 and t_2 . It cannot be ruled out that participating in the three online surveys led parents to reconsider their self-assessment, potentially because the survey instrument broadened their perceptions of what constitutes effective language activities. From a measurement analysis perspective, this result could also be explained by a 'regression towards the mean': with repeated measurements, the effect is observed that extreme initial measurements tend towards the centre of the distribution.

In addition, our results revealed that the completion of a small number of app tasks had a positive influence on language-related PSE, which increased exponentially. This suggests that language-related PSE increases significantly within the first 4 weeks (0–12 tasks) with each task completed. The subsequent plateau suggests that further exercises primarily serve to consolidate confidence in one's own parenting abilities without further increasing language-related PSE. For future interventions, this could mean that other modes of support are needed to further increase language-related PSE (e.g., through more intensive support by family support programmes combined with feedback on the actual implementation of parenting abilities in everyday life). Furthermore, with 30 tasks, the *Chancenreich* app intervention was quite extensive; the results indicate that even less extensive app interventions can successfully strengthen language-related PSE. This is a particularly valuable finding, because less extensive interventions can presumably reach more parents and are less cost intensive. Additionally, this supports the findings of Biber et al. (2019), who argue that information can be made available more quickly and new knowledge can be gained faster via digital forms of family support. This again emphasises the potential of digital (and in particular app-based) approaches to family support.

The results further show that changes in language-related PSE were significantly positively associated with changes in the frequency of language-stimulating activities in the HLE. The study thus replicated findings of earlier national and international studies (Gessulat, 2021; Peacock-Chambers et al., 2017; Vukovic et al., 2013). It also confirms the theoretical assumptions of the model of the home learning environment (i.e., that PSE is directly linked to family processes and that PSE needs to be addressed in a domain-specific way if the HLE is to be strengthened) (Bojczyk et al., 2018). Furthermore, we can derive from the results that domain-specific PSE can be addressed very effectively even in the first year of a child's life. Finally, these results also show that parental beliefs are specifically linked to what parents do with their children. This is particularly important for gaining knowledge about the processual nature of the HLE, as the existing research suggests that only processes are directly related to child development.

With regard to the third research question, the mediation analyses revealed no direct effect between the intensity of use of the *Chancenreich* app and changes in language-stimulating activities. The construct of the HLE is considered to be very dynamic, even early in a child's life (Burgess, 2011). The absent direct effect between app usage and changes in language-stimulating activities may also conceivably be explained by the fact that language-related PSE and the frequency of language-stimulating activities increase at different rates in very early childhood, so that direct effects may only be measurable at a later stage. More in-depth studies could investigate the extent to which support programmes for parents initially lead to increases in PSE and subsequently to increases in the frequency of language-stimulating activities. In addition, the app did not address all items of the HLE scale equally, and included other constructs in addition to the HLE construct (e.g., parental knowledge, parental stress). Further, the app's tasks were not only related to frequency, but also emphasised qualitative aspects of language-stimulating activities. Therefore, we also need to consider whether the language-stimulating activities assessed in this study would show different results if they had been captured using other methods (e.g., through observations of the quality of the reading or play situations in the families).

Another possible explanation for the unobserved direct effect between the intensity of use of the *Chancenreich* app on changes in frequency of the language-stimulating activities in the HLE of toddlers might be the composition of the group of app users themselves: these parents already engaged actively in language-stimulating activities before participating in the study. Such 'ceiling effects' occur when variable values (in this study, the language-stimulating activities and language-related PSE) are concentrated in the upper scale of the measurement instruments, leading to relatively limited variability. Also, they may indicate a self-selection effect, whereby those parents who perceive themselves more self-efficacious and highly engaged in HLE are more likely to reflect on their abilities and activities, while parents with lower self-efficacy beliefs and low engagement may be less likely to participate in surveys. Therefore, follow-up studies should focus on families in which there are lower levels of language stimulation and self-efficacy beliefs. Unfortunately, in Germany, parents in this target group are generally difficult to reach (Wilke et al., 2014).

Moreover, further research could look at what family interventions need to provide in order to directly strengthen processes in the HLE; it is questionable whether the mere provision of the necessary structures for a sustainable digital parent support programme is sufficient to directly facilitate more or better language-stimulating activities. Further possible approaches may lie in the more comprehensive communication of content (more in-depth information, even more interactive design of digital support services through chat options, supplementary learning videos or an online consultation accompanying the intervention). However, our results showed a small positive and statistically significant indirect effect between the intensity of use of the *Chancenreich* app and changes in the frequency of language-stimulating activities, mediated by changes in language-related PSE. This confirms previous findings

postulating that family support programmes strengthen the home learning environment precisely by improving (actual or perceived) parenting abilities (Kuger et al., 2012).

In summary, the findings reflect the fundamental relevance of language-related PSE to the HLE and suggest that families with toddlers benefit from support approaches that build on their parenting abilities and beliefs. To support parents effectively, it is not enough to focus only on suggestions for parent–child activities. Parents also need to be encouraged to feel that they have the ability to support and promote their children's language development.

LIMITATIONS

The data for the present study were drawn from a rather small and geographically limited German sample, which was conducted online; it is a convenience sample. Even though great efforts were made to reach disadvantaged groups of parents as well, parents with a low level of education or low SES are under-represented within the sample compared to the German average (German Federal Statistical Office, 2024). Recruiting parents from this target group is often a challenge for research on intervention studies in Germany (Wilke et al., 2014). Potential ceiling effects associated with this may bias the estimation of relations between the intensity of app use, language-related PSE and HLE in this study. The research team used different recruitment strategies in the respective groups, which means that parents could only decide whether they wanted to participate in the study, but not in which group. In addition, we would point out the different group sizes in the intervention and comparison groups. Due to the small group size, parents who only used the app and parents who simultaneously took part in an online parenting course on the app were considered together as the intervention group. It should be noted that those parents in the intervention group who also took part in the online parenting course showed more intensive app use compared to parents who only used the app. In the present study, we therefore cannot rule out the possibility that the course content was also relevant for the relations described. Details of the influence of the course on the use of the app are discussed in further analyses (Anders et al., 2023).

During the implementation phase, however, it was also observed that a broad range of potential users were excluded by the conceptual focus (families and children with support needs in other developmental domains or in other age groups, and also non-German-speaking families). Despite the reference to the age-related nature of the app content, parents with children in other age groups used the app. Additionally, as the *Chancenreich* app was only implemented in German, families of migrant origin or who were not fluent in German were only addressed to a limited extent in this study. It is also worth noting that, as self-assessment was used for the measurement of the frequency of language-stimulating activities, responses may be biased by social desirability. Finally, this database does not permit us to make any statements about the quality of the home learning environment or allow SES to be mapped using classic constructs such as the International Standard Classification of Education (ISCED) or similar.

CONCLUSIONS AND IMPLICATIONS

The findings of the present study emphasise the relevance of new digital media such as parenting apps for strengthening parental abilities, and thus the home learning environment of families with toddlers. Today's parents use digital devices more intensively than previous generations of parents (Prensky, 2001), making digital media part of the reality of family life. App-based family support programmes are likely to experience significant developments in the coming years. This is where new kinds of intervention programmes

may emerge, offering great potential for strengthening families in their parenting abilities. Of course, the programmes should be utilised in a practical and scientifically beneficial way (Wilke et al., 2014): however, it should be noted that the implementation and scientific evaluation of these programmes is still in its infancy. It would therefore be prudent for further research to also address the question of the extent to which parenting apps have the potential to enhance accessibility for families, foster trusting parenting partnerships and facilitate the provision of stable and flexible support services.

Moreover, our findings indicate that app-based programmes designed to strengthen PSE represent a promising approach to enhancing parenting abilities. The implications of this pattern of evidence for early childhood education practice are that, when designing support programmes, it is also important to consider how to ensure intensive—or at least effective—use by the target group. In case of the *Chancenreich* app, additional support services could be provided (e.g., an online platform for social communication, a service hotline, a private chat group or *Chancenreich* online parents' evenings). In addition, the app offers a good basis for adaptive app components that can, for example, use AI to adapt to the respective skills and resources of the users. A further development of this kind would be unique in the early childhood education sector and offers a forward-looking perspective to designing programmes which correspond to individual needs.

Equally, though, the use of a parenting app is, in and of itself, by no means a guarantee of successful family support, and it cannot be denied that parental screen time will be increased by digital family support programmes. However, studies on parental use of digital devices show that some parents critically reflect on their media use behaviour and regulate it in family contexts (Brito et al., 2017). Ultimately, however, children will also benefit from digital programmes which enhance their parents' abilities and increase the quality of the home learning environment. Parental beliefs have been shown to be directly linked to processes in the home learning environment (i.e., to the key characteristics for successful language development in early childhood): the influence that parents have on children's early literacy acquisition can scarcely be overstated (Tamis-LeMonda et al., 2014), with their own estimations of their parenting abilities playing a central role in the effectiveness of language-stimulating activities both in the first years of life and for later language development (de Bondt et al., 2020; Niklas et al., 2024). In this way, parenting apps that aim to strengthen parental abilities and thus the home learning environment represent a crucial contribution to the successful support of families with toddlers.

ACKNOWLEDGEMENT

Open Access funding enabled and organized by Projekt DEAL.

FUNDING INFORMATION

This research was funded by the CARINA Foundation (www.carina-stiftung.de/chancenreich).

CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

DATA AVAILABILITY STATEMENT

The datasets presented in this paper are not freely available because the data are currently reserved for scientific qualifications (PhD and Master's theses). Requests to access the datasets should be directed to yvonne.anders@uni-bamberg.de.

ETHICS STATEMENT

Ethical review and approval for the study on human participants was obtained in accordance with local legislation and institutional requirements. Written consent was obtained from the participants prior to their involvement in the study.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Prokupek, L., Hummel, T., Blaurock, S., Cohen, F. & Anders, Y. (2025). Potential of a digital parenting app to support parents of toddlers: Relations between the intensity of app use, language-related parental self-efficacy and the home literacy environment. *British Educational Research Journal*, 00, 1–24. <https://doi.org/10.1002/berj.70022>

APPENDIX A

TABLE A1 Topics in the *Chancenreich* app.

Week	Weekly topic	Description (summarised content of the three weekly app tasks)
1	Oral explorers	The app focuses on the fact that babies and toddlers are like little explorers, discovering the world by putting things in their mouths. This is important for their development, because this is how they gather information about their environment
2	Picture books	Even in the first year of life, children are sensitive to learning language. The app explains that parents have a great influence on their children's learning to speak—right from the start! Parents can look at books even with young babies. In this way, babies learn new words through play. Parents can try to draw their child's attention to a specific picture or motif
3	Dialogue reading & sound diary	During the period of 'pre-linguistic development', babies begin to experiment with their voice. This includes squeaking, humming and cooing. By reading to very young children and asking questions, parents can encourage them to imitate syllables or first words. Progress in speech can be recorded in a sound diary. In this way, the first speech patterns of babies can also be recognised
4	Language opportunities in daily life	In this week, the app focuses on how, in everyday life, attention can be paid to what children are exploring. This can help reveal language opportunities to talk about what children are experiencing and discovering
5	Language stimulation during diapering	The app encourages parents to 'bathe' children in language in their first year of life. By accompanying everyday situations that are experienced together with language, the child's language development can be supported quite incidentally
6	Finger games & self-efficacy	The app informs parents about finger games and why they are good for language development. With their help, babies can enjoy high-quality speech and touch experiences. Parents have a great influence on how their child learns to speak. The sound diary can help parents to recognise language developments
7	Parental stress	Many parents struggle with overload and perceptions of stress. The app encourages parents to talk to friends and close confidants in such circumstances. It explains that this is important to mitigate the negative impact of stress on the family. In the app-integrated family handbook of the <i>Chancenreich</i> family programme, helpful contacts can be found when parents are looking for support
8	Meals as a language occasion	To 'bathe' children in language, all situations in everyday family life are suitable (e.g., mealtimes). The app addresses the fact that parents can explain to their children what is happening during feeding and that they can also use this situation to name the different foods
9	Language & movement	In the app, parents can learn more about how babies naturally enjoy movement. This joy of movement is a fantastic method for teaching language in a playful way. More information about children's motor development can be found in the relevant section of the app-integrated family handbook of the <i>Chancenreich</i> family programme
10	Closing	In the final week, the app gives parents the opportunity to reflect on all the activities of the last 10 weeks and to name their favourite activity. Parents are encouraged to continue to engage with their children's language development and to note further steps in their children's language development in the sound diary

Appendix D

Operationalisation of constructs

	Study 1 (N = 8.513)	Study 2 (N ₁ = 1.088; N ₂ = 11)	Study 3 (N = 184)	Outcome
Stressor	- Changes in employment at household level - Changes in hours of childcare outside the home	Quantitative - Financial burden: low perception of economic household situation Qualitative - Financial burden: low perception of economic household situation - Time constraints		Study 1 (cross-sectional) <i>Home Learning</i> Self-reported change of frequency of learning-stimulating activities compared to the time before the lockdown (children on average 3 to 4 years old)
Stress	Scale: perception of parental stress and reference classes of low, medium, high perception of stress	Narrative perception of parental stress		Study 2 (cross-sectional) <i>Home Learning</i> Quantitative Frequency of learning-stimulating activities (children on average 5 to 6 years old)
Risk factors		- Lack of parental self-efficacy - Ineffective co-parenting (e.g., conflicts with the other parent)		Qualitative Narratives of frequency and variety of learning-stimulating activities (children on average 4 years old)
Familial system resources	Role distribution within partnership as component of supportive co-parenting	Narratives of supportive co-parenting		Study 3 (longitudinal) <i>Home Literacy</i>

				▪ Frequency of language-stimulating activities, changes in frequency of language-stimulating activities (children aged on average 12 months) ▪ Language-related parental self-efficacy, changes in language-related parental self-efficacy (children aged on average 12 months)
Parental resources		▪ High parental self-efficacy ▪ Problem-orientated coping and positive appraisal	▪ Language-related parental self-efficacy	
Social support	▪ General advice, advice on parenting issues, emotional support	▪ Social networks (Friends, large family, ex-partner) ▪ Structural networks (Employer, financial and organisational Support, Counselling services)		
Family support			▪ Intensity of use of the <i>Chancenreich</i> app (number of completed app tasks)	
Structures	▪ Two-parent families ▪ Large families ▪ Single parents	▪ Two-parent families ▪ Single parents	▪ Two-parent families	

Control variables	Socio-economic status	Socio-economic status	Socio-economic status
	▪ Parental education classified by ISCED ▪ Perceived financial problems before COVID-19	▪ International Socio-Economic Index at household level HISEI-08 ▪ Narrative rating (low, medium or high)	▪ Families' net equivalent income
	Respondent	Respondent	
	▪ Gender	▪ Gender ▪ Employment (1 = not employed; 4 = full-time employed)	
	Target child	Target child	Target child
	▪ Gender ▪ Age	▪ Gender ▪ Age	▪ Age
		Family environment	Family environment
		▪ Family language ▪ Number of siblings/ children	▪ Family language ▪ Number of children in the household ▪ Number of adults in the household