Young Children's Language and Socioemotional Development: The Role of Family Background

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Abstract

Given the importance of early language and socioemotional skills in children's later lives, it is important to understand the early emergence of these skills. Although studies have shown that the level of both skills differ by family background from early on, there are still important gaps in previous research (e.g., mixed or contradictory findings). This dissertation investigated the impact of family background on children's language and socioemotional development in early childhood. Especially, the mediating pathways through different parenting behaviors as well as domain-specific parenting behaviors have been examined to identify a more specific correlation between family background and children's outcomes. In addition, children's early language was also considered as an additional pathway linking family background and children's later socioemotional outcomes. Furthermore, given the inconsistent findings on the association between children's language and socioemotional development, this dissertation also conducted an in-depth investigation of this association by considering language-related family background (i.e., extent of speaking majority and minority languages at home), which might account for the inconsistent findings. Differ from previous studies which only controlled for children's language backgrounds, this dissertation explicitly studied whether the directionality of this association differs between children with different language backgrounds. Drawing on two nationally representative data sets, Millennium Cohort Study (MCS) from the UK and the German National Educational Panel Study – Newborn Cohort Study (NEPS-SC1), three empirical studies using sophisticated statistical techniques—structural equation modeling—have been conducted to address the research questions of the current dissertation.

Study 1 investigated mediational protective and risk pathways linking socioeconomic status (SES; e.g., parental education) and 5-year-olds' behavioral difficulties

in two large-scale samples (N_{mcs} = 13,053; N_{neps} = 2,022). Models considered parental sensitivity and advanced child vocabulary as protective pathways connecting parental education with children's behavioral outcomes; the risk pathways focused on negative parental disciplinary practices linking (low) parental education, parental distress, and children's difficult temperament to children's behavioral difficulties. Further, all analyses controlled for families' income, the child's sex, and formal child care attendance. The results showed that the hypothesized models fitted both data sets well. Children with higher educated parents experienced comparatively more sensitive interactive behavior, had more advanced vocabulary, and exhibited fewer behavioral difficulties. Children with parents who suffered from distress tended to experience more negative disciplinary behavior and exhibited more behavioral difficulties. Additionally, children's advanced vocabulary served as a mechanism mediating the association between parental education and children's (lower) behavioral difficulties. Overall, similar patterns of results were substantiated across the UK and Germany.

Study 2 investigated whether specific aspects of parental sensitivity differentially mediated the association between SES (i.e., maternal education) and children's domain-specific outcomes using NEPS-SC1 (N = 2,478). More specifically, *cognitive-verbally stimulating parenting behavior* and *socioemotionally supportive parenting behavior* were modelled to differentially link maternal education and children's language at 26 months and social competence at age 3. The model controlled for family net income, single parenthood, migration background, mother's depressive feelings, and child's negative affectivity. Multiple imputation by chained equations was applied to handle missing values. The model revealed a good fit to the data. The results indicated that the mother's cognitive-verbally stimulating parenting behavior was specifically related to the children's language skills, whereas the mother's socioemotionally supportive parenting behavior exclusively correlated

with children's later social competence. These two separable parenting behaviors also differentially mediated the association between maternal education and toddler's language and social competence. Similar to Study 1, children's language additionally connected maternal education, specific parental sensitivity (i.e., cognitive-stimulating parenting behavior), and children's social competence.

Study 3 examined the directionality of the association between children's majority language and socioemotional development at ages 3 and 5 by considering language-related family background (N = 12,951). The cross-lagged models using MCS controlled for family background, early extrafamilial care attendance, and child's sex. The model fit indices indicated that the analyzed models fitted the data well. Results indicated a bidirectional association for monolingual children, a unidirectional effect of majority language on socioemotional development for Dual Language Learners (DLLs) who speak English and minority language(s) at home, and a unidirectional effect of socioemotional development on majority language for DLLs who only speak minority language(s) at home.

Overall, the results demonstrated the differential mediating effects of different parenting behaviors on the association between family background and children's language and socioemotional outcomes. In addition, children's early language has been substantiated to additionally link family background and children's later socioemotional outcomes. Finally, this dissertation also found that the association between children's majority language and socioemotional development differ between children with different language-related family backgrounds. Drawing on findings from the current dissertation, practical implications for early preventive programs are discussed.

Keywords: family background, parental education, specific parenting behaviors, language, socioemotional development, parental sensitivity, dual language learner, early childhood

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1. Introduction

In early childhood, children's language and socioemotional development are important developmental domains that affect children's later academic success and well-being (Klein & Englund, 2021; Pace et al., 2019; Yew & O'Kearney, 2013). Studies have found that children who are better at resolving conflicts with peers (e.g., verbally instead of using behavioral aggression) and who are helpful and cooperative with others are more likely to become well-adjusted adults who have jobs and contribute positively to society (Jones et al., 2015). Understanding the early emergence of language and socioemotional skills is of particular importance, as early individual differences in these skills are relatively stable from preschool age onward (e.g., Bornstein et al., 2014; Obradović et al., 2006).

Children with different family backgrounds have been shown to have different levels of language and socioemotional development (e.g., Bradley & Corwyn, 2002; Hart & Risley, 1995; Hoff, 2003). Parenting behavior might be one of the most influential factors reflecting the underlying mechanisms thereof (e.g., Tamis-LeMonda et al., 2001; van IJzendoorn et al., 1995), as parents play an important role in their socialization processes (Ainsworth, 1979). However, focusing on these underlying mechanisms (mediating pathways), previous studies drew more attention to the dysfunctional pathways based on Family Stress Model (FSM; Conger et al., 2000). For example, lower-educated parents might experience more family stress, which in turn, affects children's development of behavioral difficulties indirectly through negative parenting behavior. Protective pathways (e.g., parental sensitivity) drawing on Family Investment Model (FIM; Conger et al., 2010) that might hinder children's adverse outcomes (or promote the development of language and socioemotional skills) are still understudied. As both risk and protective pathways are likely to occur together in the developmental process (Gore & Eckenrode, 1996), whether they contribute independently

to children's outcomes remains an open question. Hence, the first purpose of this dissertation was to examine the mediating effects of parental sensitivity and negative disciplinary parenting behavior—in the forms of protective and risk pathways—on explaining the association between family background and children's outcomes.

Moreover, as parenting behavior is multidimensional (Grusec & Davidov, 2010; Linberg, 2018), children's language and socioemotional outcomes were very likely to be differentially affected by specific aspects of parental sensitivity. That is, parents' verbal and cognitive stimulation might exclusively promote children's language acquisition (Vygotsky, 1978; Wood et al., 1976), whereas parents' warmth, responsiveness, and emotional presence might be particularly important for children's socioemotional development (Ainsworth et al., 1974; Grusec & Goodnow, 1994). However, prior findings on the association between globally measured parental sensitivity and children's language as well as socioemotional outcomes could hardly provide a clear picture of the association between specific parental sensitivity and children's domain-specific outcomes (e.g., Barnett et al., 2012; Pungello et al., 2009). Thus, this dissertation specially separated parental sensitivity into *cognitive-verbally stimulating parenting behavior* and *socioemotionally supportive parenting behavior* as differential mediating pathways connecting family background and children's language and socioemotional development.

Furthermore, while language acquisition is embedded in diverse social interactions, socioemotional development is deeply influenced by the process of language acquisition (i.e., social interactions). The association between these two domains seems to be bidirectional. However, previous works investigating this association revealed contradictory findings: Some found unidirectional effects either from language skills to socioemotional development or the reverse (Girard et al., 2017; Rose et al., 2016), others found bidirectional or even no interrelation between them (e.g., Barnett et al., 2012; Petersen et al., 2016). Since

those studies have typically either focused on children with single language status (monolingual or bilingual sample; e.g., Ertanir et al., 2021; Ziv, 2013) or failed to consider the language-related heterogeneity (e.g., Girard et al., 2016, 2017), it could be that the language-related heterogeneity contribute to these inconsistent findings. In other words, the developmental trajectories of children with different language-related family backgrounds (i.e., the extent of speaking majority language and minority language) might be different compared to children who grow up with one (majority) language. The association between children's majority language and socioemotional development might also differ between children with different language backgrounds. Therefore, the second goal of this dissertation is to address the impact of language-related family background on children's outcomes.

Taken together, this dissertation investigated the impact of family background on children's language and socioemotional development. More specifically, different parenting behaviors as well as domain-specific parenting behaviors were considered as explanatory factors (pathways) to explain the underlying mechanisms between family background and children's outcomes. In addition to parenting behavior, this dissertation also considered children's language skills as an additional pathway linking family background and children's socioemotional outcomes, as language is a crucial psychological and communication tool in gaining mastery over behavior and cognition (Vygotsky, 1978). Using nationally representative data sets, this dissertation sought to find generalizable evidence on mediating pathways. Furthermore, the influence of language-related family background on the directionality of association between children's majority language skills and socioemotional skills was also studied by controlling for children's initial levels of skills. Finally, these investigated mechanisms were controlled for empirically evidenced influential variables.

2. Definition of Socioemotional Development

Socioemotional development is a broad term containing a range of social and emotional skills that facilitate the child to form close and secure adult and peer relationships; to experience, regulate, and express emotions in socially appropriate ways; and to explore the environment and learn in the context of family, community, and society (Denham, 2006; Yates et al., 2008). In addition, a series of potential behavioral difficulties that may impede children's flexible and appropriate responses in social interactions might also emerge in children's socioemotional development. These behavioral difficulties may include externalizing (e.g., conduct problems), internalizing (e.g., emotional problems), and peer relationship problems. It should be noted that children who have behavioral difficulties may also demonstrate social and/or emotional skills. In other words, the emergence of behavioral difficulties does not hinder the presence of social and emotional skills. The absence of behavioral difficulties should also not be seen as the presence of social and emotional skills. Thus, socioemotional development covers both positive behaviors (e.g., prosocial behavior) and the potential formation of behavioral difficulties (e.g., conduct problems). Early experiences affect children's understanding of the world and themselves, which in turn, promotes socioemotional development. For example, when caregivers consistently meet children's needs, children are easily comforted at a very young age, are better able to regulate their own emotions later on, pay more attention to their surroundings, and develop secure relationships (Eisenberg et al., 2010). By contrast, very young children who frequently experienced negative parenting behavior (e.g., yelling) might apply that inappropriate experience to other social contexts, and be at a higher risk of exhibiting problem behaviors (Bandura, 2016).

Despite differences in terminology, socioemotional development has been broadly studied with a smaller set of subdomains (see Halle & Darling-Churchill, 2016, for a review). The current dissertation studied two contradictory subdomains—social competence (or social skills) and behavioral difficulties. Social competence indicates the abilities of recognizing social cues, regulating one's behaviors, and appropriately interacting with others, such as exhibiting prosocial behavior (Blair & Razza, 2007; Fabes et al., 2006; Rose-Krasnor, 1997). With these abilities, young children are able to satisfy their own and other's goals to reach effective social interactions (Rose-Krasnor, 1997). On the other hand, behavioral difficulties is a continuum including a series of developmentally inappropriate behaviors, e.g., hyperactivity and conduct problems, which impede a child's ability to adapt and function in their environment (Campbell, 1998).

In this dissertation, children's socioemotional development was measured by the parent-reported Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). SDQ is a brief behavioral screening questionnaire that covers children's behaviors, emotions, and relationships. There are parent- or teacher-reported versions for children ranging from 2 to 17 years old and a self-reported version for children from 11 years old and up. The 25 SDQ items are divided into five subscales of five items each: Prosocial Behavior (e.g., often volunteers to help others; shares readily with other children), Peer Relationship Problems (e.g., picked on or bullied by other children; gets on better with adults than with other children (reversed)), Emotional Symptoms (e.g., often complains of headaches, stomachache or sickness; often unhappy, down-hearted or tearful), Conduct Problems (e.g., often fights with other children or bullies them), and Hyperactivity (e.g., restless, overactive, cannot stay still for long; easily distracted, concentration wanders). Items can be rated as "*not true*" (scores 0), "*somewhat true*" (scores 1), or "*certainly true*" (scores 2). The scores for Peer Relationship Problems, Emotional Symptoms, Conduct Problems, and

Hyperactivity can be summed to generate a Total Difficulties score (ranging from 0 to 40) to indicate children's behavioral difficulties; the Prosocial Behavior which indicates children's strengths cannot be integrated (in reversed form) into the Total Difficulties score, as the absence of prosocial behavior does not conceptually mean the presence of behavioral difficulties (Goodman, 1997). Depending on study designs and data availability, the five subscales of SDQ were differentially operationalized in each conducted study. Detailed procedures are described below in the sections of Method and Conducted Studies.

3. Family Background, Parenting Behaviors, and Children's Outcomes

3.1 The Impact of Family Background on Children's Outcomes

The bioecological model suggests that child development results from the interactions between individuals, their proximal environment, and distal influential factors (Bronfenbrenner & Morris, 2006). Socioeconomic status (SES)—one aspect of family background—has been widely studied to affect children's development (e.g., Bradley & Corwyn, 2002; Hoff et al., 2002; Hoff & Laursen, 2019). Previous studies have shown that children with higher-SES parents have comparatively greater vocabulary skills and show less behavioral problems in early childhood than children with lower-SES parents (e.g., Hart & Risley, 1995; Hoff, 2003; Rowe et al., 2016). For example, Hart and Risley (1992) found that SES level was highly correlated with parents' number of words spoken per hour, and that substantial variability existed in the amount of language exposure children received. By contrast, lower-SES children more often manifest symptoms of psychiatric disturbance and maladaptive social functioning than children from higher-SES families (e.g., Bolger et al., 1995). However, the simple association between SES and children's developmental outcomes says little about the underlying mechanisms between them.

Drawing on FIM, higher-SES parents who have greater access to resources are able to make significant investments in the development of their children, whereas lower-SES parents might need to invest in more immediate family needs (e.g., Bradley & Corwyn, 2002; Conger et al., 2010). For example, higher-SES mothers are more likely to have conversations with children for longer periods of time, elicit more talk from their children, and respond to their children in a more contingent manner (Hoff, 2003; Hoff-Ginsberg & Tardif, 1995).

Through education particularly, parents may have developed a set of skills (e.g., cognitive flexibility and language skills) and capabilities (e.g., gathering information and applying it to novel situation; Coleman, 1988). Parents with higher educational levels thus have more access to human, cultural, and social capital (resources, assets), and this capital, in turn, helps parents to support their children's development (Colemann, 1988). One way in which parental education is assumed to affect children's outcomes is by shaping parent–child interactions as well as parental disciplinary practices (i.e., what parents do in disciplinary encounters; Hoff & Laursen, 2019; Rowe et al., 2016; Weinert et al., 2017). Parents with higher levels of educational qualification may have more knowledge about child development and appreciate sensitive parent–child interactions and the enrichment of the home learning environment more as compared to parents with lower educational levels. More specifically, highly educated parents could use their different skills to promote their children's development by providing them with highly supportive interactions and a stimulating home learning environment (e.g., Harding et al., 2015; Weinert et al., 2017). Furthermore, as the mother is still the primary caregiver in the early years, mother–child interactions in early childhood turned out to be an essential influential factor related to children's early language and socioemotional development (Barnett et al., 2012; Bornstein et al., 2020; Hartas, 2011; Nozadi et al., 2013; Raviv et al., 2004).

On the other hand, lower-SES compared to high-SES parents may have less resources to support their children's development and face more stressors (e.g., low family income). According to FSM, those stressors lead to children's adverse behavioral outcomes indirectly through family processes such as using negative disciplinary strategies in child-rearing practices (Conger et al., 2000; Dietz, 2000; Hoff et al., 2002). Empirical evidence suggests that parents suffering from higher levels of stress are more likely to show less engagement and consistency in interactions with their children (McLearn et al., 2006) and

tend to exhibit more coercive behaviors and negative emotional expressions in disciplinary encounters—that is, to use harsher and more inconsistent strategies to discipline their children (Deater-Deckard, 2004). Subsequently, by experiencing a series of negative disciplinary encounters, children are at risk for behavioral difficulties at a very early age (e.g., Choe et al., 2013; Gard et al., 2021; van Zeijl et al., 2007).

3.2 Parenting Behavior as Explanatory Factor Linking to Children's Outcomes

As mentioned above, parenting behavior is one of the important proximal factors reflecting the underlying mechanisms linking family background and children's early outcomes. In early childhood, much of children's environmental exposure to language occurs through interactions with parents (Tamis-LeMonda et al., 2001; Tamis-LeMonda & Bornstein, 2002). Parental sensitivity refers to an adequate perception and accurate interpretation of a child's signals and needs as well as a prompt and appropriate responsiveness (Ainsworth et al., 1978). Sensitivity could support mutual engagement in interpersonal interactions and facilitate children's understanding that language is a tool for communicating desires and intentions (e.g., Barnett et al., 2012; Bornstein et al., 2020; Nozadi et al., 2013). Moreover, sensitive parents are expected to encourage children's abilities to understand and produce language by providing them with a higher quantity of verbal input (Hoff, 2006; Tamis-Lemonda et al., 2014). In sum, parents' sensitive responsiveness can thus promote children's understanding of the role of language in communication and affect children's language development. For example, controlling for stability in maternal sensitivity and child language, Bornstein et al. (2020) found a significant association between the globally assessed maternal sensitivity at 5 months and children's language skills at 49 months. They also illustrated that sensitive parents are more

likely to provide children with a verbally stimulating learning environment that might greatest account for the emerged association.

Furthermore, parental sensitivity and warmth in responding to infant behavior can establish a secure parent–child attachment (Ainsworth, 1979). The secure attachment lays an important basis for children's socioemotional development (Ispa et al., 2017; van IJzendoorn et al., 1995), as securely attached children are more likely to actively explore their environment and engage in social interactions. In other words, children who are secure in their belief that their surroundings and their caregivers are reliably responsive would be more inclined to engage regularly in interpersonal interactions, as they know that their intentions will be heard and responded to. The increased social interactions, in turn, provide children with more opportunities to develop their socioemotional skills. Taken together, sensitive and warm parenting can foster the development of autonomy and self-control in toddlerhood (Dallaire & Weinraub, 2005), encourage prosocial behavior (Spinrad et al., 2007), enhance competence in peer relationships (Sroufe et al., 1993), and subsequently promote socioemotional skills (Barnett et al., 2012). Empirically, studies have also demonstrated positive association between observed sensitive parenting behavior and children's higher levels of socioemotional skills in early childhood (e.g., Barnett et al., 2012; Newton et al., 2014).

Investigating the association between family background, parenting behavior, and children's outcomes, previous studies often applied a piecemeal method. That is, some examined the effects of SES on parenting behavior (e.g., Dietz, 2000; Hoff et al., 2002; McLearn et al., 2006) or on children's outcomes (e.g., Bolger et al., 1995; Hart & Risley, 1995; Rowe et al., 2016); others studied the association between parenting behavior and children's outcomes (e.g., Barnett et al., 2012; Bojczyk et al., 2016; Bornstein et al., 2020; Newton et al., 2014; Ispa et al., 2017). Drawing on FSM, some studies considered these

three sets of variables simultaneously (e.g., Conger et al., 2002; Gard et al., 2021), with particular emphasis of risk pathways triggered by economic deprivation (i.e., dysfunctional family processes positively affect children's adverse socioemotional outcomes). However, only few studies have examined parenting behaviors serving as protective mediating pathways linking SES and children's outcomes (e.g., Longo et al., 2017) though some studies may have only considered SES as a control variable (e.g., Bornstein et al., 2020; Newton et al., 2014). Given that parental education has been found to explain the greatest share of the variance compared to other components of SES (i.e., family income and parental occupation; Hoff et al., 2002), sensitive parenting behavior has been rarely studied as protective mediating pathway linking parental education and children's outcome.

Furthermore, apart from the positive effects of protective pathways (e.g., sensitive parenting behavior) per se, some protective factors may also affect the later emergence of other protective mechanisms (Gore & Eckenrode, 1996). For example, as illustrated above sensitive parenting behavior has been suggested to influence children's language development by supporting mutual interpersonal interactions and encouraging children's language productions (Barnett et al., 2012; Hoff, 2006). Possessing higher levels of language skills, in turn, can provide children with essential means of communication and self-regulation of their social behavior (Vygotsky, 1978; Bruner, 1985), which facilitate children's efforts to interpret social exchange, to communicate better with peers, and to show more cooperative behavior (e.g., Vygotsky, 1978; Rose et al., 2018). However, there is no known study to date that has studied children's language skills as a mediating pathway linking parenting behavior and children's socioemotional development.

Moreover, despite the existing studies investigating mediating pathways linking SES and children's outcomes (especially through different parenting behaviors), it is important to consider whether protective pathways make an independent contribution to children's

outcomes over and above the effects of risk pathways and vice versa, as both pathways are likely to occur together in the developmental process (Gore & Eckenrode, 1996). To date, few studies have examined the co-occurrences of these influential factors and findings from those limited studies have been mixed (Gardner et al., 2003; Gershoff et al., 2007; Longo et al., 2017; Totsika et al., 2019). That is, studies either found that (1) protective factors (e.g., sensitive parent–child interactions) correlated uniquely to fewer behavioral difficulties independent of other risk factors such as negative parenting behavior (Gardner et al., 2003) or (2) a dependent effect of the protective pathway (e.g., positive parent–child relationship) on children's behavioral difficulties, i.e., the effect disappeared when the negative pathway (negative parenting behavior) was included (Totsika et al., 2019). Note that some of the previous works exclusively considered samples in risk circumstances (e.g., low-income families; Gershoff et al., 2007; Totsika et al., 2019). This might hinder the generalizability of the findings to the general population and be a potential reason for the inconsistent findings. All of these issues make it hard to build a comprehensive picture of what happens when multiple risk and protective factors appear together.

Hence, the primary goal of this dissertation was to in-depth examine the impact of SES on typically developing children's language and socioemotional development by considering the underlying mediating pathways (i.e., different parenting behaviors). To build up a complex understanding of the underlying mechanisms, multiple protective and risk pathways linking children's early socioemotional outcomes were considered simultaneously. In addition to parenting behaviors, this dissertation also considered children's language skills as an additional pathway linking SES, parenting behaviors, and children's socioemotional outcomes. Given the important role of parental education in explaining parenting behaviors and children's outcomes, the current dissertation utilized parental education as a main indicator of SES.

3.3 The Role of Specific Parenting Behaviors

In addition to the bioecological model, the Specificity Principle also helps in understanding human development by providing a foundation for refining research questions and challenges to assumptions of methodology (Hill, 2021). The Specificity Principle asserts that specific experiences affect specific outcomes at specific times in specific individuals (Bornstein, 2017, 2019a, 2019b). This concept emphasizes whole-individual development and the uniqueness of each individual's development. In agreement with this concept, different parenting behaviors should affect children's developmental outcomes in different ways, as parenting behavior is multidimensional (e.g., Linberg, 2018).

Empirically, parenting behavior has been studied as a multidimensional concept to affect children's outcomes—that is, specific aspects of parenting behaviors have been shown to affect children's domain-specific outcomes (e.g., Bornstein et al., 2008; Grusec & Davidov, 2010; Linberg, 2018). Thus, it is very likely that the specific aspects of parental sensitivity differentially affect children's language and socioemotional development. Drawing on the scaffolding concept, providing appropriate assistance and stimulation in the zone of proximal development will enhance children's achievement (Vygotsky, 1978; Wood et al., 1976), parents' verbal and cognitive stimulation provides children with a learning environment that helps to extend their existing language skills more efficiently (Wood et al., 1976). Therefore, it is suggested that cognitively stimulating and verbally sensitive parenting behavior can provide toddlers with a stimulating learning environment that facilitates the acquisition of advanced language skills. On the other hand, parenting behavior characterized by warmth, sensitivity, responsiveness, and emotional presence have been suggested to promote a secure parent–child attachment, which in turn, can enhance children's

socioemotional development (as described in details earlier; Ainsworth et al., 1974; Grusec & Goodnow, 1994; Ispa et al., 2017).

However, most prior works applied more general approaches to investigate the association between parental sensitivity and children's language as well as socioemotional skills (e.g., Barnett et al., 2012; Bornstein et al., 2020; Newton et al., 2014; Pungello et al., 2009). For example, Pungello et al. (2009) and Barnett et al. (2012) measured maternal sensitivity by summing up five dimensions: Global sensitivity, detachment (reverse), positive regard, animation, and stimulation of cognitive development. Both studies found significant effects of this aggregated parental sensitivity measure on toddlers' language and social competence, respectively. However, it is unclear whether these effects were due to the globally measured parental sensitivity or domain-specific aspects of sensitivity. Furthermore, Nozadi et al. (2013) found a significant relation between maternal sensitivity (i.e., attentive responses to children's emotions, behaviors, and interests) and toddler's expressive language skills. The authors interpreted the results as indicating that sensitive mothers tend to create stimulating environments for their children and to use appropriate language (without analyzing the effects of distinguishable parenting behaviors directly). To understand how parental sensitivity affects children's language and socioemotional development, this dissertation not only examined the globally measured parental sensitivity as protective pathways linking parental education and children's outcomes, but also differentiated specific aspects of parental sensitivity, i.e., cognitive-verbally stimulating parenting behavior and socioemotional supportive parenting behavior, and explored these specific effects on children's domain-specific outcomes. Accordingly, this dissertation also examined children's language as a specific mediating pathway linking parental education, cognitive-stimulating parenting behavior, and children's socioemotional outcomes.

Furthermore, another form of parenting behavior—disciplinary parenting practice—also helps to account for the development of children's behavioral outcomes. Based on social learning theories, children are more likely to perceive aggression as a legitimate and acceptable way to treat others, and they are deprived of opportunities to learn nonviolent ways of dealing with interpersonal conflicts when their parents use negative disciplinary strategies, such as yelling and hitting (Bandura, 2016). In other words, children may generalize the way they have been treated/disciplined to other contexts such as peer interactions, which may in turn elicit peer problems. Hence, this dissertation also examined (negative) disciplinary parenting practices as risk mediating pathways affecting children's socioemotional outcomes.

3.4 The Interplay Between Children's Outcomes: The Role of Language-related Family Background

From the perspective of the social-pragmatic view of language development and social learning, language acquisition relies on, but is not limited to, the basic processes of social learning (Tomasello, 1992). Diverse social interactions with skilled caregivers or peers (e.g., in play situations) provide children with language exposure and productions that promote their language acquisition (Vygotsky, 1978). Presumably, socially competent children (e.g., who are able to establish positive relationships with peers) might be more likely to boost their language acquisition by constantly promoting effectiveness in social interactions (Rose-Krasnor, 1997). In contrast, children with aggressive behavior, inattention, or emotional problems may have less opportunities to participate in language-based exchanges with peers and may be even with adults; this could decrease their exposure to language as well as opportunities to produce language (Erdemir & Brutt-Griffler, 2022).

As mentioned earlier, a range of language behaviors (e.g., communication, verbal self-regulation) is important for children's successful participation in everyday social life. Developing language skills is often considered as a social skill (Bruner, 1983). More specifically, language allows children to express their needs, improve their emotion expression knowledge, better communicate with peers and adults, and solve social conflicts verbally (e.g., Keenan & Shaw, 2003; Schultz et al., 2001). Children with limited language skills might have difficulty expressing themselves and, thus, be easily misunderstood by peers, leading to peer rejection and to a higher risk of aggressiveness or hyperactivity (Girard et al., 2016; Menting et al., 2011; Petersen & LeBeau, 2021). This decreases their likelihood to establish better peer relationships. Furthermore, language skills help children to learn and moderate their behaviors and emotions (Schultz et al., 2001). In particular, self-regulating abilities can guide children's behavior in difficult situations using private speech (e.g., anger management; Vygotsky, 1962). Both communication and self-regulating skills contribute to socioemotional development.

Drawing on these theories, the association between children's language and socioemotional development seems to be reciprocal. Empirically, previous studies found a correlational association (Hartas, 2011; Ziv, 2013) as well as a predictive effect of children's early language skills on later socioemotional development in early childhood (i.e., controlling for children's initial levels of socioemotional skills; Petersen et al., 2013; Rose et al., 2018). With respect to the directionality of the association between these two domains (by controlling for children's initial levels of both skills), existing studies found, however, contradictory findings: Unidirectional effects of higher levels of language skills on later social competence (Girard et al., 2017; Rose et al., 2016), a bidirectional association between language and socioemotional outcomes (Girard et al., 2014, 2016; Petersen et al., 2013), or a nonsignificant relation between these two domains at all (e.g., Barnett et al., 2012). Note

that controlling for the initial levels of skills is essential for determining the directionality of this association because the association of early socioemotional skills with later language skills could reflect the opposite direction of effect from language to socioemotional skills (i.e., the lagged association could be due to the stability of language skills) and vice versa.

It is noteworthy that most of the abovementioned studies did not differentiate children with various language backgrounds, i.e., some of the children spoke a minority language other than the majority language of the society at home (e.g., Girard et al., 2014, 2016, 2017; Rose et al., 2016). Furthermore, while children's language skills were mainly assessed by vocabulary in these studies, children's socioemotional development was differentially measured across studies, e.g., by children's strengths in socioemotional behavior (e.g., prosocial behavior; Girard et al., 2017) or their behavioral difficulties (e.g., conduct problems; Girard et al., 2014, 2016; Petersen et al., 2013). As children's language skills (either in majority or minority languages) depend largely on the language exposure at home (and in extrafamilial care) and on how much children themselves actually speak each language (Tomasello, 2003), it could be that the language-related heterogeneity among children and the different operationalizations contribute to the discrepant findings. DLLs are unlikely to be a homogenous group with regard to their majority language skills (Hoff, 2018). For example, some DLLs with a large exposure to the majority language may have already attained effective communication skills in the majority language, whereas others with limited input and usage of the majority language may still be in the process of acquiring very basic skills in the majority language (Hoff, 2018). Furthermore, DLLs who are mainly exposed to minority language at home, may need to draw more heavily on other sources and their socioemotional skills to access the majority language, e.g., when interacting with peers or other adults in a majority language environment. In other words, socioemotional development can particularly facilitate these DLLs' language acquisition (in the majority

language) in the increased social interactions with peers or/and adults who speak the majority language.

Taken together, the association between children's majority language and socioemotional development might thus differ for different DLLs groups and monolingual children. However, it has not yet been tested empirically. Hence, this dissertation investigated not only the mediating effect of children's early language skills on their later socioemotional development, but also the directionality of the association between these two domains while considering the language-related family background. More specifically, given the language-related heterogeneity in DLLs, this dissertation explicitly differentiated different DLLs groups and investigated whether the association between children's majority language skills and socioemotional development differs for DLLs groups and monolingual children.

3.5 Additional Influential Factors on the Association between Family Background and Children's Outcomes

Apart from the aforementioned explanatory factors, the current dissertation also considered some additional characteristics that reflect diversity in view of the association between family background and children's outcomes (indirectly through parenting behaviors). It is worth to noting that multiple factors can constitute those influential factors, but it is not possible to include all of these factors in the models due to restricted data (Spanos, 1986). Therefore, drawing on the probabilistic reduction approach, the current dissertation specified the empirical models by capturing the systematic nature of the observed data (Kaplan, 2009; Spanos, 1986). In other words, guided by theoretical assumptions, this dissertation chose central influential and observable factors from the data sets and modeled them in a particular way to address the research questions empirically.

In addition to the main indicator of SES (i.e., parental education), financial hardship such as (1) low family income or (2) single parenthood at birth can increase parental distress, thereby making it harder for parents to provide sensitive parenting behavior (Cavanagh & Huston, 2006). This, in turn, may negatively affect children's language and socioemotional development (e.g., Barnett et al., 2012; Freund et al., 2017). Furthermore, (3) parents with a migration background might behave differently in their parenting as compared to parents without a migration background due to cultural reasons (Bornstein, 2017). They may also provide their children with a bilingual or even multilingual environment that could affect children's majority language and socioemotional outcomes. Prior studies have demonstrated that a migration background has been associated with young children's lower majority language skills (e.g., De Feyter & Winsler, 2009) and lower socioemotional development (especially in internalizing outcomes; see Belhadj Kouider et al., 2014, for a review).

Furthermore, various individual characteristics of both children and parents are associated with parenting behavior as well as children's outcomes. That is, (4) mother's depressive feelings and (5) parental psychological distress have been shown to influence parents' behaviors, resulting in less engagement and reduced consistency in interactions with their children and increase parents' use of harsh and inconsistent discipline (e.g., Deater-Deckard, 2004; Lupien et al., 2009; McLearn et al., 2006). Likewise, children's characteristics such as (6) temperament also play an important role in both parenting behavior and children's behavioral outcomes. In particular, children with an early difficult temperament tend to develop behavior problems later on (van Zeijl et al., 2007) and influence maternal parenting behavior (Bate et al., 2014). They are also less likely to comply with parents' socialization efforts, and thus tend to elicit harsher and more inconsistent discipline from their parents (Bates et al., 2014). Furthermore, numerous studies on (7) child's sex have found that girls possess, overall, more advanced language skills and are

more likely to exhibit more prosocial behavior than boys in early childhood (Girard et al., 2016; Paavola-Ruotsalainen et al., 2018; Rose et al., 2018; Wirth et al., 2020).

Finally, (8) the extrafamilia Early Child Education and Care (ECEC) provides children with an additional opportunity to interact with peers and caregivers other than parents. Attendance at ECEC has been associated with more advanced language skills (Kohl et al., 2019) as well as children's social competence (Linberg, Burghardt, et al., 2019; Loeb et al., 2007). In particular, attendance at ECEC provides DLLs an opportunity to be exposed to and to use the majority language, as well as to establish interactions with peers speaking the majority language (Erdemir & Brutt-Griffler, 2022).

4. Research Questions and Hypotheses

The current dissertation had two main goals. The primary one was to examine how parenting behavior helps to explain the association between family background and children's developmental outcomes. More specifically, this dissertation first investigated how different parenting behaviors (i.e., parental sensitivity and parents' disciplinary practices) served as mediating pathways linking SES (i.e., parental education) and children's language and socioemotional outcomes. Different parenting behaviors were studied in the form of protective and risk pathways simultaneously linking to children's early outcomes, to test whether these pathways have independent effects on children's outcomes. In addition, to test the generalizability of the results across Western European countries, models were sequentially conducted drawing on two nationally representative data sets from the UK and Germany. Second, this dissertation examined whether different aspects of parental sensitivity would differentially influence children's different outcomes. That is, whether mothers' cognitive-verbally stimulating parenting behavior and socioemotionally supportive parenting behavior served as separable mediating pathways connecting parental education and children's language and socioemotional outcomes, respectively. Furthermore, alongside the hypothesized association between parenting behaviors (either globally or specifically measured) and children's language skills, this dissertation also examined an additional mediating pathway linking parental education, parenting behaviors, and children's socioemotional outcomes indirectly through children's language skills.

Apart from the mediating effect of children's language skills on their socioemotional development, this dissertation also studied in-depth the association between children's language skills and socioemotional development by considering different language-related family backgrounds (i.e., the extent of speaking majority language and minority language)—

as the second goal of this dissertation. By controlling for children's initial levels of skills, this dissertation aimed to determine the directionality of the association between these two domains for 1) *monolingual English children* (MOEN; children who exclusively speak the majority language at home), 2) *English and minority language(s) DLLs* (EM-DLLs; children who speak both majority and minority languages at home), and 3) *minority language predominant DLLs* (ML-DLLs; children who exclusively speak the minority language at home).

Furthermore, to enhance the robustness of the results, models also controlled for additional influential factors: Family net equivalent income, migration background, single parenthood, mothers' depressive feelings, parental psychological distress, child's temperament and sex, and the attendance at extrafamilial ECEC. The following three research questions have been addressed:

(1) How do parenting behaviors as explanatory variables mediate the association between SES and children's language and socioemotional development in early childhood?

Given that parents influence young children's development through parent–child interactions and disciplinary practices (Hoff and Laursen, 2019; Rowe et al., 2016; Weinert et al., 2017), this dissertation expected that parental sensitivity is positively associated with children's advanced language skills and less behavioral difficulties, and the (negative) disciplinary parenting practices is positively associated with children's behavioral difficulties at the preschool age. Furthermore, this dissertation posited that different parenting behaviors function as (mediating) protective and risk pathways linking parental education and children's language skills as well as behavioral difficulties. Given the inconsistent previous findings, this dissertation conducted an exploratory

examination of whether protective and risk pathways have independent effects on children's outcomes. In addition, taking individual characteristics into account, this dissertation also hypothesized that parental psychological distress and the child's difficult temperament (as stressors) affect children's behavioral difficulties indirectly through parents' negative disciplinary practices.

Drawing on the Specificity Principle and the nature of parenting behavior (i.e., multidimensionality), this dissertation hypothesized that parental sensitivity is separable and different aspects of parental sensitivity differentially affect children's outcomes—that is, mothers' cognitive-verbally stimulating parenting behavior at 26 months only directly affects children's advanced language skills at 26 months; mothers' socioemotionally supportive parenting behavior at 26 months only directly affects children's higher levels of social competence at age 3. In addition, as mothers' cognitive-verbally stimulating parenting has been hypothesized to influence children's early language skills and children's language skills have been suggested to influence their later socioemotional development, this dissertation also expected to find an indirect effect of mothers' cognitive-verbally stimulating parenting behavior on children's socioemotional development through children's language skills.

(2) Are the investigated protective and risk pathways linking SES and children's developmental outcomes (indirectly through parenting behaviors) generalizable across countries?

Because the UK and Germany emphasize individualism and independence and thus provide parents with similar implicit or explicit models for child-rearing

such as comparable behaviors that parents appreciate and emphasize (Bornstein & Cheah, 2006), this dissertation expected to find generalizable findings across these two cultures, albeit minor differences in the assessments and operationalization (in the data sets from these two countries).

(3) What is the association between children's majority language and socioemotional development when considering language-related family background?

Due to the variation of majority language skills among monolingual children and DLLs (Hoff, 2018; Lauro et al., 2020), this dissertation anticipated different associations between majority language and socioemotional development (from age 3 to 5) across groups. Drawing on theory and empirical findings, this dissertation expected to find at least an effect of children's language skills on their socioemotional outcomes for MOEN. Although previous studies documented mixed findings on the opposite effect, this dissertation also suspected to find effects of socioemotional development on later language skills for MOEN. Due to the scarcity of findings related to association between majority language skills and socioemotional development in DLLs, this dissertation wanted to conduct an exploratory examination of this association among children who spoke both English and minority language(s) at home (i.e., EM-DLLs). However, because children who spoke exclusively minority language(s) at home (i.e., ML-DLLs) may possess very limited majority language skills, this dissertation hypothesized their majority language might not affect their socioemotional development. On the other hand, these children may need to draw on their socioemotional skills to access the majority language and

to improve majority language skills. Thus, an effect of socioemotional development on their majority language skills for ML-DLLs is expected.

5. Method

5.1 Data Sets

To answer the aforementioned research questions, three empirical studies have been conducted. The analyses were based on the Millennium Cohort Study from the UK and the National Educational Panel Study from Germany.

The Millennium Cohort Study (MCS)

The MCS is a single ongoing cohort study. It drew a representative sample of 18,522 families across the UK in 2000–2001 (Wave 1). The sample contains 253 sets of twins and 11 sets of triplets. In Wave 2 (in 2004), 692 additional families took part in the MCS. However, the twins, triplets, and the additional families since Wave 2 were excluded from the analyses in this dissertation, as there might be anomalous language outcomes among multiple birth children (McMahon et al., 1998). Employing sample design weights permits statements for the whole UK (see Plewis et al., 2007, for detailed sampling design).

The MCS collects a diverse range of data from children, their siblings, and parents using direct interviews and a self-completion questionnaire (Hansen et al., 2010). There have been eight waves to date, children's average ages across waves range from 9 months to 22 years. In Waves 1 and 2, parents provided information on family demographics and children's characteristics. Parents reported their monthly family net equivalent income (M = 1,334.19 pounds, SD = 868.38) and their highest educational qualification under the British National Vocational Qualification (NVQ) framework: low = 40.27%; middle = 16.75%; high = 42.98% (see Table 1). Note that the information of 12,951–13,053 children (49% female) from Wave 1 to Wave 3 were included in the conducted studies. Children's ages in respective waves were on average 9 months (M = 9.20, SD = 0.51), 3 years (M =

37.62, *SD* = 2.46), and 5 years (*M* = 62.63, *SD* = 2.97). Around 21% of the parents were born outside the UK. The ethnic groups of children were White (82%), Pakistani and Bangladeshi (7%), Black or Black British (4%), Mix (3%), and Indian (3%).

Table 1.

British National Vocational Qualifications in Wave 1

Reduced categories	UK qualifications	
Low	None of these qualifications (this excludes any overseas qualifications) No qualifications GCSE grades D–G (academic) NVQ SVQ GSVQ level 1 (vocational) NVQ SVQ GSVQ level 2 (vocational)	40.27%
Middle	O level GCSE grade A–C (academic) NVQ SVQ GSVQ level 3 (vocational) A AS S Levels (academic)	16.75%
High	Diplomas in higher education, nursing, or other medical qualifications, NVQ level 4 First degree, higher degree, professional qualifications at degree level, NVQ level 5	42.98%

Note. A = Advanced; AS = Advanced Subsidiary; GCSE = General Certificate of Secondary Education; GSVQ = General Scottish Vocational Qualifications; NVQ = National Vocational Qualification, SVQ = Scottish Vocational Qualification.

The MCS data from Wave 1 to Wave 3 has been used in Studies 1 and 3. In Wave 2, children's vocabulary skills were assessed, parent–child interactive behaviors were observed, parental disciplinary practices, and children's socioemotional development were parent-reported. In Wave 3, children's vocabulary skills and socioemotional development were measured again.

The National Educational Panel Study (NEPS)

The NEPS is a multicohort study. The current dissertation used the newborn cohort study—NEPS-SC1. This longitudinal large-scale study started in 2012 (Wave 1). A representatively drawn sample of 3,431 families and their 6–8-month-old children (50% female) participated in NEPS-SC1. Employing sample design weights permits statements for whole Germany (see Aßmann et al., 2015, for detailed sampling design). The data set includes information on the target children, their siblings, and their families using videotaped observation and self-completed questionnaires. There have been nine waves to date, children's average ages across waves range from 7 months to 8 years. Parents reported demographic information and on their children's characteristics at each measurement point. In Wave 1, parents had approximately 15.83 years of education (SD = 2.24) and their average monthly family net equivalent income was 1,723.86 Euro (SD = 868.53). Information of 2,022–2,478 children from Wave 1 to Wave 6 were included in the conducted studies. Children's ages in respective waves were 7 months (M = 7.10, SD = 0.74), 14 months (M = 13.75, SD = 1.41), 26 months (M = 27.00, SD = 1.24), 3 years (M = 39.14, SD = 1.09), 4 years (M = 51.04, SD = 1.72), and 5 years (M = 62.26, SD = 1.83). Around 44% of the children came from families with a migration background.

NEPS-SC1 data from Wave 1 to Wave 6 has been used in Studies 1 and 2. From Wave 1 to Wave 3, parent–child interactions were observed. Note that only interactions in Wave 3 were used in the current dissertation. In Wave 3, parents reported children's language skills. In Wave 4, children's vocabulary skills were assessed and their socioemotional development was parent-reported. In Wave 5, parents reported their disciplinary parenting practices. In Wave 6, children's vocabulary skills were assessed and parents reported children's socioemotional development again.

5.2 Main Measures

These two large-scale data sets provide the conducted studies with various measures on family and individual characteristics from different time points, e.g., parental educational level, family income, parental distress, and children's temperament. In this section, only the outcome variables and the main explanatory variables were briefly described, i.e., children's language and socioemotional development and parental sensitivity. Depending on study designs, these indicators were differentially modeled in each conducted study (see below). For further detailed information on measures, see the attached empirical studies.

Language skills (child). In MCS, children's expressive vocabulary in English was directly assessed at ages 3 and 5 by using the Naming Vocabulary subtest from the British Ability Scale Second Edition (BAS II; Elliott et al., 1996). In NEPS-SC1, children's language skills in German at 26 months were reported on a validated language checklist (Elternfragebögen für die Entwicklung von Risikokindern 2; ELFRA 2; Grimm & Doil, 2006). This instrument, which measures children's expressive vocabulary, syntax, and morphology, is comparable to the MacArthur Communicative Development Inventories (CDI; Fenson, 1993). In addition to the parent-reported language skills, children's vocabulary skills were also directly assessed in NEPS-SC1. That is, children's receptive vocabulary skills in German were assessed at age 3 by using a German version of the Peabody Picture Vocabulary Test – 4 (PPVT – 4; Dunn & Dunn, 2007). Study 1 included the directly assessed language skills at age 3: Expressive vocabulary from MCS and receptive vocabulary from NEPS-SC1. Study 2 used parent-reported children's language skills at 26 months from NEPS-SC1, and Study 3 used the directly assessed expressive vocabulary at ages 3 and 5 from MCS.

Socioemotional development (child). Children's socioemotional development was reported by parents on subscales from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997): Prosocial Behavior (e.g., shares readily with other children), Peer Relationships Problems (e.g., picked on or bullied by other children), Emotional Symptoms (e.g., many worries, often seems worried), Conduct Problems (e.g., often fights with other children), and Hyperactivity (e.g., easily distracted, concentration wanders). In MCS, all five subscales were measured at ages 3 and 5. In NEPS-SC1, the first two subscales were assessed at ages 3 and 5, whereas the last two subscales were only measured at age 5. Each subscale has five items and the rating scale ranges from 0 (*not true*) to 2 (*certainly true*). Higher scores suggest higher levels of respective behaviors. In order to use the comparable measures of children's behavioral difficulties from MCS and NEPS-SC1, Study 1 used factor scores extracted from Peer Relationship Problems, Conduct Problems, and Hyperactivity at age 5 from both data. Study 2 included two separate factors as indicators of children's social competence: Prosocial Behavior and Peer Relationship Problems at 26 months from NEPS-SC1. In Study 3, children's socioemotional development was indicated (for the main analyses) by separate Prosocial behavior and Total Difficulties score (sum score of the four difficulties subscales) at ages 3 and 5 from MCS. In the sensitivity check of Study 3, the models were analyzed using separate difficulties subscales.

Parental sensitivity. Parental sensitivity was measured in parent–child interactions. While the physical environment and responsivity of the parent were evaluated during the home visits at age 3 in MCS, the parent–child interactions in semistructured play situations at home were videotaped and rated at age 26 months in NEPS-SC1. In MCS, six items capturing observed sensitive interactive behaviors were included (e.g., the interviewed parent praised the child spontaneously). In NEPS-SC1, five items were included in the studies: Sensitivity to Nondistress (sensitive reactions toward child signals in nondistress

situations), Positive Regard for the Child (verbal and nonverbal expression of positive emotions toward the child), Emotionality (emotional presence), General Stimulation (general enrichment of the child's learning environment), and Language Stimulation (verbal enrichment of the interactive situation). The home learning environment in the MCS was assessed on the Home Observation for Measurement of the Environment (binary) scale (HOME; Bradley & Caldwell, 1984); the 5-point rating scale for coding the interactions in NEPS-SC1 was adapted from the NICHD (National Institute of Child Health and Human Development) and the Study of Early Child Care and Youth Development (SECCYD; NICHD Early Child Care Research Network, 1999; Linberg, Mann, et al., 2019). To examine how parental sensitivity explains the association between SES and children's behavioral difficulties, Study 1 included the globally measured parental sensitivity, i.e., including all six items capturing sensitive interactive behaviors at age 3 from MCS and including all five items assessing sensitive parent–child interactions at 26 months from NEPS-SC1, respectively. To test the effects of specific parental sensitivity, Study 2 differentiated the sensitive parent–child interactions at 26 months from NEPS-SC1 into two specific parenting behaviors, i.e., cognitive-stimulating parenting behavior (General Stimulation and Language Stimulation) and socioemotional supportive parenting behavior (Sensitivity to Nondistress, Positive Regard for the Child, and Emotionality).

5.3 Analytic Strategies

Each study firstly analyzed bivariate correlations between the studied variables and subsequently examined the hypothesized models by using structural equation modelling (SEM) in M*plus* 8.3 (Muthén & Muthén, 2015). Missingness was handled with full information maximum likelihood (FIML; Enders & Bandalos, 2001) or multiple imputation by chained equations (MICE; White et al., 2011). Depending on the specific study designs,

confirmatory factor analysis (CFA), one-way ANOVA, or/and cross-lagged panel model (CLPM) were employed.

6. Conducted Studies

6.1 Study 1: The emergence of 5-year-olds' behavioral difficulties: Analyzing risk and protective pathways in the UK and Germany

Early behavioral difficulties, which refer to a series of age-inappropriate behaviors, often persist throughout elementary school and into adolescence and adulthood (Duncan & Magnuson, 2011). A comprehensive identification of factors affecting early behavioral outcomes is of practical importance, as early behavioral difficulties can become a crystallized pattern of behavior (e.g., Eron, 1994), increase academic problems and influence later academic achievement (Rabiner et al., 2016). Previous studies have indicated that SES, parenting behaviors, and child characteristics are important contributors to children's behavioral outcomes. Although these influential factors—in either protective or risk forms—are likely to occur together in the developmental process (Gore & Eckenrode, 1996), whether they reveal independent effects on children's outcomes remains an open question. Thus, Study 1 (Huang, Weinert, Wareham, et al., 2022) was conceptualized in a comprehensive way and longitudinally investigated multiple protective and risk (mediating) pathways linking to typically developing children's behavioral difficulties at age 5. See Appendix 2, for details.

Given the importance of parenting behavior in socialization processes in early childhood (Ainsworth, 1979), Study 1 investigated the effects of two different parenting behaviors as mediating protective and risk pathways—that is, how globally assessed parental sensitivity (i.e., sensitive parent–child interactions) and negative disciplinary practices differentially influence children's behavioral difficulties. The models also considered central characteristics that have been shown to affect both parenting behaviors

and children's behavior outcomes: Parental education, parental psychological distress, and a child's difficult temperament (Bates et al., 2014; Deater-Deckard, 2004; Hoff & Laursen, 2019; McLearn et al., 2006; Weinert et al., 2017). Furthermore, Study 1 also examined whether children's early vocabulary skills mediated the effect of parental sensitivity, which in turn, may additionally serve as a protective pathway influencing children's behavioral difficulties. Taken together, the protective pathways consisted of observed sensitive parent–child interactions and tested child vocabulary linking parental education to children's behavioral outcomes; the risk pathways focused on parent-reported negative disciplinary practices linking (low) parental education, parental distress, and children's difficult temperament to children's behavioral difficulties. Controlling for family income, child's sex, and formal child care attendance, the protective and risk pathways were firstly specified simultaneously and then separately. By doing so, Study 1 aimed to determine whether they revealed independent effects on children's behavioral outcomes. Given the similarities of parental cognition in child-rearing in Western European countries (i.e., emphasizing individualism and independence; Bornstein & Cheah, 2006), Study 1 sequentially analyzed the models by using two nationally representative data, i.e., MCS from the UK (N = 13,053) and NEPS-SC1 from Germany (N = 2,022), to test the generalizability of the findings (albeit minor differences in the assessments and operationalization were employed).

Children's behavioral difficulties at age 5 were indicated by the factor score extracted from a second-order measurement model, which included peer relationship problems, conduct problems, and hyperactivity at age 5 (MCS: χ^2 = 2704.908, df = 87, p < .001, CFI = .938, RMSEA = .049, SRMR = .056; NEPS-SC1: χ^2 = 194.240, df = 87, p < .001, CFI = .954, RMSEA = .025, SRMR = .065). Sensitive parent–child interactions in MCS was indicated by the mean value of all the observed six items (α = .60) capturing sensitive interactive behaviors between parents and their children during the interview; in

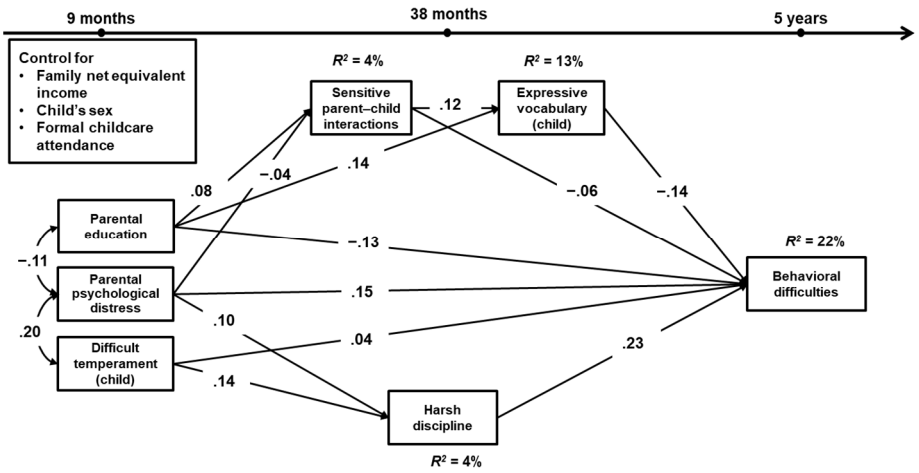
NEPS-SC1 all five observed items (α = .80) from play situations at home were included to calculate the mean value. The negative disciplinary practices were self-reported on the Conflict Tactics Scale at age 3 in MCS (Straus & Hamby, 1997) and the Alabama Parenting Questionnaire at age 4 in NEPS-SC1 (Shelton et al., 1996), respectively. Models were conducted using SEM in M*plus*. All analyses included survey weights to account for the stratified cluster sample design of the studies and attrition bias due to nonresponse across surveys. Missingness was handled by using FIML.

Primarily, the results showed that models fit the data well (MCS: $\chi^2 = 100.635$, $df = 10$, $p < .001$, CFI = .981, RMSEA = .026, SRMR = .013; NEPS-SC1: $\chi^2 = 11.133$, $df = 10$, $p = .35$, CFI = .995, RMSEA = .007, SRMR = .016). Second, findings suggested that considering the control variables both protective and risk pathways simultaneously influence children's behavioral difficulties. In other words, higher parental education has direct and indirect effects through protective pathways (i.e., sensitive parent–child interactions, advanced vocabulary skills) on lower levels of children's behavioral difficulties, whereas parental psychological distress and children's difficult temperament have effects on higher levels of children's behavioral difficulties directly and indirectly through the risk pathway (i.e., parents' negative disciplinary practices). Third, findings indicated that children's early vocabulary skills are an additional protective mechanism affecting behavioral difficulties. Namely, children's vocabulary skills mediated the association between sensitive parent–child interactions or higher parental education and children's behavioral difficulties in the UK and only mediated the association between higher parental education and children's behavioral difficulties in Germany. Finally, when protective and risk pathways were included in the models separately, models revealed almost the same results as documented in the models simultaneously considering both pathways. These results indicated that the protective pathways have unique effects on children's behavioral difficulties with the

presence of risk pathways, and vice versa. Apart from these aforementioned differences, Study 1 found broadly consistent patterns of results across both countries. Taken together, predictors and mediators explained about 22% in the UK and 15% in Germany of the total variance in behavioral difficulties. For detailed results, see Figures 1 and 2.

Figure 1

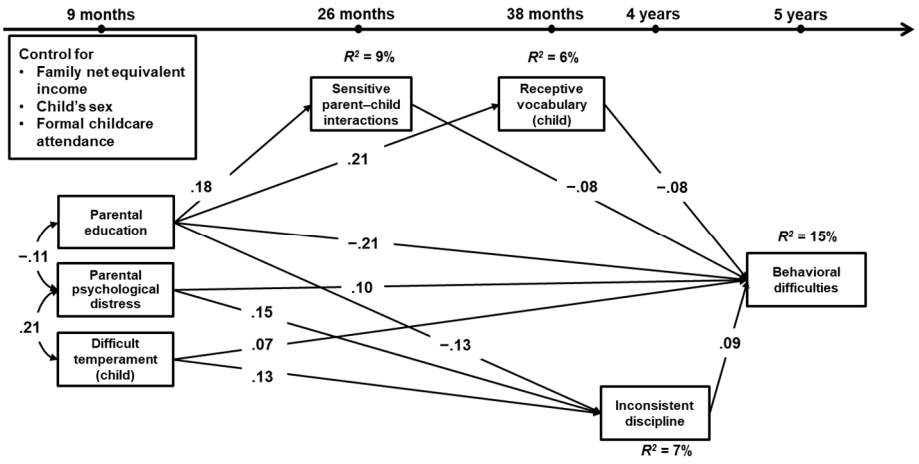
Significant standardized results of conditioned main model using MCS in UK



Note. All coefficients are significant at the $p < .05$ level. $N = 13{,}053$, $\chi^2 = 100.635$, $df = 10$, $p < .001$, CFI = .981, RMSEA = .026, SRMR = .013

Figure 2

Significant standardized results of conditioned main model using NEPS in Germany



Note. All coefficients are significant at the $p < .05$ level. $N = 2{,}022$, $\chi^2 = 11.133$, $df = 10$, $p = .35$, CFI = .995, RMSEA = .007, SRMR = .016

6.2 Study 2: Specific parenting behaviors link maternal education to toddlers' language and social competence

The acquisition of early language and social competence depends particularly on specific experiences at home, with parents playing the most important role in their socialization (Collins et al., 2000). Although previous studies have shown a significant effect of maternal sensitive parenting behavior on children's developmental outcomes, they often mixed different aspects of maternal sensitivity together to investigate its global effect. For example, examining the global effect of sensitive parenting behavior on children's outcomes, Study 1 found a significant effect of parental sensitivity on children's behavioral outcomes in both data sets, but not on children's language skills in NEPS-SC1. This kind of operationalization (i.e., globally measured sensitivity) makes it unclear whether all aspects or specific aspects of parental sensitivity affect children's domain-specific outcomes. Concerning children's language and social competence, prior works also applied more general models to examine early sensitive parenting behavior as proximal condition or pathway linking family background and children's language and social competence (e.g., Barnett et al., 2012; Nozadi et al., 2013; Pungello et al., 2009). Although those findings are important, our understanding of the effects of specific parenting behaviors on children's domain-specific outcomes is still limited. Altogether, it opens up the question whether different facets of parental sensitivity instead of the overall sensitive parenting behavior have an impact on children's domain-specific outcomes.

Therefore, Study 2 (Huang, Weinert, von Maurice, et al., 2022) conceptualized parenting behavior as a multidimensional construct (e.g., Bornstein et al., 2008; Grusec & Davidov, 2010; Linberg, 2018) and distinguished the influences of specific maternal parenting behaviors (i.e., mothers' cognitive-verbally stimulating parenting behavior and

mothers' socioemotionally supportive parenting behavior) linking SES and children's language and social competence. In addition, as language is a crucial psychological and communication tool to gain mastery over behavior and cognition (Vygotsky, 1978), Study 2 also tested whether children's language skills serve as a pathway linking cognitive-stimulating parenting behavior to their later social competence in toddlerhood. See Appendix 3, for details.

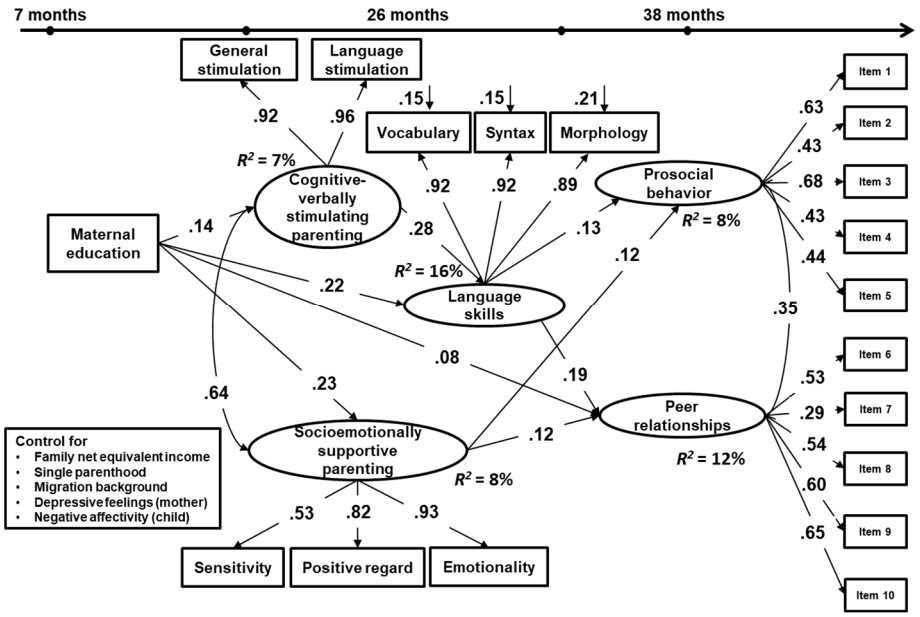
Modelling was based on 2,478 mother–child dyads from NEPS-SC1. Maternal sensitivity at 26 months was indicated by a two-factor measurement model including mothers' cognitive-verbally stimulating parenting behavior (i.e., mothers' general stimulation and language stimulation), and mothers' socioemotionally supportive parenting behavior (i.e., mothers' sensitivity to nondistress, positive regard for the child, and emotionality; χ^2 = 93.096, df = 4, p <.001, CFI =.996, RMSEA =.095, SRMR =.019). Children's social competence was indicated by a two-factor measurement model containing prosocial behavior and peer relationships at age 3 (χ^2 = 216.866, df = 33, p <.001, CFI = .901, RMESA = .047, SRMR = .049). These two observed specific parenting behaviors at 26 months were modeled as separate mediating pathways linking maternal education at 7 months and children's language skills at 26 months as well as social competence at age 3. Furthermore, modelling also controlled for family net equivalent income, single parenthood, migration background, mothers' depressive feelings, and child's temperament. Missingness was handled by multiple imputation.

The hypothesized model fits the data well (χ^2 = 970.287, df = 205, p < .001, CFI = .969, RMSEA = .039, SRMR = .039). The results indicated that maternal cognitive-verbally stimulating parenting behavior can be separated from socioemotionally supportive parenting behavior, and that these two interrelated facets (r = .64) of maternal sensitivity are differentially related to children's language skills at 26 months and their social competence

at age 3. More specifically, mothers' cognitive-verbally stimulating parenting behavior was only related to children's language skills, whereas mother's socioemotionally supportive parenting behavior was exclusively associated with children's social competence. In particular, both facets of maternal sensitivity serve as distinguishable mediating pathways between maternal education and early (domain-specific) children's outcomes: Children with more educated mothers experienced comparatively more cognitive-verbally stimulating and more socioemotionally supportive parenting behaviors. Subsequently, children who experienced comparatively more cognitive-verbally stimulating parenting behavior showed more advanced language skills at 26 months, and those who experienced more socioemotionally supportive parenting behavior had a higher level of social competence at age 3. Furthermore, the findings also suggested that children's early language skills have an additional effect on their social competence, thus serving as an additional indirect path linking cognitive-stimulating parenting behavior and children's social competence. These aforementioned findings were also robust in the presence of the control variables. It is noteworthy that although Study 1 did not find a significant effect of globally measured parental sensitivity on children's language skills at age 3, Study 2 did find a significant effect of a specific aspect of parental sensitivity (i.e., cognitive-verbally stimulating parenting behavior) on children's language skills at 26 months. Taken together, predictors and mediators in this model explained about 16%, 8%, and 12% of the total variance in children's language, prosocial behavior, and peer relationships, respectively. For detailed results, see Figure 3.

Figure 3

Standardized Estimates of the Conditional Model



Note. All coefficients are significant at the $p < .05$ level. $N = 2{,}478$, $\chi^2 = 970.287$, $df = 205$, $p < .001$, CFI = .969, RMSEA = .039, SRMR = .039.

6.3 Study 3: Relations between early majority language and socioemotional development in children with different language backgrounds

In Studies 1 and 2, early language skills have been hypothesized to impact children's later socioemotional development, as language serves as a communicating and self-regulating tool for successful social interactions (Vygotsky, 1978). At the same time, early language acquisition is embedded in a series of social interactions with adults and peers (Schieffelin & Ochs, 1986). The association between these two domains seems to be reciprocal. As expected, Studies 1 and 2 found significant correlative associations between children's early language skills and their later socioemotional development. However, as

both Studies did not control for children's initial level of socioemotional development, the predictive effects of children's language skills on socioemotional development could not be determined. Apart from this, as socioemotional development in both Studies were measured (at ages 3 and 5) later than language skills (at 26 months and age 4), the opposite effect from socioemotional development to language skills could not be tested either. Furthermore, previous works also found contradictory findings: Unidirectional effects either from language skills to socioemotional skills or the reverse, a bidirectional, or even no interrelation between them (e.g., Barnett et al., 2012; Girard et al., 2016; Sparapani et al., 2018). This makes it hard to get a clear picture of the association between these two domains. Note that the contradictory findings might be due to that previous studies did not differentiate between children with various language backgrounds and/or different operationalizations of socioemotional development (for details, see Section 3.4). In particular, given the increasing number of bilingual/multilingual children in the UK as well as worldwide, it is particularly important to understand whether this association differs for children who grow up with different language-related family backgrounds (i.e., language backgrounds).

Thus, Study 3 (Huang, Weinert, & Volodina, submitted) longitudinally investigated the association between children's majority language skills and socioemotional development in children with different language backgrounds. More specifically, Study 3 explicitly considered the heterogeneity in DLLs and differentiated two DLLs groups: 1) *English and minority language(s) Dual Language Learners* (EM-DLLs; children who speak both majority and minority languages at home) and 2) *minority language(s) predominant DLLs* (ML-DLLs; children who exclusively speak the minority language at home), to compare with *monolingual English children* (MOEN; children who exclusively speak English at home). In order to determine the directionality of the investigated association and enhance

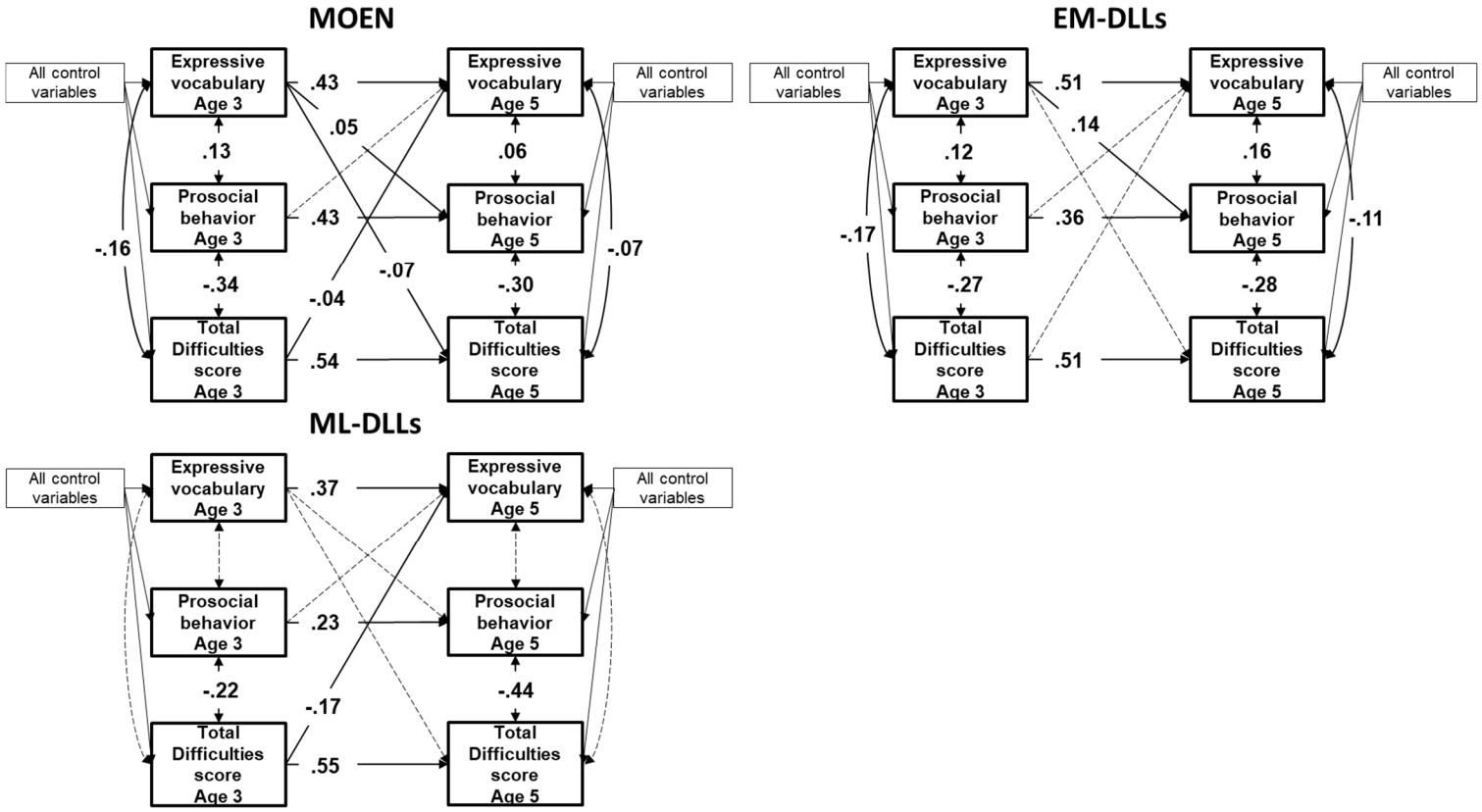
the robustness of the results, models specifically controlled for children's initial levels of skills and a number of influential factors. Taken together, Study 3 examined the directionality of the association between children's majority language skills and socioemotional development considering children's language backgrounds and controlling for children's initial levels of skills. See Appendix 4, for details.

In total, 12,951 children from MCS were included in Study 3. At ages 3 and 5, children's language skills were measured by expressive vocabulary using the Naming Vocabulary subtest from the BAS II (Elliott et al., 1996). Children's socioemotional development at ages 3 and 5 was indicated by prosocial behavior and the Total Difficulties score of the four difficulties subscales (i.e., Conduct Problems, Emotional Symptoms, Hyperactivity, and Peer Relationship Problems) from SDQ (age 3: αs = .66 and .78; age 5: αs = .67 and .80). The analysis models also controlled for family background, early attendance at ECEC, and the child's sex. According to the information on the language(s) spoken at home, 11,410 children (88%) were categorized into MOEN, 1,180 children (9%) were categorized into EM-DLLs, and 360 children (3%) were categorized into ML-DLLs. In addition to the main model separating children with different language backgrounds, Study 3 also included another model differentiating different aspects of behavioral difficulties, i.e., conduct problem and hyperactivity (as externalizing problems), emotional symptoms (as internalizing problems), and peer relationship problems, to test for the generalizability of results; and then another model using the full sample to help us better understand whether differentiating children's different language backgrounds could be accounted for in the unclear existing findings. The multiple-group analyses were conducted with cross-lagged panel models. Study 3 first analyzed the unconditional model and then the conditional model (including all control variables). Missingness was handled by using FIML.

The results indicated that both unconditional and conditional models fit the data well (χ^2 = 151.601, *df* = 6, *p* < .001, CFI = .983, RMSEA = .075, SRMR = .028; χ^2 = 144.029, *df* = 6, *p* < .001, CFI = .990, RMSEA = .073, SRMR = .014). Primarily, the results revealed that the association between these two domains differs for children with different language backgrounds. That is, the findings indicated (1) a bidirectional association between children's expressive English vocabulary and their total behavioral difficulties for MOEN. Yet for both DLLs groups, only (2) a unidirectional effect of children's expressive English vocabulary on prosocial behavior for EM-DLLs and (3) a unidirectional effect of children's total behavioral difficulties on their expressive English vocabulary for ML-DLLs emerged. Furthermore, the similar results of unconditional and conditional models indicated that the emerging associations were robust to the inclusion of control variables. Second, the overall pattern of relations largely holds for externalizing and internalizing problems though not for peer relationship problems. For the latter case, results indicated a unidirectional effect of language skills on peer relationship problems for MOEN, the opposite effect for EM-DLLs, and nonsignificant cross-lagged association for ML-DLLs. Third, considering the full sample, children's majority language skills affect socioemotional development, and socioemotional difficulties affect their expressive vocabulary. For detailed results, see Figures 4–6.

Figure 4

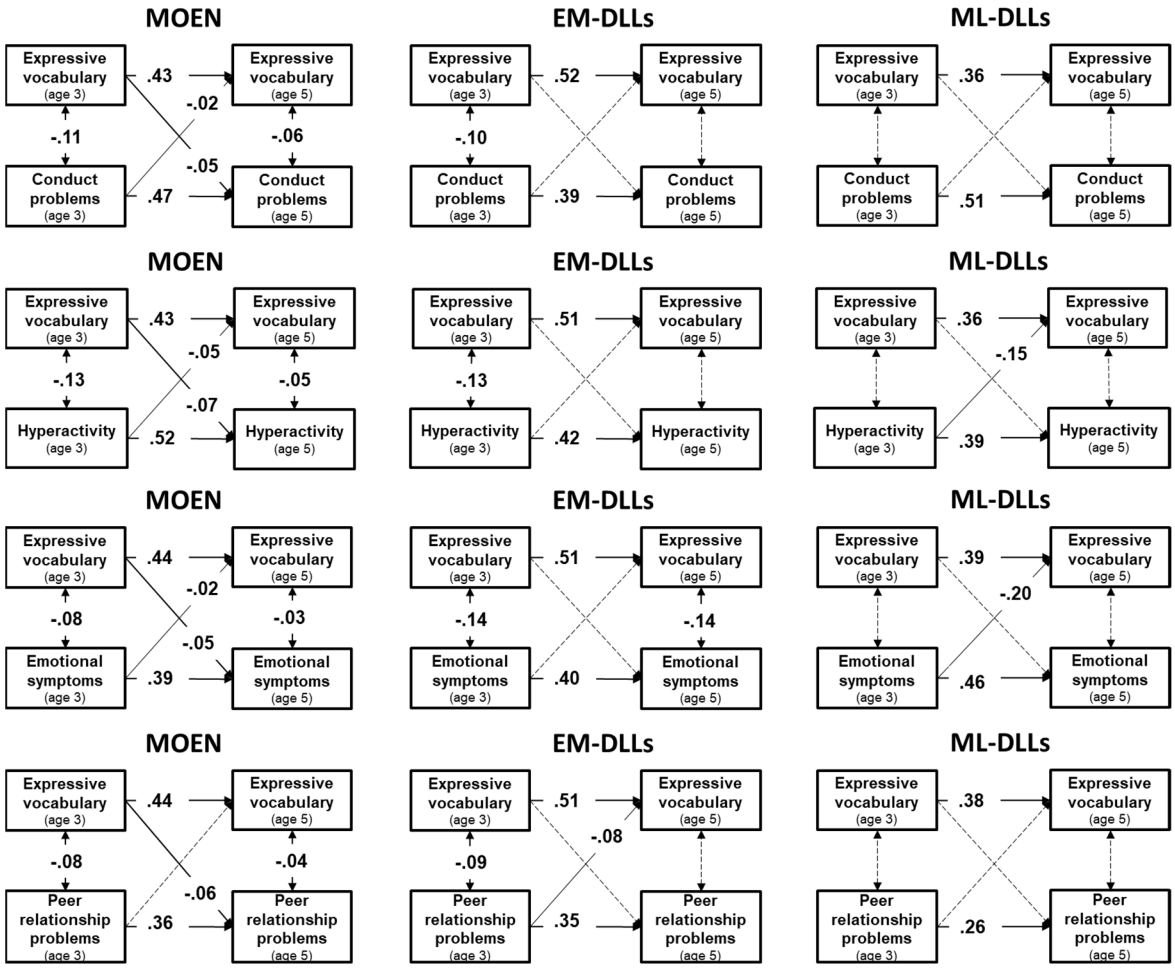
Standardized Estimates of the Conditional Bidirectional Coupling Model



Note. All significant paths ($p < .05$) are presented in solid lines. Dashed lines refer to non-significant paths. n_{moen} = 11,410, $n_{em\text{-}dlls}$ = 1,181, $n_{ml\text{-}dlls}$ = 360, χ^2 = 144.029, df = 6, $p < .001$, CFI = .990, RMSEA = .073, SRMR = .014. MOEN = English monolingual children; EM-DLLs = English and minority languages dual language learners; ML-DLLs = minority language predominant dual language learners.

Figure 5

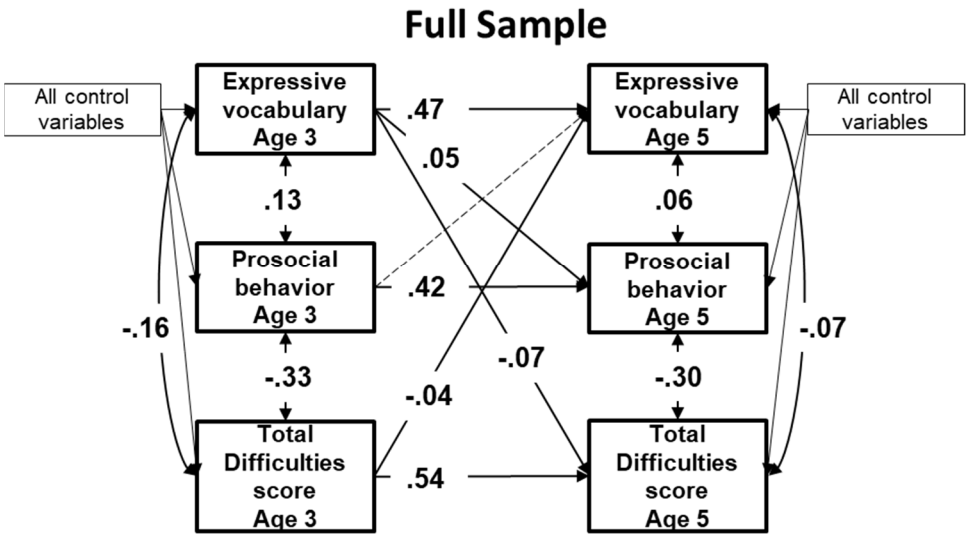
Standardized Estimates of the Conditional Bidirectional Coupling Model with Separate Difficulties Subscales



Note. All significant paths ($p < .05$) are presented in solid lines. Dashed lines refer to non-significant paths. $n_{moen} = 11{,}410$, $n_{em\text{-}dlls} = 1{,}181$, $n_{ml\text{-}dlls} = 360$, model fits for each model are same: $\chi^2 = 0.00$, $df = 0$, $p < .001$, CFI = 1.00, RMSEA = .00, SRMR = .00. MOEN = English monolingual children; EM-DLLs = English and minority language dual language learners; ML-DLLs = minority language predominant dual language learners. All models controlled for all control variables (i.e., parental education level, family net equivalent income, parents' immigrant background, child's sext, and attendance at early child education and care under 36 months).

Figure 6

Standardized Estimates of the Bidirectional Coupling Model for the Full Sample



Note. All significant paths ($p < .05$) are presented in solid lines. Dashed lines refer to non-significant paths. N = 12,951, $\chi^2 = 140.709$, $df = 2$, $p < .001$, CFI = .990, RMSEA = .073, SRMR = .014.

7. Discussion

This dissertation sought to investigate the underlying mechanisms between family background and children's language and socioemotional development in early childhood. Primarily, the findings support the hypothesis that parenting behaviors are not only associated with children's outcomes, but also function as mediating pathways illustrating the impact of SES (i.e., parental education) on children's outcomes. The results indicate that early parental sensitivity is positively related to children's advanced language skills at age 4 and less behavioral difficulties at age 5. The (negative) disciplinary practices are related to more pronounced children's behavioral difficulties (Study 1). Parents' negative disciplinary practices also additionally mediate the effect of parental psychological distress and children's difficult temperament on children's behavioral difficulties (Study 1) indicating that different parenting behaviors function as differential mediating pathways linking to children's outcomes. Furthermore, the results suggest that parental sensitivity can be separated into two domain-specific parenting behaviors (i.e., cognitive-verbally stimulating parenting behavior and socioemotional supportive parenting behavior) that differentially mediate the effects of maternal education on children's language and socioemotional skills, respectively (Study 2). In addition, this dissertation also found that children's language skills serve as an additional pathway linking parental education, parenting behaviors, and children's socioemotional outcomes (Studies 1 and 2). The comparable results regarding the independent protective and risk pathways (i.e., different parenting behaviors) linking parental education and children's outcomes in the UK and Germany indicate that those findings are generalizable across these two European countries (Study 1), albeit minor differences in measurements and operationalizations were employed.

Moreover, this dissertation also demonstrates that the language-related family background, i.e., different language backgrounds, influences the association between children's language and socioemotional outcomes. More specifically, the findings substantiate the assumption that the association between children's majority language and socioemotional development differ for children with different language backgrounds (Study 3). This dissertation found a bidirectional association between these two domains for monolingual English children and opposite unidirectional associations for DLLs (i.e., a unidirectional effect of children's majority language skills on prosocial behavior for English and minority language(s) DLLs and a unidirectional effect of children's total behavioral difficulties on their majority language skills for minority language predominate DLLs).

7.1 The Role of Family Background in Children's Outcomes

The current dissertation sheds light on the important role of parenting behaviors in explaining the underlying association between family background and children's language and socioemotional development. Unlike previous studies, this dissertation explicitly considered parental education as a predictor (instead of control variable) of parenting behaviors and children's outcomes. Note that parental education is significantly associated with other family background factors, e.g., family net equivalent income (r is about .44 across the three Studies) and migration background (Study 2: $r = -.22$, $p < .001$). Although the direct effects of parental education on children's outcomes emerged in this dissertation, the indirect/mediating effects of parenting behaviors illustrate that the diversity in children's outcomes could be further explained by the variability of parenting behaviors. The findings here are in line with previous research drawing on Family Investment Model which indicated highly educated parents tend to provide their children with sensitive parental interactions, and, subsequently, their children are more likely to show higher levels of language and

socioemotional development (e.g., Barnett et al., 2012; Bornstein et al., 2020; Newton et al., 2014). Furthermore, the mediating role of negative disciplinary practices linking family background and children's outcomes is in accordance with the Family Stress Model reflecting that family stressors influence children's adverse outcomes indirectly through negative family processes (i.e., negative discipline parenting; Conger et al., 2000).

Co-occurrence of Protective and Risk Pathways

With regard to the co-occurrence of protective and risk pathways (i.e., through parental sensitivity and negative disciplinary practices), the current results indicate that parental sensitivity and negative disciplinary practices have independent impacts on children's behavioral difficulties at the same time. It suggests that protective and risk pathways might co-occur (Gore and Eckenrode, 1996) but have unique roles in explaining the variability of children's outcomes. This finding is in line with the previous findings of Gardner et al. (2003), but it differs from the results of Totsika et al. (2019)—which also used MCS—in that only negative pathways maintained a robust effect on children's behavioral difficulties over and above the protective pathway. This discrepant finding might primarily due to specific characteristics of the sample used in the study by Totsika et al. (2019), i.e., children with intellectual disabilities who experience poverty. Furthermore, the protective pathway in their study was self-reported positive parent–child relationship, whereas in the current dissertation it was through observed sensitive parent–child interactions. As mentioned earlier, multiple factors can be operationalized in given ways to constitute these protective and risk pathways. It could be that if other aspects of (interrelated) parenting behaviors in forms of protective and risk pathways were selected (based on theories) for the purpose of the current dissertation, different or even contradictory results might reveal. Note that the correlations between the protective and risk pathways in the current dissertation are

very low and nonsignificant in both data sets (MCS: $r = -.01$; NEPS-SC1: $r = -.03$), whereas in the study of Totsika et al. (2019) the correlations are significant (rs = −.38 – −.35). The nonsignificant association between parental sensitivity and negative disciplinary practices indicates that early sensitive parenting behavior does not necessarily imply parents' later disciplinary practices.

Furthermore, it should be noted that the protective pathways might also become risk pathways if they scored very low. Taken parental sensitivity from the current dissertation as an example, sensitive parenting behavior can promote children's understanding of the role of language and facilitate secure parent–child attachment, which in turn, affects children's language and socioemotional development (Tamis-Lemonda et al., 2014; Ainsworth, 1979). A very low level of sensitive parenting behavior or the absence of sensitive parenting behavior could be negatively associated with children's language and socioemotional development, as children experienced low level of sensitive parenting behavior that could hinder language and socioemotional development. That is, (low) sensitive parenting behavior becomes a risk pathway negatively influencing children's outcomes. Similarly, low levels of risk pathways (e.g., negative disciplinary practices) might also become protective pathways preventing children from exhibiting problem behaviors.

Language-related Family Background and Children's Outcomes

Apart from parental education, this dissertation also highlights how language-related family background (i.e., extent of speaking majority and minority languages at home) plays an important role in children's language and socioemotional development. Because speaking a minority language might generally happen in families with a migration background, the language-related family background here indirectly refers to a migration background. Note that language(s) spoken at home has been frequently utilized to indicate migration

background (e.g., Rose et al., 2016). Given that the number of immigrants is increasing worldwide, understanding how immigrant children develop is becoming more and more crucial. Although previous studies using heterogeneous samples have controlled for a migration background, this operationalization might not comprehensively clarify its effect on children's outcomes.

In this dissertation migration background was controlled for in Study 2, and it revealed significant effects on toddlers' peer relationships and language skills ($r = -.05$ and $-.15$, ps $< .00$). In Study 3, the language-related family background was explicitly considered to affect the association between children's language and socioemotional development. The results first demonstrate the overall highest levels of majority language and socioemotional development in monolingual children and the lowest respective skills in DLLs. Because the level of young children's language skills depends largely on language exposure at home as well as on how much children themselves actually speak each language (Tomasello, 2003). It makes sense that children who immerse in different language environments acquire different levels of majority language skills (in particular with regard to vocabulary). Furthermore, the different patterns of results across language groups indicates that previous findings which failed to consider language-related family backgrounds cannot simply apply to children who also acquire minority language(s) other than the majority language (e.g., Barnett et al., 2012; Girard et al., 2017). The different results for different DLLs groups further underline that DLLs are not homogenous in terms of language and socioemotional development. However, given the nonignorable influences of migration background on children's language and socioemotional development, the fact that migration as a family background was not considered in Study 1 should be noted as a limitation.

7.2 Bidirectionality in Child Development

Although the focus of the current dissertation is to investigate how parents influence children's development through their parenting behaviors, it is noteworthy that the association between parenting behaviors and children's developmental outcomes might be reciprocal (Bronfenbrenner & Morris, 2006; Patterson et al., 1991; Sameroff, 1975). That is, children can influence their own socialization by affecting the parenting they receive (Bell, 1968). For example, Barnett et al (2012) found not only significant effects of early sensitive parenting behavior on children's later language and socioemotional skills, but also the reverse effects of children's early socioemotional skills on later sensitive parenting behavior. Furthermore, apart from the social learning theory, coercive theory also helps to account for the development of behavioral difficulties through a bidirectional perspective (Patterson et al., 1991). That is, children's adverse behaviors, such as whining and yelling, are reinforced by parents' withdrawal of discipline. On the other hand, parents' ineffective discipline, such as yelling and hitting, is reinforced when children temporarily stop exhibiting adverse behaviors. Although this dissertation was not able to test the bidirectional association between parenting behaviors and children's language and socioemotional outcomes (due to data restriction), Study 1 did find that children's difficult temperament tends to trigger parents to use negative disciplinary strategies at the preschool age. Although Study 2 did not find a significant association between children's difficult temperament and sensitive parent–child interaction in toddlerhood, one previous study using NEPS-SC1 found that the association only emerged under cumulative distressed conditions (Freund et al., 2017).

To continue the bidirectional perspective in terms of child development (e.g., Bronfenbrenner & Morris, 2006; Sameroff, 1975), this dissertation further demonstrated that children's developments in different domains are not only affected by exogenous

(environmental) factors, but they also interactively affect and are affected by each developmental domain. In line with the dominant existing empirical findings, i.e., the effect of language skills on socioemotional development is robust or stronger than the reverse effect (e.g., Petersen et al., 2013; Salmon et al., 2016), Studies 1 and 2 highlight that children's early language skills affect their later socioemotional development at preschool age. In Study 3, the association has been further substantiated to be, on the one hand, bidirectional for monolingual children's language and total behavioral difficulties and, on the other hand, to be unidirectional for bilingual children's language and socioemotional outcomes. These findings align with the theoretical assumption that advanced language skills facilitate social interaction in daily life because children are better able to understand others, express themselves more efficiently, and solve conflicts verbally, thus, triggering more prosocial behavior (Bruner, 1983; Durkin & Conti-Ramsden, 2007; Keenan & Shaw, 2003; Schultz et al., 2001). At the same time, children who exhibit less behavioral difficulties seem to be more likely to boost their language exposure and productions by increased social interactions with others (Tomasello, 1992; Vygotsky, 1978). Alongside previous findings, i.e., some found a unidirectional effect of children's language on socioemotional skills (e.g., prosocial behavior; Girard et al., 2017; Rose et al., 2016), and others found a bidirectional association between language and behavioral difficulties (Girard et al., 2014, 2016; Petersen et al., 2013), this dissertation emphasizes that not all aspects of socioemotional development are equally important for language acquisition. This may also help explain some of the conflicting patterns of findings identified above.

7.3 Specificity in Child Development

Drawing on the Specificity Principle (Bornstein, 2017, 2019a, 2019b), which asserts that specific setting conditions (e.g., place) of specific people (e.g., individual-difference

characteristics) at specific times (e.g., early childhood) moderate development in specific domains (e.g., language and socioemotional development) by specific processes (e.g., different aspects of parenting behaviors), this dissertation highlights the specificity in terms of parenting behaviors and children's outcomes.

The results on the co-occurrence of protective and risk pathways indicate that parenting behaviors in different forms function as independent specific mediating pathways linking to children's outcomes. The different associations between children's temperament and different parenting behaviors (as mentioned above) also reflect the specific processes related to children's outcomes. In particular, the nonsignificant association between sensitive parent–child interaction and negative disciplinary practices (MCS: $r = -.01$; NEPS-SC1: $r = -.03$) hints that these two parenting behaviors might be simply different concepts differentially correlating to children's temperament. Moreover, even the interrelated two aspects of parental sensitivity ($r = .64$) have also been demonstrated to be separable and differentially influence specific domains of child development. Despite the significant cross-domain correlations between specific parenting behaviors and children's outcomes, i.e., cognitive-verbally stimulating parent behavior correlates to children's socioemotional skills (rs = .05 and .06, ps < .05) and socioemotionally supportive parenting behavior correlates to children's language skills ($r = .14$, $p < .001$), the results from the SEM indicate that only direct domain-specific effects emerged. In particular, although Study 1 did not find a significant association between globally measured parental sensitivity and children's language skills, a significant association between a specific aspect of parental sensitivity and children's language skills did emerge in Study 2. Findings here underline the importance of considering the specificity of parenting behaviors. Furthermore, the different associations between children's language and socioemotional development also underline the specificity of children's outcomes (as mentioned above). Different subdomains of socioemotional

development as well as language development might be differentially correlated to one or another (in terms of cross-domain associations). However, in order to give a comprehensive understanding of the specific association between children's language and socioemotional development, more studies are needed to in-depth study the question which facets of socioemotional development are particularly relevant to which aspects of language development.

7.4 Limitations and Future Studies

Although SDQ is a well-established and widely used screening instrument, the Cronbach's alphas of the SDQ subscales are not very high (e.g., prosocial behavior at age 3: $\alpha = .51$). Due to time constraints, large-scale assessments tend to use rather short instruments, e.g., five items for each SDQ subscale. Scales including more items might be more reliable (Streiner, 2003) and warranted in future research. Yet, note that Cronbach's alpha is designed for measures where items contribute equally to the underlying construct (τ-equivalent). In fact, the measurement model of SDQ which indicated a good fit showed unequal factor loadings of the items, and thus, Cronbach's alpha might be less informative.

In Study 2, children's language and socioemotional skills were reported by the same informant (i.e., their parents). There might be shared method variance and potentially inflating the results. This cannot be ruled out based on the NEPS-SC1 data or theoretical considerations, although a significant association between children's tested language skills and parent-reported socioemotional skills shows up at 38 months in NEPS-SC1 ($r = .11$, $p < .001$). Nevertheless, previous evidence as well as Study 3 using multimethod designs (e.g., Girard et al., 2016; Menting et al., 2011) have shown the predictive role of children's early language skills in their later socioemotional development. In addition, children's socioemotional development was exclusively reported by parents in the current dissertation,

rather than teacher-reported as compared to previous studies. This might be of limited accuracy due to social desirability and differences in parental observation. Differences between parent and teacher reports might also be due to context-specificity of child behavior. However, not all children included in the current dissertation attended child care at age 3 and the teacher-reported data are only available for a limited group of samples in NEPS-SC1 or for older children in MCS.

In Study 3, only expressive vocabulary was considered as a measure of child language. Although disparities in vocabulary skills according to family language background have emerged between monolinguals and DLLs (Oller et al., 2007) and vocabulary is related to skills in other language subdomains, it is still only one facet of children's language skills. Thus, future studies might consider further facets of language skills such as grammatical skills when investigating relations between language and socioemotional development (see, e.g., Rose et al., 2018). Nevertheless, even the measure of expressive vocabulary shows that the interrelation between developmental domains might vary across different groups of children.

While the observational assessment of different aspects of parental sensitivity is a strength of this dissertation (rather than using self-reported measurement), the videotaped play situation was rather short (each for 10 min) and the interrater reliability for each single item was not that high despite extensive training (Spearman's ρ: .60–.63; Linberg, Mann, et al., 2019). This may limit the generalizability of the emerged effects of interactive parenting behavior on children's outcomes. However, it is worth pointing out that additional codings and analyses showed acceptable ecological and construct validities of the assessments (Linberg, Mann, et al., 2019) and some stability across different interactive situations (Weinert et al., 2023). Thus, the results may inspire future studies with more elaborate

observations. Furthermore, as mothers play the central role in children's socialization in early childhood, Study 2 demonstrated that mothers' parenting behaviors mediate the effect of the maternal educational level on children's language and socioemotional development. However, given the increasingly acknowledged importance of the father's role in parenting, the impacts of paternal parenting behaviors on children's outcomes should not be ignored. For example, Newton et al. (2014) found not only positive effects of the observed mothers' but also fathers' sensitivity on children's socioemotional skills. Study 1 has illustrated the influences of two different forms of parenting behaviors on children's behavioral difficulties. However, only 1 % (MCS) and 3% (NEPS-SC1) of the parents included in the studies are fathers. Hence, conclusions on the influence of fathers can be hardly drawn. Thus, future studies should further examine the father's role in these mechanisms.

Finally, as the current dissertation focused on early childhood, the conducted studies examined a relatively short span of development (from the first year up to 5 years of age). While Studies 1 and 2 examined parenting behaviors as explanatory variables mediating the effect of parental education on children's outcomes from toddlerhood to preschool age, future studies could extend the time period and test whether the effects of parenting behaviors hold for children's later language and socioemotional development. Moreover, due to data restriction (i.e., no measure of expressive vocabulary was collected in Wave 4 in MCS when children were 7 years old), the models investigating the association between children's language and socioemotional development could not be extended beyond 5 years of age in Study 3. Future studies could further examine whether the impact of language-related family background remains a significant factor for older children's outcomes. For example, future research could investigate whether changes in the magnitude of the association between language and socioemotional development or even the direction of that association can be observed in older children.

7.5 Practical Implications

Findings from the current dissertation shed light on the role of parenting behaviors in explaining the impact of parental education on children's developmental outcomes. Although parenting behaviors are not only determined by the levels of parental education, the big differences in parenting behaviors within and across social groups as well as developmental domains suggest that educational options influence and enhance parenting behaviors. In particular, the current findings suggest early specific professional parenting programs that can help parents to deliver more adequate parenting behaviors (e.g., domain-specific parenting) to their children. This, in turn, could reduce the impact of social disparities related to different parents' educational levels on children's development, namely promoting language and socioemotional skills and preventing problematic child behavior. Besides programs for all parents, tailored programs for specific groups of parents should also be considered, e.g., for less educated parents or parents who are vulnerable to mental health. Furthermore, the current findings also have implications for meeting the needs of young children with different language-related family backgrounds. In order to best equip children's development, parents may need to foster children's majority language development which can enable successful social interactions in the society. Especially for children who speak little or no majority language at home, parents would be advised to choose early extrafamilial child care to immerse their children in the majority language environment (by increasing their children's opportunities to connect with native speakers). Moreover, caregivers from child care could pay more attention to promoting children's majority language skills. For example, establishing conversations about prosocial behaviors and inner states could not only enhance the development of prosocial behaviors directly, but also increase verbal interactions (Brazzelli et al., 2021).

7.6 Conclusion

The current dissertation found that different parenting behaviors serve as mediating pathways (either as protective or risk pathways) explaining the underlying mechanisms between family backgrounds and young children's outcomes. In particular, the findings indicate that parental sensitivity can be separated into domain-specific parenting behaviors (i.e., cognitive-verbally stimulating and socioemotionally supportive parenting behaviors) differentially affecting children's language and socioemotional development. Furthermore, the association between children's language and socioemotional development is not only unidirectional, i.e., early children's language skills have an effect on their later socioemotional development, which adds an additional pathway linking SES, parenting behaviors, and children's socioemotional development; the reverse effect of children's socioemotional development (behavioral difficulties) on later language skills also emerged in the current dissertation. Finally, language-related family background has been shown to influence the association between children's majority language skills and socioemotional development. That is, findings indicate a bidirectional association between majority language and socioemotional development for monolingual children, a unidirectional effect of majority language skills on socioemotional development for majority and minority languages DLLs, and a unidirectional effect of children's socioemotional development on majority language skills for minority language predominate DLLs.

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9. Appendix

Appendix 1. Tabular compilation of publications

	Authors	Title	Status	Author Contributions
1	Huang, W., Weinert, S., Wareham, H., Law, J., Attig, M., von Maurice, J., & Roßbach, H.-G.	The Emergence of 5-Year-Olds' Behavioral Difficulties: Analyzing Risk and Protective Pathways in the United Kingdom and Germany.	Published in *Frontiers in Psychology, 12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.769057	The first author designed the research questions as well as the computational modelling, calculated the analyses, and drafted the manuscript. All authors contributed to the specification of the hypotheses, the exact modelling and revision of the manuscript.
2	Huang, W., Weinert, S., von Maurice, J., & Attig, M.	Specific Parenting Behaviors Link Maternal Education to Toddlers' Language and Social Competence	Published in *Journal of Family Psychology, 36*, 998–1009. https://doi.org/10.1037/fam0000950	The first author designed the research questions as well as the computational modelling, calculated the analyses, and drafted the manuscript. All authors contributed to the specification of the hypotheses, the exact modelling and revision of the manuscript.
3	Huang, W., Weinert, S., & Volodina, A.	Relations Between Early Majority Language and Socioemotional Development in Children With Different Language Backgrounds	Resubmitted in *Child Development*	The first author designed the research questions as well as the computational modelling, calculated the analyses, and drafted the manuscript. All authors contributed to the specification of the hypotheses, the exact modelling and revision of the manuscript.

Appendix 2. Study 1: The emergence of 5-year-olds' behavioral difficulties: Analyzing risk and protective pathways in the UK and Germany

Huang, W., Weinert, S., Wareham, H., Law, J., Attig, M., von Maurice, J., & Roßbach, H.-G. (2022). The emergence of 5-year-olds' behavioral difficulties: Analyzing risk and protective pathways in the United Kingdom and Germany. *Frontiers in Psychology*, *12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.769057

The emergence of 5-year-olds' behavioral difficulties: Analyzing risk and protective pathways in the UK and Germany

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Disclosure 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.

Author Contributions

The first author designed the research questions as well as the computational modelling, calculated the analyses and drafted the paper. All authors contributed to the specification of the hypotheses, the exact modelling and revision of the manuscript.

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Data Availability Statement

This paper used MCS data and NEPS-SC1 data. The MCS data are freely available to bona fide researchers under standard access conditions via the UK Data Service (http://ukdataservice.ac.uk). The NEPS data are provided as open-access scientific use file which are available under standard access condition via NEPS Data Center (https://www.neps-data.de/Data-Center/Data-and-Documentation/Starting-Cohort-Newborns).

Abstract

This study aimed to advance our understanding of 5-year-olds' behavioral difficulties by modeling and testing both mediational protective and risk pathways simultaneously. Drawing on two national samples from different Western European countries—the UK (13,053) and Germany (2,022), the proposed model considered observed sensitive parental interactive behaviors and tested child vocabulary as protective pathways connecting parental education with children's behavioral outcomes; the risk pathways focused on negative parental disciplinary practices linking (low) parental education, parental distress, and children's difficult temperament to children's behavioral difficulties. Further, the tested model controlled for families' income as well as children's sex and formal child care attendance. Children with comparatively higher educated parents experienced more sensitive interactive behavior, had more advanced vocabulary, and exhibited fewer behavioral difficulties. Children with a comparatively higher level of difficult temperament or with parents who suffered from distress tended to experience more negative disciplinary behavior and exhibited more behavioral difficulties. Additionally, children's vocabulary skills served as a mechanism mediating the association between parental education and children's behavioral difficulties. Overall, we found similar patterns of results across the UK and Germany with both protective and risk pathways contributing simultaneously to children's behavioral development. The findings suggest that promoting parents' sensitive interactive behaviors, favorable disciplinary practices, and child's vocabulary skills have potential for preventing early behavioral difficulties.

Keywords: behavioral difficulties, protective pathways, risk pathways, parent–child interactions, negative discipline, vocabulary

Introduction

Early behavioral difficulties are a series of age-inappropriate behaviors such as inattention–hyperactivity or conduct problems. They often persist throughout elementary school and into adolescence and adulthood (Duncan & Magnuson, 2011). Previous research suggests that without intervention, early behavioral difficulties can become a crystallized pattern of behavior (e.g., Eron, 1994), increase academic problems such as school dropout, and influence later academic achievement (Rabiner et al., 2016). Children frequently do not "grow out of" early occurring behavioral problems naturally (Richman et al., 1982). Hence, a comprehensive identification of factors affecting early behavioral outcomes of overall typically developing children can facilitate proposing efficient preventive programs.

Evidence from longitudinal studies indicates that family's socioeconomic status, parental behaviors, and child characteristics are important distal and proximal contributors to developmental pathways leading to behavioral difficulties (e.g., Bates et al., 2014; Gard et al., 2020; van Zeijl et al., 2007). However, previous studies focused mainly on dysfunctional pathways (i.e., risk factors as mediating pathways) to behavioral difficulties (e.g., Conger et al., 2000; Gard et al., 2020). Protective pathways (i.e., protective factors as mediating pathways) that may hinder the development of behavioral difficulties are still understudied and cannot be viewed exclusively as an absence of risk factors. Which pathways are more pronounced when risk and protective factors are considered simultaneously remains an open question, because both channels are likely to occur together in this developmental process (Gore & Eckenrode, 1996).

Drawing on theoretical assumptions and empirical evidence, the present study proposes and simultaneously tests a complex model of protective and risk pathways to children's behavioral difficulties. In particular, given the importance of parenting behavior

in socialization processes in early childhood (Ainsworth, 1979), this study investigated the effects of two different forms of parenting behaviors as mediating protective and risk pathways—that is, how sensitive parent–child interactions and negative disciplinary practices differentially affect children's behavioral outcomes. Our models also considered central characteristics that have been shown to influence both parenting behaviors and children's behavioral outcomes: parental education, parental psychological distress, and child's difficult temperament (Bates et al., 2014; Deater-Deckard, 2004; Hoff & Laursen, 2019; McLearn et al., 2006; Weinert et al., 2017). Further, we investigated whether the effect of parental interactive behaviors is mediated by advanced early vocabulary skills which may additionally serve as a protective pathway influencing children's behavioral outcomes, because language is a key developmental asset facilitating cognitive and behavioral development (Bruner, 1985; Vygotsky, 1978). Finally, we tested the generalizability of the studied mechanisms by sequentially running the model using two national representative data.

Protective Pathways

Parental education has been widely studied as an indicator of family background predicting children's behavioral outcomes (e.g., Hoff et al., 2002; Hoff & Laursen, 2019). Children with higher educated parents exhibited more competent behavior, whereas children with lower educated parents displayed significantly poorer social-emotional behavior than children with higher educated parents (Halle et al., 2009). One way in which parental education is assumed to affect children's behavior is by shaping parent–child interactions and parental disciplinary practices—that is, what parents do in discipline encounters (Hoff & Lausen, 2019; Weinert et al., 2017). Higher educated parents generally have more resources that matter for children's development (Coleman, 1988) such as books, toys, and access to child care programs. Furthermore, they generally acknowledge the importance of

enriched learning environments, making them more likely to provide children with environments that foster their development such as supportive (i.e., sensitive, warm) interactions (e.g., Weinert et al., 2017). Compared to other important components of family background, i.e., family income and occupation (which might fluctuate over time), parental education is relatively stable and easy to measure. In addition, parental education has been found to influence later income and occupation (Cohn & Addison, 1998) and to explain the greatest share of the variance in child outcomes (Hoff et al., 2002). Thus, for this study, we chose parental education as an indicator of family background contributing to the pathways leading to differences in children's behavioral outcomes.

Sensitive Parent–Child Interactions

Attachment theory indicates that parental sensitivity and warmth in responding to infant behavior can establish a secure parent–child attachment (Ainsworth, 1979). In particular, such sensitive interactive behaviors are more effective than other parenting behaviors (such as negative discipline) in providing a secure base for developing autonomy and self-regulation in toddlerhood (Ainsworth et al., 1974; Grusec & Goodnow, 1994; Ispa et al., 2017). Hence, these kinds of sensitive parent–child interactions in early childhood may serve as a protective factor against the development of behavioral difficulties from an early age. This is empirically supported by study results on the effects of sensitive parent-child interactions on children's behavioral outcomes (e.g., Barnett et al., 2012; Gardner et al., 2007; Huang et al., submitted; Sanders et al., 2000). For example, drawing on a low-income sample, Gardner et al. (2007) found that proactive parent–child interactions (including the use of constructive activities, positive disciplinary strategies, and praise) were associated negatively with children's destructive behavior over and above the effects of negative disciplinary practices. Moreover, using a national sample from Germany, a recent study found that supportive parent–child interactions at 26 months was associated negatively

with peer problems at 38 months (Huang et al., submitted). To enhance our understanding of this protective mechanism, we examined a protective pathway linking parental education and children's behavioral difficulties via an effect of sensitive parental interactive behavior on children's behavioral outcomes (Pathway a).

Subsequent Mechanism—Language

Apart from the positive effects of protective factors per se, some protective factors may also impact on the later emergence of other protective mechanisms (Gore & Eckenrode, 1996). Sensitive parental interactive behaviors have also been suggested to impact children's language development by appropriately responding to children (e.g., Barnett et al., 2012; Bornstein et al., 2020; Nozadi et al., 2013). Furthermore, sensitive parents are also more likely to provide children with a verbally stimulating learning environment that facilitates the acquisition of advanced language skills (Huang et al., submitted). Subsequently, higher language skills provide children with essential means of communication and self-regulation of their social behavior (Bruner, 1985; Vygotsky, 1978). This facilitates their efforts to interpret social exchange, to communicate better with peers, and to show more cooperative behavior (e.g., Rose et al., 2018; Vygotsky, 1978).

In particular, receptive and expressive vocabulary skills in early childhood such as understanding words and putting ideas into words are associated with later behavioral outcomes (e.g., Girard et al., 2016; Menting et al., 2011; Petersen & LeBeau, 2021; Rose et al., 2018). Advanced receptive language skills at age 3 significantly predict the development of cooperative behavior between ages 3 and 7 (Rose et al., 2018), and better receptive language at age 4 predicts decreased externalizing behavioral problems by 6 years (Petersen & LeBeau, 2021). Conversely, both limited receptive and expressive language skills prevent children from expressing themselves well, leading to potentially increased peer rejection and

to a higher risk of exhibiting behavioral difficulties such as aggressive or inattention–hyperactive behaviors (e.g., Girard et al., 2016; Menting et al., 2011).

In this regard, more advanced vocabulary skills are probably a protective factor, whereas limited vocabulary skills may become a risk factor for behavioral development. Therefore, we specified two more pathways linking parental education and children's behavioral difficulties: one directly via an effect of children's vocabulary on behavioral outcomes (Pathway b) and another indirectly via an effect of parental sensitive interactions on children's behavioral difficulties mediated by child vocabulary (Pathway c).

Risk Pathways

When considering how risk factors influence children's behavioral development, studies draw mainly on the family stress model (FSM) hypothesizing that stressors lead to children's adverse behavioral outcomes indirectly through family processes such as negative disciplinary parenting practices (Conger et al., 2000). Empirical evidence suggests that parents suffering from higher levels of stress are more likely to show less engagement and consistency in interactions with their children (McLearn et al., 2006) and tend to exhibit more coercive behaviors and negative emotional expressions in disciplinary encounters—that is, to use harsher and more inconsistent strategies to discipline their children (Deater-Deckard, 2004). Subsequently, by experiencing a series of negative disciplinary encounters, children are at risk for behavioral difficulties at a very early age (e.g., Choe et al., 2013; Gard et al., 2020; van Zeijl et al., 2007). In addition, children's characteristics such as temperament also play an important role in both parenting behavior and children's behavioral outcomes. In particular, children with an early difficult temperament are not only more likely to develop behavior problems (van Zeijl et al., 2007), but also less likely to comply with parents' socialization efforts, and they tend to elicit harsher and more

inconsistent discipline from their parents (Bates et al., 2014), leading to another pathway to children's early behavioral difficulties. Given such evidence, we specified the first two risk pathways leading from parental psychological distress as well as from child's difficult temperament via parents' negative disciplinary practices to children's behavioral difficulties (Pathways d and e).

Although FSM emphasizes the prominent role of economic pressure, parental education might also play an important role in their disciplinary practices. Parents with comparatively lower education might have fewer resources and capacities to help them cope with stressors, and they are more likely to use negative strategies in discipline encounters than higher educated parents (Ryan et al., 2016). Thus, we hypothesized an additional risk pathway from parental education via negative disciplinary practices to children's behavioral difficulties (Pathway f).

Co-occurrence of Protective and Risk Pathways

Despite existing evidence on mediating pathways related to children's behavioral difficulties, it is important to consider whether protective pathways make an independent contribution to children's behavioral outcomes over and above the effects of risk pathways and vice versa. So far, empirical findings on co-occurrences of these factors have been mixed (e.g., Gardner et al., 2003; McKee et al., 2007; Totsika et al., 2019). Gardner et al. (2003) found that protective factors (i.e., sensitive mother–child interactions) correlated uniquely with fewer conduct problems at age 4 independent of other risk factors including low SES, children's initial conduct problems and hyperactivity, maternal depression, and negative parenting behavior at age 3. In contrast, a recent study by Totsika et al. (2019) found that in risk circumstances (i.e., children with intellectual disability, experience of poverty, and parental psychological distress at 9 months), the effect of the modeled protective pathway

(indicated by positive parent–child relationship at ages 3 and 5) on children's behavioral difficulties at age 7 disappeared when the negative pathway (indicated by negative parenting behavior at ages 3 and 5) was included in the analysis. Conversely, the negative pathway maintained a robust effect on children's behavioral difficulties regardless of the presence of the protective pathway.

This inconsistent evidence makes it hard to build up a comprehensive picture of what happens when multiple risk and protective factors appear together. Hence, this study studied multiple protective and risk pathways linking children's early behavioral outcomes simultaneously with the aim of establishing more complex understanding of the mechanisms involved. In particular, we examined whether the predicted pattern of mechanisms holds across different birth cohort studies conducted in different Western European countries (the UK and Germany) at different time points (and thus also across comparable but slightly different instruments and operationalizations of the central constructs).

The Present Study

Our primary goal was to advance our understanding of the underlying mediating protective and risk pathways connected to children's behavioral difficulties at age 5. However, according to Spanos (1986), theoretical assumptions cannot be unambiguously translated into an empirically testable model, due to the fact that not all constructs and relations are directly observable and may be measured differently. In other words, as multiple factors (operationalized in given ways) can constitute these protective or risk pathways, it is not possible to include all of these factors in our model due to restricted data. To address these issues, we applied the probabilistic reduction approach to specify our empirical model, which captures the systematic nature of the observed data (Kaplan, 2009; Spanos, 1986). That is, guided by theoretical assumptions, we chose central influential and

observable factors from two different data sets and modeled their relations within a structural equation model to address our research questions empirically. The protective pathways consisted of parental education through sensitive parent–child interactions and children's vocabulary skills to children's behavioral outcomes. The risk pathways to behavioral difficulties focused on parental education, parental psychological distress, and the child's difficult temperament through parents' negative disciplinary practices. In relation to protective and risk pathways in early childhood, it is important to consider some additional characteristics that reflect diversity in view of their association with early behavioral difficulties. Thus, based on previous evidence, all analyses controlled for the child's sex and formal child care attendance (under 36 months) that might influence children's language and behavioral development (Linberg, Burghardt, et al., 2019; Barnett & Scaramella, 2013), as well as family net income that might affect negative disciplinary practices and children's behavioral outcomes (Ryan et al., 2016).

Furthermore, we aimed to test for the generalizability of results across Western European countries by using two large longitudinal national samples from the UK and Germany. On the one hand, these two cultures emphasize individualism and independence and thus provide parents with similar implicit or explicit models for childrearing such as comparable behaviors that parents appreciate and emphasize (Bornstein & Cheah, 2006). On the other hand, they had contrasting welfare systems at the time of data collection: a liberal market economy in the UK (2000–2001) versus a more conservative welfare state in Germany (2012–2013). The UK had less welfare state protection in terms of, e.g., paid parental leave (14 weeks) to support working parents (Daly & Scheiwe, 2010). Germany, in contrast, legally recognizes the family as a key societal institution (Fagnani, 2007) and has a series of regulations supporting families such as universal provisions for children and longer paid parental leave (12–14 months). These welfare resources are intended to promote

parental health and behavior and, in turn, child development (e.g., Waldfogel, 2006). Drawing on these two perspectives, similar results will allow a generalization of the microlevel mechanisms across different Western European countries, albeit minor differences in the assessments and operationalizations employed, whereas different results could reflect effects of the social and educational systems and/or policy differences (and/or assessment differences). We explored the following three research questions:

(1) Do the specified protective and risk pathways account for early behavioral outcomes when being considered simultaneously?

(a) In particular, we expect parents' sensitive interactive behavior to partially mediate positive effects of parental education on children's behavioral outcomes.

(b) We expect child vocabulary to exert a direct effect on behavioral outcomes and to find an indirect link between parental education via sensitive interactive behaviors and language to children's behavioral outcomes.

(c) With respect to risk pathways, we expect parental education, psychological distress, and children's difficult temperament to be risk factors related to children's behavioral difficulties partially via negative disciplinary practices.

(2) Are the investigated pathways generalizable across countries?

As a robustness check we also test whether considering protective and risk pathways separately leads to the comparable results.

Materials and Methods

Participants

The Millennium Cohort Study (MCS)

The Millennium Cohort Study (MCS) is an ongoing, multidisciplinary cohort study that began in 2000–2001. The MCS drew a representative sample of 18,552 families from across the UK in the first wave. Applying sample design weights permits statements for the whole UK. The MCS collects a diverse range of data from children, their siblings, and parents (Hansen et al., 2010). There have been seven waves to date (ranging from 9 months to 17 years). This study used data from Waves 1 (9 months), 2 (3 years), and 3 (5 years). Twins and the refreshment sample (in Wave 2, due to information that is not available in this sample) were excluded from the analyses. Hence, the current study included information on 13,053 children who participated in the third panel wave (49% female, age at Time 1: *M* = 9.20 months, *SD* = 0.51). In Wave 1, parents provided information on family's demographic and children's characteristics. Parents reported their highest vocational and academic qualifications under the National Vocational Qualification (NVQ) framework: low = 40.27%; middle = 16.75%; high = 42.98% (details see below) and their monthly family net equivalent income (*M* = 1,334.19 pounds, *SD* = 868.38; for details see below). In Wave 2, children were presented with a standardized vocabulary test.

The National Educational Panel Study (NEPS)

The ongoing German National Educational Panel Study (NEPS; Blossfeld & Roßbach, 2019; doi:10.5157/NEPS:SC1:6.0.0) is a large-scale national longitudinal study addressing educational processes and trajectories. The current study used the newborn cohort study of the NEPS containing a representatively drawn sample of infants born across Germany from February to June 2012 (Aßmann et al., 2015). In Wave 1 in 2012–2013, a total of 3,431 families agreed to take part. The data set offers information on the target children and their families. In the children's first 5 years, six measurement waves were conducted when children were around 7, 14, 26, 38, 50, and 60 months old. The current study included 2,022 children who participated in Wave 6 (50% female, age at Time 1: *M* =

7.10 months, *SD* = 0.74). Parents provided demographic information and reported on children's characteristics at each measurement point. In Wave 1, parents reported their years of education (*M* = 15.83, *SD* = 2.24), and their monthly family net equivalent income (*M* = 1,723.86 Euro, *SD* = 868.53; for details see below). At 38 months, children's vocabulary skills were assessed by a standardized test.

The current study only conducted secondary data analysis on both data sets and thus there was no need for Institutional Review Board approval.

Measures

Children's Behavioral Difficulties

In both data sets, parents rated their children's behavior on three subscales from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997)—Conduct Problems (e.g., often fights with other children), Hyperactivity (e.g., easily distracted, concentration wanders), and Peer Relationship Problems (e.g., picked on or bullied by other children)—using a 3-point scale ranging from 0 (not true) to 2 (certainly true). Each subscale contains five items and measures specific child behaviors. A confirmatory factor analysis (CFA) demonstrated good fits for these subscales within a second-order model containing three factors (MCS: $\chi^2 = 2704.908$, $df = 87$, $p < .001$, CFI = .938, RMSEA = .049, SRMR = .056, factor loadings = .48–.83; NEPS: $\chi^2 = 194.240$, $df = 87$, $p < .001$, CFI = .954, RMSEA = .025, SRMR = .065, factor loadings = .41–.86) compared to a first-order model containing one factor (MCS: $\Delta\chi^2 = 2612.674(3)$, $df = 90$, $p < .001$, CFI = .875, RMSEA = .068, SRMR = .083, factor loadings = .30–.80; NEPS: $\Delta\chi^2 = 223.155(3)$, $df = 90$, $p < .001$, CFI = .860, RMSEA = .042, SRMR = .099, factor loadings = .30–.83). Thus, the following analyses used the factor scores extracted from the second-order model to indicate children's behavioral difficulties. Higher scores suggested a higher level of behavioral difficulties.

Parental Education

Parent-reported education according to the country-specific education system was recoded into the Comparative Analysis of Social Mobility in Industrial Nations-Classification (CASMIN-Classification; Brauns et al., 2003). This consists of nine educational categories tracking both academic and vocationally oriented education that reflect institutional differences in national education and training systems, thereby facilitating the comparability of educational attainments in the UK and Germany. Because CASMIN indicators were already available in the NEPS data set, we recoded education attainment in the MCS into the CASMIN classification. Due to low numbers in certain categories, the CASMIN indicators in both cohorts were condensed into three groups: low, middle, and high (for details, see Table S1).

Parental Psychological Distress

For MCS, parents reported their distress on nine items from the modified version of the Rutter Malaise Inventory (Rutter et al., 1970) when their children were about 9 months old. This binary inventory measures whether a parent generally suffers from an emotional disturbance (e.g., feel miserable) and experiences physical symptoms (e.g., heart races like mad). Cronbach's alpha was .72. In NEPS, when children were about 7 months old, parents rated three items on their experienced depressive feelings or stress on a 5-point scale ranging from 1 (never) to 5 (always). An example is, "How often did you feel depressed and sad?" Cronbach's alpha was .65.

Difficult Temperament (child)

In MCS, parents reported children's difficult temperament at 9 months using the 3-item Intensity subscale from the Carey Infant Temperament Scale (Carey & McDevitt, 1978) on a 5-point scales ranging from 1 (almost never) to 5 (almost always). Similarly, at 7

months, parents in NEPS reported their children's behavior on the 3-item Negative Affectivity subscale of the Infant Behavior Questionnaire – Revised (IBQ–R; Gartstein & Rothbart, 2003) on 7-point scales ranging from 0 (never) to 6 (always). Both subscales indicate whether children exhibited challenging behavior over the past weeks (e.g., child becomes upset when not getting what he wants in the MCS; child gets angry when denied something special in NEPS). Cronbach's alphas of both measurements were .54 (MCS) and .51 (NEPS).

Negative Disciplinary Practices

In MCS, harsh discipline was assessed with six items from the Conflict Tactics Scale (Straus & Hamby, 1997). When children were aged about 38 months, parents reported how often they have applied harsh disciplinary strategies (e.g., ignore child, shout at child) on 5-point scales ranging from 1 (never) to 5 (always). For NEPS, self-reported inconsistent disciplinary practices were derived from the Alabama Parenting Questionnaire (APQ; Shelton et al., 1996). Parents reported on four items how often they utilized inconsistent disciplinary practices (e.g., it's hard for you to be resolute in your parenting) on a 5-point scale ranging from 1 (never) to 5 (very often) when children were aged 4 years. Cronbach's alphas of both subscales were .70 (MCS) and .67 (NEPS).

Sensitive Parent–Child Interactions

In MCS, interviewers used selected items from the Home Observation for Measurement of the Environment scale (HOME; Bradley & Caldwell, 1984) to evaluate the physical environment, responsivity of the parent, and arrangement of the environment during home visits by indicating a yes (= 1) or no (= 2) on whether they observed certain parent–child interactions (link to the interviewer guidance: https://cls.ucl.ac.uk/wp-content/uploads/2017/07/MCS2-CAPI-Questionnaire-Child-Measurements.pdf). This

study included six items capturing observed sensitive interactive behaviors at 38 months (e.g., the interviewed parent praised the child spontaneously). Cronbach's alpha of this measurement was .60. The sensitive parent–child interactions in MCS were rated on binary scales (1 = yes, 2 = no), and about 90% parents were rated as showing sensitive interactions (= 1) on each of the six items (situations). We recoded this 90% as 1 (providing prominent sensitive interactions) and the remaining 10% as 0 (providing nonprominent sensitive interactions).

In NEPS, a measure adapted from the NICHD (National Institute of Child Health and Human Development) Study of Early Child Care and Youth Development (SECCYD; NICHD Early Child Care Research Network, 1999) was used as a basis to code the videotaped parent–child interactions in a semistructured play situation in the family homes at age 26 months. Parents were asked to play with their child as naturally as possible for 10 min using a standardized set of toys (for details, see Linberg, Mann, et al., 2019). Trained coders rated each 10-min videotape on qualitatively defined 5-point scales adapted from the rating instrument of the NICHD-SECCYD Study ranging from 1 (not at all characteristic) to 5 (very characteristic). Interrater reliability was good (weighted percentage between 92% and 94%). For the current study, five coded dimensions (items) of parent–child interactions were used: sensitivity to nondistress, positive regard for the child, emotionality, general stimulation, and language stimulation. Cronbach's alpha was .80. For the following analyses, we first calculated the mean values of these five dimensions and then recoded the upper 90% of parents as 1 (providing prominent sensitive interactions) and the remaining 10% as 0 (providing nonprominent sensitive interactions).

Vocabulary Skills (child)

In both cohorts, child vocabulary was assessed when children averaged 38 months old (MCS: SD = 2.50 months; NEPS: SD = 1.10 months). In MCS, children's expressive vocabulary was assessed using the Naming Vocabulary subtest from the British Ability Scales Second Edition (BAS II; Elliott et al., 1996). The scale comprises a stimulus booklet presenting a total of 36 colorful pictures that the child is asked to name (e.g., picture of a shoe). Starting and stopping points differ depending on the child's age and performance: the better they do, the more items they are given. The test is stopped at any point when the child has made five consecutive errors.

NEPS used the German version of the Peabody Picture Vocabulary Test – 4 (PPVT – 4; Dunn & Dunn, 2007) to measure children's receptive vocabulary. The child was asked to select the one out of four pictures that best matched the meaning of the given word. Similar to the Naming Vocabulary subtest, starting and stopping points depended on the child's age and performance. A maximum of 19 sets with 12 items each were administered, and the test was terminated when the child gave more than seven wrong answers in one set.

The standardized ability score (adjusted for item difficulty and age) from the Naming Vocabulary and an age-adjusted sum score of PPVT – 4 were used as continuous variables indicating children's vocabulary skills. Please note that although measurements of vocabulary skills differ across these two cohorts (i.e., expressive vocabulary versus receptive vocabulary), both types of vocabulary skills are highly interrelated (see, e.g., Vatalaro et al., 2018).

Covariates

In MCS, the available weekly family net equivalent income was multiplied by 52 and divided by 12 to provide the monthly family net equivalent income. In NEPS, this was calculated using the OECD-modified equivalence scale (Hagenaars et al., 1994) that assigns

a weight of 1.0 to the household head, 0.5 to each additional person older than 14 years, and 0.3 to each child under 14 years. Further, we log-transformed the net equivalent income from both data sets to reduce its skewness.

At 9 months (MCS) or 7 months (NEPS), parents in both data sets reported their child's sex. Information on formal child care attendance under 36 months was gathered when children were around 9 and 36 months old in MCS and around 7, 14, 26, and 38 months old in NEPS. Formal child care was defined as childminder, day nursery, and playgroup in MCS, and center-based child care and childminder in NEPS.

Analysis Strategy

Due to the nonnormal distribution of the variables under study, a maximum likelihood estimator with robust standard errors (MLR) was used within structural equation modeling in Mplus 8.3 (Muthén & Muthén, 2017). Full-information maximum likelihood (FIML) was used to handle missing data. All analyses included survey weights to account for the stratified cluster sample design of the studies and attrition bias due to nonresponse across surveys. Prior to the SEM analysis, three parcels were separately created by calculating the mean value of the items for parental psychological distress, difficult temperament, and negative disciplinary practices (Little et al., 2002; Matsunaga, 2008). Using parcels was preferred because it requires fewer parameters and is more parsimonious compared to item-level data (e.g., Little et al., 2002; Little et al., 2013).

We ran the main model simultaneously examining pathways a to e. Both children's vocabulary skills and behavioral difficulties were regressed on all covariates; sensitive parent–child interactions were regressed on family equivalent income; negative disciplinary practices were regressed on family equivalent income and formal childcare attendance. As robustness check, we ran two additional models to test whether protective and risk pathways

revealed independent effects on children's behavioral difficulties. Model A1 modeled only the protective pathways a, b, and c with sensitive parental interactive behaviors and vocabulary skills linking parental education and children behavioral outcomes. In Model A2, the risk pathways d, e, and f included parental education, parental psychological distress, and child's temperament as risk factors linking to child behavioral difficulties via negative disciplinary practices.

In order to test the generalizability of the studied mechanisms, we sequentially ran the models using the MCS and NEPS data sets. For working model see Figure S1.

Results

Descriptive Statistics

The descriptive statistics and bivariate correlations between all study variables in MCS and NEPS respectively are presented in Tables 1 and 2. Unless noted otherwise, the significance level was set at $p < .001$ for all significant effects in the correlation analyses. In both countries, children with higher educated parents were more likely to exhibit fewer behavioral difficulties at age 5 (MCS: $r = -.25$; NEPS: $r = -.23$), to experience comparatively higher levels of supportive parent–child interactions at age 3 and 26 months respectively (MCS: $r = .23$; NEPS: $r = .34$), and to show advanced vocabulary skills at age 3 (MCS: $r = .40$; NEPS: $r = .28$). Children who were reported to have a comparatively higher level of difficult temperament by their parents or whose parents suffered higher levels of psychological distress during the first year of their children's lives were more likely to exhibit behavioral difficulties (MCS: r = .24 and .10; NEPS: r = .12 and .09). Furthermore, children who experienced a higher level of negative discipline tended to have more behavioral difficulties (MCS: r = .23; NEPS: r = .19), whereas those who experienced higher

levels of sensitive parent–child interactions or had advanced vocabulary skills were less likely to exhibit behavioral difficulties (MCS: r = −.13 and −.23; NEPS: r = −.10 and −.12).

Main Models

We found very similar results in the UK and Germany. The model fit indices indicated that the models fit both data well (MCS: $\chi^2 = 100.635$, $df = 10$, $p < .001$, CFI = .981, RMSEA = .026, SRMR = .013; NEPS: $\chi^2 = 11.133$, $df = 10$, $p = .35$, CFI = .995, RMSEA = .007, SRMR = .016). The results of the structural equation models are presented in Table 3. Table 4 gives an overview of the total and indirect effects (via different pathways) to children's behavioral difficulties. Figures 1 and 2 include all significant paths with standardized estimates ($p < .05$).

Accounting for child's sex, formal child care attendance under 36 months, and family net equivalent income, sensitive interactions and children's vocabulary skills were associated significantly with lower behavioral difficulties in both countries: Children who experienced a higher level of sensitive parent–child interactions and/or had advanced vocabulary skills in toddlerhood showed comparatively fewer behavioral difficulties at age 5. Both sensitive parental interactions and children's vocabulary skills partially mediated the effect of parental education levels on behavioral difficulties (MCS: $\beta = -.01$ & $-.02$, ps $< .001$; NEPS: $\beta = -.01$ & $-.02$, ps $< .05$). In other words, children with higher educated parents were more likely to acquire advanced vocabulary skills or to receive higher levels of parental sensitive interactions that might protect them from developing later behavioral difficulties. In addition, sensitive interactions were associated significantly with children's vocabulary skills in the UK, but not in Germany.

At the same time, parental distress, children's difficult temperament, and parents' negative disciplinary behavior had direct effects on children's behavioral difficulties at age

5. Children with a higher level of difficult temperament, whose parents suffered from higher levels of psychological distress in the child's first year of life, or who experienced negative discipline from their parents at age 3 or 4, were more likely to exhibit comparatively higher levels of behavioral difficulties at age 5. Furthermore, negative disciplinary practices partially mediated the effects of parental distress and children's difficult temperament on children's behavioral difficulties in the UK (β = .02 & .03, ps < .001). These mediating effects were not significant in Germany (β = .01, p = .06 & β = .00, p = .07).

Taken together, predictor and mediator variables explained about 22% in the UK and 15% in Germany of the total variance in behavioral difficulties.

Robustness Check

When models were calculated separately for protective and risk pathways, the associations between the studied variables were almost the same as documented in the main models. The overall pattern of results was similar across the two cohorts. For details, see the supplemental material—Figures S2–S5.

Discussion

The current study examined model specifying protective and risk pathways linked to 5-year-olds' behavioral difficulties within an integrated framework. Drawing on two large national samples from different Western European countries, we found clear support for applying the theoretical perspectives under study to understand the mediating pathways to behavioral difficulties in early childhood. Primarily, findings suggest that both protective and risk pathways simultaneously influence children's behavioral difficulties. In other words, even when accounting for family net equivalent income, the child's sex, and formal child care attendance under 36 months, higher parental education still has direct and indirect effects through protective pathways (i.e., sensitive parent–child interactions, advanced

vocabulary skills) on children's behavioral difficulties leading to comparatively lower levels; whereas parental psychological distress and children's difficult temperament have effects on children's behavioral difficulties directly and indirectly through the risk pathway (i.e., parents' negative disciplinary practices) associated with comparatively higher difficulties. Second, findings confirm that children's early vocabulary skills are a subsequent protective mechanism—of sensitive parent–child interactions or of higher parental education in the UK and only of higher parental education in Germany—that impact on behavioral difficulties. Apart from the aforementioned differences, we found broadly consistent patterns of results across both countries. This indicates that these microlevel mechanisms are generalizable within these Western European countries despite contrasting welfare systems at the time of data collection (UK: 2000–2001; Germany: 2012–2013) as well as across slightly different operationalizations. Finally, the robustness check indicates comparative results between the integrated model (of both protective and risk pathways) and separated models, and thus hints to a rather independent impact of each pathways.

The findings regarding protective pathways are in line with previous research and demonstrate that children with higher compared to lower educated parents exhibit comparatively fewer behavioral difficulties by either experiencing early sensitive interactions and/or by acquiring more advanced vocabulary skills (e.g., Rose et al., 2018; Weinert et al., 2017). In particular, these findings are in accordance with prior study using the same German sample (Huang et al., submitted). Drawing on the theoretical concepts of sensitive parenting behaviors (Ainsworth, 1979; Vygotsky, 1978), this evidence indicates that children who experience sensitive interactions and/or acquire advanced vocabulary skills in early childhood tend to show fewer behavioral difficulties at age 5. Similarly, the findings regarding risk pathways support the previous evidence drawing on FSM (e.g., Bates et al., 2014; Gard et al., 2020) and illustrate the risk pathway (i.e., negative discipline) as a

link between parental distress and/or children's difficult temperament and children's behavioral difficulties.

However, unlike recent evidence from Bornstein et al. (2020), our hypothesized association between sensitive parent–child interactions and children's vocabulary skills does not emerge in Germany. This could be due to the fact that not all aspects of parenting behaviors affect children's vocabulary skills (Huang et al., submitted). Thus, different aspects of parenting behavior may exert differential impacts on children's domain-specific development (e.g., Bornstein et al., 2008). Although Bornstein et al. (2020) found a significant association between their globally assessed maternal sensitivity and children's language skills, they emphasized that this association may be accounted for the verbal interactions measured in the maternal sensitivity. Furthermore, sensitive parent–child interactions (particularly verbal stimulation) might also be associated more strongly with children's expressive vocabulary but less with receptive vocabulary, because even parent–child interactions in book-reading situations reveal stronger effects on expressive skills, but a weaker or no effect on children's receptive vocabulary (e.g., Bojczyk et al., 2016; DeTemple, 2001).

Moreover, it is worth noting that in both date sets, the results from robustness check also hold when protective and risk pathways are modeled separately. These findings differ from those of Totsika et al. (2019)—in which the effects of protective pathways disappeared once the risk pathway was simultaneously added to the models. Thus, contrary to Totsika et al. (2019), our analyses suggest that the effects of protective pathways (i.e., sensitive interactions and advanced vocabulary skills) on typically developing children's behavioral difficulties are not simply markers for the absence of risk factors; and the impact of risk pathways (i.e., negative discipline) is not attenuated when protective factors are considered. Their effects on behavioral difficulties are independent and robust. This difference to

Totsika et al.'s (2019) study might be associated with the age differences between the samples (i.e., behavioral outcomes at age 7), because sensitive parenting behavior might be more predictive for younger children (Gardner et al., 2003). Furthermore, the discrepancy could also be that Totsika et al. (2019) used sample in risk circumstance (e.g., children with intellectual disability, experience of poverty), whereas we used typically developing samples. Nonetheless, previous research has claimed that the substantial effects of risk factors might disappear when protective factors are controlled, because the latter appear to influence both risk factors and children's behavioral difficulties (e.g., Haggerty et al., 1996). However, the protective and risk factors in our both data sets were not interrelated. This suggests that parents' sensitive interactions are not associated with parental disciplinary strategies. Both factors reflect different dimensions of parenting behaviors. Once again, evidence here emphasizes the multidimensional nature of parenting behaviors—sensitive parent–child interactions and parental disciplinary strategies are different dimensions (Bornstein et al., 2008; Huang et al., submitted).

Finally, although our analysis included important indicators of parental education, parenting behavior, and other explanatory factors (e.g., parents' and children's characteristics), our models explained only 22% and 15% of the variance in 5-year-olds' behavioral difficulties in the UK and Germany. Hence, other factors must account for the unexplained outcome variance. For example, sensitive parent–child interactions in our study were observed directly during interviews or coded from a 10-min videotaped play situation. The frequency of these interactions in daily life might better help to determine the mechanisms. Furthermore, although we focus on the impact of family, we also recognize the importance of extrafamilial childcare—by controlling for formal childcare attendance under 36 months. In both countries, nearly all children began Kindergarten at age 3 (and thus 2 years before outcome assessment). Relations with peers and caregivers within the

Kindergarten environment might also contribute to children's later behavioral outcomes. The differences in explained variance between the two countries might be due to the different welfare systems and the different measurements in the two data sets. However, the notable finding here is the broadly similar mechanisms despite these differences between countries.

Strengths and Limitations

This study contributes to the extensive research on mediational pathways linked to children's behavioral difficulties by tracing 5-year-olds' behavioral difficulties in a range of novel ways: First, it advances our understanding of protective mechanisms by examining sensitive parent–child interactions as protective pathways linking parental education and children's behavioral difficulties. In particular, drawing on theoretical and empirical research, we also included children's vocabulary skills as a subsequent mechanism in our models. Findings indicate that alongside sensitive interactions (attachment theory), language skills (language stimulating scaffolding behavior) serve as an important means of communication to facilitate behavioral development in early childhood. As a second strength, unlike previous studies, we simultaneously considered stressors from both parents' and children's perspectives indirectly via the effect of negative discipline on behavioral difficulties. Third, by using two large national samples from different countries, this study delivers generalizable evidence. These large-scale data sets also allow us to control for the known effects of child and parent covariates. Measurements were theoretically well-designed and based on observation, parent questionnaires, and vocabulary tests with empirically substantiated fit characteristics. Most notably, we identified the independent effects of protective and risk pathways. Fourth, this generalizable evidence suggests that specific preventive programs to help parents deliver more sensitive interactions and efficient disciplinary strategies to their children could prevent problematic child behavior.

Furthermore, programs additionally promoting children's vocabulary skills could also, in turn, help prevent children from exhibiting behavioral difficulties.

That said, this study is not without limitations. First, results cannot be interpreted causally, because structural equation modelling draws on correlational evidence and does not experimentally examine causal effects among these factors. Second, the Cronbach's alphas of some measures are not very high (α: .51–.80). Given that the assumptions (e.g., tau equivalent) of Cronbach's alpha are almost never fulfilled, we additionally calculated the composite reliabilities (CRs) of the constructs (which were specified as latent variables) and found that the CRs were not very high either (see Table S2). The comparably low internal consistencies of some measures (e.g., temperament) might result from the fact that children were very young (7 or 9 months old); characteristics of children at such a young age might not be as coherent or consistent as in older children (Petersen et al., 2015). Furthermore, due to time constraints in large-scale studies the instruments had to be rather short. Scales including more items might be more reliable (Streiner, 2003) and warranted in further research. Related to this issue, we additionally ran two sensitivity tests including the measurement errors to check whether our results are robust to the low reliabilities of some measures. We applied single-indicator latent variables for item parcels with respect to parental distress, child temperament, and negative disciplinary practices in one model and included the full measurement models in another (replacing the item parcels). Overall, we found very similar estimates in both tests compared to our original models (for details see Tables S3 and S4). Third, although we investigated the impact of two different forms of parenting behavior—observed parent–child interactions and self-reported disciplinary parenting behavior—on children's behavioral difficulties, only 1% (MCS) and 3% (NEPS) of the parents included in the studies are fathers. Hence, we can hardly draw conclusions on the influence of fathers. Given the increasingly acknowledged importance of the father's

role in parenting behavior, future studies should further examine their role in these mechanisms. Fourth, children's behavioral difficulties are parent-reported. This might be of limited accuracy due to social desirability and the variation in parental observation. Although we had valid measures of the three-factor behavioral difficulties, future studies using multi informant assessment (e.g., teacher-report) are needed.

Conclusion

In early childhood, sensitive parent–child interactions or possessing advanced vocabulary skills in toddlerhood can protect children from exhibiting behavioral difficulties (i.e., protective pathways). In contrast, experiencing negative discipline may elicit behavioral difficulties (i.e., risk pathways). These two pathways proved independent in our study. This emphasizes that even for children from risk groups (i.e., from families with lower parental education, who have difficult temperament, or have parents suffering from psychological distress), programs that enhance early parent–child interactions and children's vocabulary skills or support parents in promoting appropriate disciplinary strategies hold considerable potential for preventing early behavioral difficulties.

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Tables and Figures

Table 1. Descriptive statistics of study variables (MCS: N = 13,053; NEPS: N = 2,022).

	MCS					NEPS				
Variable	*M*	*SD*	*Min*	*Max*	*Range*	*M*	*SD*	*Min*	*Max*	*Range*
Outcomes (5 years)										
Behavioral difficulties (mean value of three subscales)	0.40	0.28	0.00	1.93	0–2	0.38	0.22	0.00	1.60	0–2
Predictors (9/7 months)										
Parental education	2.03	0.91	1.00	3.00	1–3	2.50	0.60	1.00	3.00	1–3
Parental psychological distress	0.18	0.19	0.00	1.00	0–1	1.75	0.60	1.00	4.33	1–5
Difficult temperament (child)	2.76	0.88	1.00	5.00	1–5	3.67	1.20	0.00	6.00	0–6
Mediators										
Negative disciplinary practices (3/4 years)	2.85	0.72	1.00	5.00	1–5	2.54	0.63	1.00	5.00	1–5
Sensitive parent–child interactions (3 years/26 months)	0.91	0.17	0.00	1.00	0–1	3.50	0.59	1.60	5.00	1–5
Sensitive parent–child interactions (dichotomized)	0.90	0.30	0.00	1.00	0–1	0.91	0.29	0.00	1.00	0–1
Vocabulary skills (child; 3 years; sum scores/age-adjusted scores)	73.77	17.69	10.00	141.00	10–141	48.83	27.86	0.00	121.00	0–228
Control variables										
Family net equivalent income (£/€)	1,334.19	868.38	62.62	5558.67	62.62–5558.67	1,758.71	898.66	270.56	14,285.71	270.56–14,285.71
Child's sex (girls = 1)	0.49	0.50	0.00	1.00	0–1	0.50	0.50	0.00	1.00	0–1
Formal childcare attendance (under 36 months; in months)	3.36	7.76	0.00	36.00	0–36	15.31	8.59	0.00	30.00	0–36

Table 2. Bivariate correlations between study variables: MCS (above diagonal) and NEPS (below diagonal).

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1.	Behavioral difficulties (5 years)	—	−.25***	.24***	.10***	.23***	−.13***	−.23***	−.26***	−.15***	−.04***
2.	Parental education (9/7 months)	−.23***	—	−.11***	.06***	.03**	.14***	.27***	.53***	.01	.14***
3.	Parental psychological distress (9 months)	.12***	−.06**	—	.19***	.12***	−.08***	−.07***	−.16***	−.02*	−.01
4.	Difficult temperament (child; 9/7 months)	.09***	.00	.21***	—	.17***	−.02*	−.01	.00	−.05***	.02*
5.	Negative disciplinary practices (3 years)	.19***	−.07**	.16***	.14***	—	−.01	.02*	.03***	−.10***	.04***
6.	Sensitive parent–child interactions (26 months/3 years)	−.09***	.16***	−.05	−.05	−.03	—	.17***	.18***	.03**	.05***
7.	Vocabulary skills (child; 3 years)	−.12***	.17***	.00	−.01	.02	.07*	—	.31***	.11***	.06***
8.	Family net equivalent income (9/7 months)	−.16***	.43***	−.14***	.06*	−.07**	.16***	.09**	—	.00	.13***
9.	Child's sex (9/7 months; girls = 1)	−.15***	.03	.01	−.02	−.02	.00	.03	−.00	—	−.00
10.	Formal childcare attendance (under 36 months; in months)	−.05*	.23***	.00	−.01	.01	.03	.06*	−.02	−.02	—

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

Table 3. Results from structural equation modeling for MCS and NEPS.

	MCS			NEPS		
	B (SE)	*ß (SE)*	*p*	*B (SE)*	*ß (SE)*	*p*
Behavioral difficulties →						
Parental education	−.08 (.01)	−.13 (.01)	**.00**	−.14 (.03)	−.21 (.04)	**.00**
Parental psychological distress	.42 (.03)	.15 (.01)	**.00**	.08 (.03)	.12 (.04)	**.01**
Difficult temperament	.03 (.01)	.04 (.01)	**.00**	.03 (.01)	.07 (.04)	**.05**
Negative disciplinary practices	.17 (.01)	.23 (.01)	**.00**	.06 (.03)	.09 (.04)	**.03**
Sensitive parent–child interactions	−.03 (.01)	−.06 (.01)	**.00**	−.11 (.06)	−.08 (.04)	**.05**
Vocabulary skills	−.07 (.01)	−.14 (.01)	**.00**	−.04 (.02)	−.08 (.04)	**.03**
Negative disciplinary practices →						
Parental education	.00 (.01)	.00 (.01)	.86	−.13 (.05)	−.13 (.04)	**.01**
Parental psychological distress	.39 (.04)	.10 (.01)	**.00**	.17 (.04)	.15 (.04)	**.00**
Difficult temperament (child)	.11 (.01)	.14 (.01)	**.00**	.07 (.02)	.13 (.04)	**.00**
Sensitive parent–child interactions →						
Parental education	.13 (.01)	.11 (.01)	**.00**	.09 (.03)	.18 (.06)	**.00**
Parental psychological distress	−.24 (.07)	−.04 (.01)	**.00**	.00 (.02)	.01 (.04)	.88
Vocabulary skills →						
Parental education	.13 (.01)	.12 (.01)	**.00**	.31 (.07)	.21 (.04)	**.00**
Sensitive parent–child interactions	.20 (.01)	.22 (.01)	**.00**	.01 (.14)	.00 (.05)	.95
N	13,053			2,022		
Model fit	χ^2 = 100.635, *df* = 10, *p* < .001, CFI = .978, RMSEA = .026, SRMR = .013			χ^2 = 11.133, *df* = 10, *p* = .35, CFI = .996, RMSEA = .007, SRMR = .016		

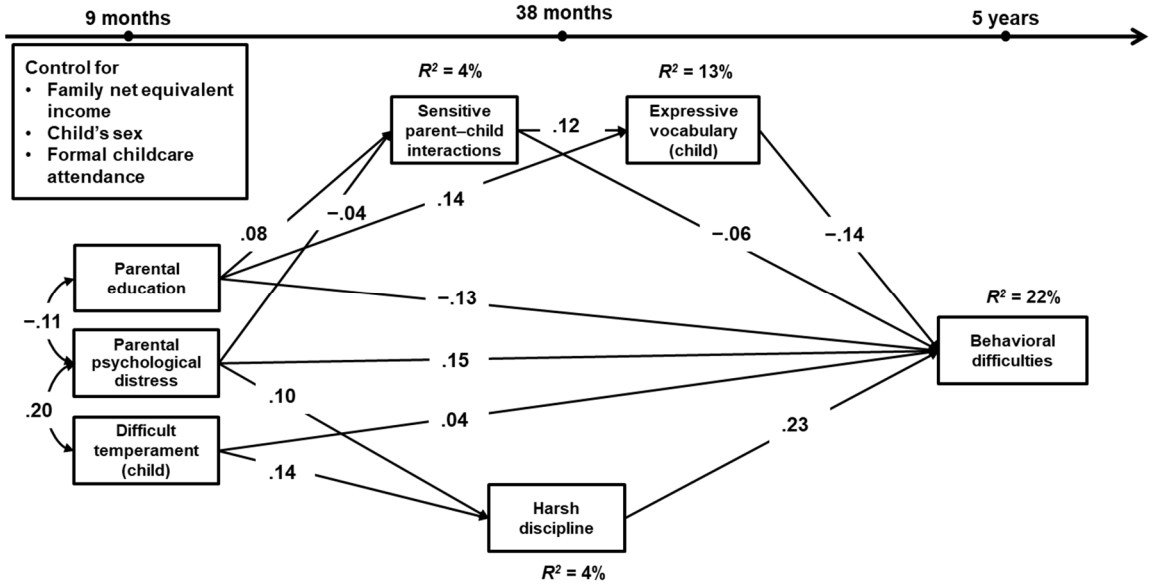
Note. These estimates include control variables. $p \leq 0.05$ are presented in bold.

Table 4. Total and indirect effects to children's behavioral difficulties.

	MCS			NEPS		
Predictor(s)	*B (SE)*	*ß (SE)*	*p*	*B (SE)*	*ß (SE)*	*p*
Parental education						
total effect	−.09 (.01)	−.16 (.01)	**.00**	−.17 (.02)	−.25 (.03)	**.00**
via sensitive parent–child interactions	−.00 (.00)	−.01 (.00)	**.00**	−.01 (.01)	−.01 (.01)	**.05**
via vocabulary skills	−.01 (.07)	−.02 (.00)	**.00**	−.01 (.01)	−.02 (.01)	**.04**
via sensitive parent–child interactions and vocabulary skills	−.00 (.00)	−.00 (.00)	**.00**	.00 (.00)	.00 (.00)	.95
via negative disciplinary practices	.00 (.00)	.00 (.00)	.86	−.01 (.00)	−.01 (.01)	.07
Parental psychological distress						
total effect	.50 (.03)	.18 (.01)	**.00**	.09 (.03)	.12 (.04)	**.00**
via sensitive parent–child interactions	.07 (.00)	.00 (.00)	**.00**	.00 (.00)	−.00 (.00)	.88
via negative disciplinary practices	.07 (.01)	.02 (.00)	**.00**	.01 (.01)	.01 (.01)	.06
via sensitive parent–child interactions and vocabulary skills	.00 (.00)	.00 (.00)	**.00**	.00 (.00)	.00 (.00)	.96
Difficult temperament (child)						
total effect	.05 (.01)	.07 (.01)	**.00**	.03 (.01)	.08 (.04)	**.02**
via negative disciplinary practices	.02 (.00)	.03 (.00)	**.00**	.00 (.00)	.00 (.00)	.07

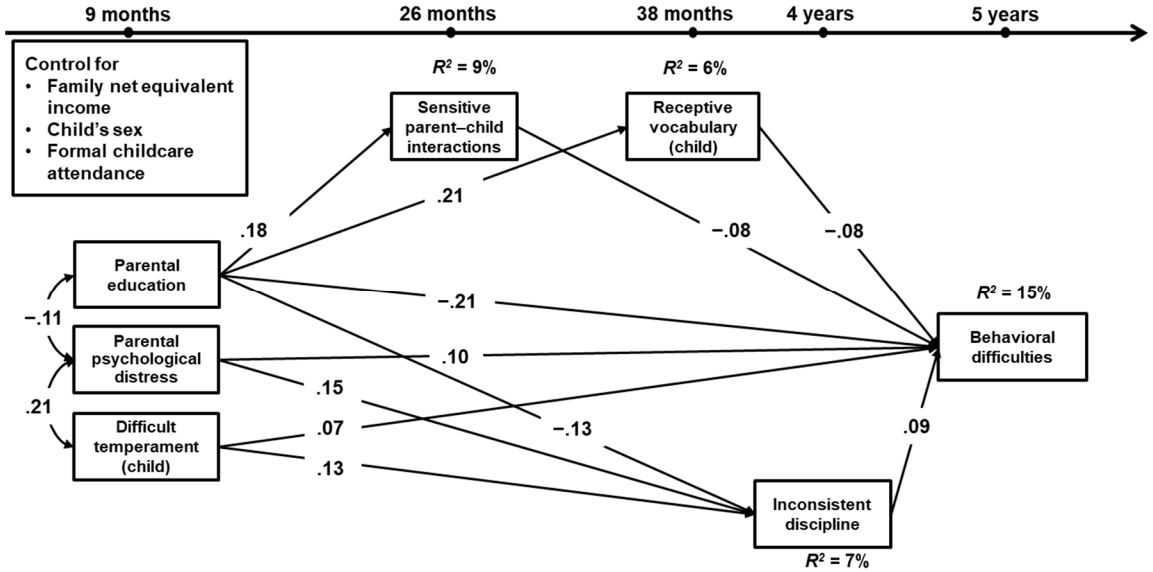
Note. $p \leq 0.05$ are presented in bold.

Figure 1. *Significant standardized results of conditioned main model using MCS in UK (p < .05)*



Note. All coefficients are significant at the $p < .05$ level. $N = 13{,}053$, $\chi^2 = 100.635$, $df = 10$, $p < .001$, CFI = .981, RMSEA = .026, SRMR = .013

Figure 2. *Significant standardized results of conditioned main model using NEPS in Germany (p < .05).*



Note. All coefficients are significant at the $p < .05$ level. $N = 2{,}022$, $\chi^2 = 11.133$, $df = 10$, $p = .35$, CFI = .995, RMSEA = .007, SRMR = .016

Supplementary Material

Table S1. UK qualifications and CASMIN categories.

Reduced categories	CASMIN full code and description	UK qualifications
Low	1a Inadequately completed general elementary education	None of these qualifications (this excludes any overseas qualifications) No qualifications
	1b Inadequately completed general elementary education	GCSE grades D–G (academic)
	1c Basic vocational qualification or general elementary education and basic vocational qualification	NVQ SVQ GSVQ level 1 (vocational)
	2a Intermediate vocational qualification or intermediate general education plus basic vocational qualification	NVQ SVQ GSVQ level 2 (vocational)
Middle	2b Intermediate general qualification	O level GCSE grade A–C (academic)
	2c (Vocational) Full general maturity certificate (vocational)	NVQ SVQ GSVQ level 3 (vocational)
	2c (General) Full general maturity certificate (academic)	A AS S Levels (academic)
High	3a Lower tertiary certificate	Diplomas in higher education, nursing, or other medical qualifications, NVQ level 4
	3b Higher tertiary certificate	First degree, higher degree, professional qualifications at degree level, NVQ level 5

Table S2. Reliabilities of investigated constructs.

	MCS			NEPS		
	Items	Cronbach's alpha	Composite reliability	Items	Cronbach's alpha	Composite reliability
Parental psychological distress	9	.72	.74	3	.65	.67
Difficult temperament (child)	3	.54	.55	3	.51	.54
Negative disciplinary practices	6	.70	.65	4	.67	.73

Table S3. Results from models using single-indicator latent variables for MCS and NEPS.

	MCS			NEPS		
	B (SE)	*ß (SE)*	*p*	*B (SE)*	*ß (SE)*	*p*
Behavioral difficulties →						
Parental education	−.08 (.01)	−.13 (.01)	.00	−.14 (.03)	−.21 (.04)	.00
Parental psychological distress	.55 (.04)	.17 (.01)	.00	.10 (.05)	.10 (.06)	.04
Difficult temperament (child)	.02 (.01)	.02 (.02)	.12	.04 (.03)	.04 (.06)	.12
Negative disciplinary practices	.27 (.01)	.27 (.01)	.00	.07 (.04)	.08 (.05)	.10
Sensitive parent–child interactions	−.03 (.01)	−.06 (.01)	.00	−.09 (.05)	−.07 (.04)	.09
Vocabulary skills	−.07 (.01)	−.14 (.01)	.00	−.04 (.02)	−.08 (.04)	.03
Negative disciplinary practices →						
Parental education	−.01 (.01)	−.01 (.01)	.54	−.13 (.05)	−.14 (.05)	.01
Parental psychological distress	.41 (.07)	.11 (.02)	.00	.23 (.05)	.16 (.04)	.02
Difficult temperament (child)	.21 (.02)	.23 (.02)	.00	.13 (.05)	.23 (.08)	.01
Sensitive parent–child interactions →						
Parental education	.13 (.01)	.11 (.01)	.00	.08 (.03)	.15 (.05)	.01
Parental psychological distress	−.34 (.10)	−.05 (.01)	.00	.00 (.03)	.01 (.04)	.89
Vocabulary skills →						
Parental education	.13 (.01)	.12 (.01)	.00	.31 (.07)	.20 (.05)	.00
Sensitive parent–child interactions	.20 (.01)	.22 (.01)	.00	.05 (.13)	.02 (.05)	.69
N	13,053			2,022		
Model fit	χ^2 = 91.410, *df* = 10, *p* < .001, CFI = .985, RMSEA = .025, SRMR = .012			χ^2 = 11.167, *df* = 10, *p* = .345, CFI = .998, RMSEA = .008, SRMR = .016		

Note. These estimates include control variables.

Parental psychological distress, difficult temperament (child), and negative disciplinary practices were modelled as single-indicator latent variables to represent respective construct with each latent variable being measured by its corresponding scale score (parcel). Each single-indicator latent variable was specified by fixing the scale score's factor loading to one and fixing its error variance (δ_x) to one minus the scale's reliability coefficient multiplied by the variance of the composite-score ($\delta_x = (1 - \rho)*VAR(X)$).

Table S4. Results from the full measurement models for MCS and NEPS.

	MCS			NEPS		
	B (SE)	*ß (SE)*	*p*	*B (SE)*	*ß (SE)*	*p*
Behavioral difficulties →						
Parental education	−.07 (.01)	−.15 (.01)	.00	−.16 (.03)	−.27 (.04)	.00
Parental psychological distress	.43 (.04)	.20 (.02)	.00	.09 (.06)	.13 (.07)	.09
Difficult temperament (child)	.03 (.01)	.05 (.02)	.01	.06 (.03)	.11 (.07)	.10
Negative disciplinary practices	.22 (.01)	.29 (.02)	.00	.08 (.05)	.13 (.07)	.10
Sensitive parent–child interactions	−.03 (.01)	−.08 (.02)	.00	−.09 (.06)	−.09 (.06)	.13
Vocabulary skills	−.07 (.01)	−.16 (.01)	.00	−.04 (.02)	−.10 (.05)	.04
Negative disciplinary practices →						
Parental education	−.01 (.01)	−.02 (.02)	.24	−.15 (.03)	−.14 (.05)	.00
Parental psychological distress	.28 (.05)	.10 (.02)	.00	.23 (.08)	.19 (.06)	.00
Difficult temperament (child)	.19 (.02)	.22 (.02)	.00	.16 (.06)	.19 (.07)	.01
Sensitive parent–child interactions →						
Parental education	.13 (.01)	.11 (.01)	.00	.08 (.03)	.15 (.05)	.01
Parental psychological distress	−.30 (.08)	−.06 (.01)	.00	.01 (.04)	.02 (.05)	.72
Vocabulary skills →						
Parental education	.13 (.01)	.12 (.01)	.00	.31 (.07)	.20 (.05)	.00
Sensitive parent–child interactions	.20 (.01)	.22 (.01)	.00	.05 (.14)	.02 (.05)	.67
N	13,053			2,022		
Model fit	χ^2 = 6827.342, *df* = 708, *p* < .001, CFI = .869, RMSEA = .026, SRMR = .031			χ^2 = 682.179, *df* = 401, *p* < .001, CFI = .905, RMSEA = .019, SRMR = .039		

Note. These estimates include control variables.

The full measurement models of children's behavioral difficulties, parental psychological distress, difficult temperament (child), and negative disciplinary practices were included in the structural model. Given the multidimensionality of the first construct and the unidimensionality of the latter three constructs, we applied second-order (containing three factors) and first-order models, respectively.

Figure S1. Working models for examining associations in the current study.

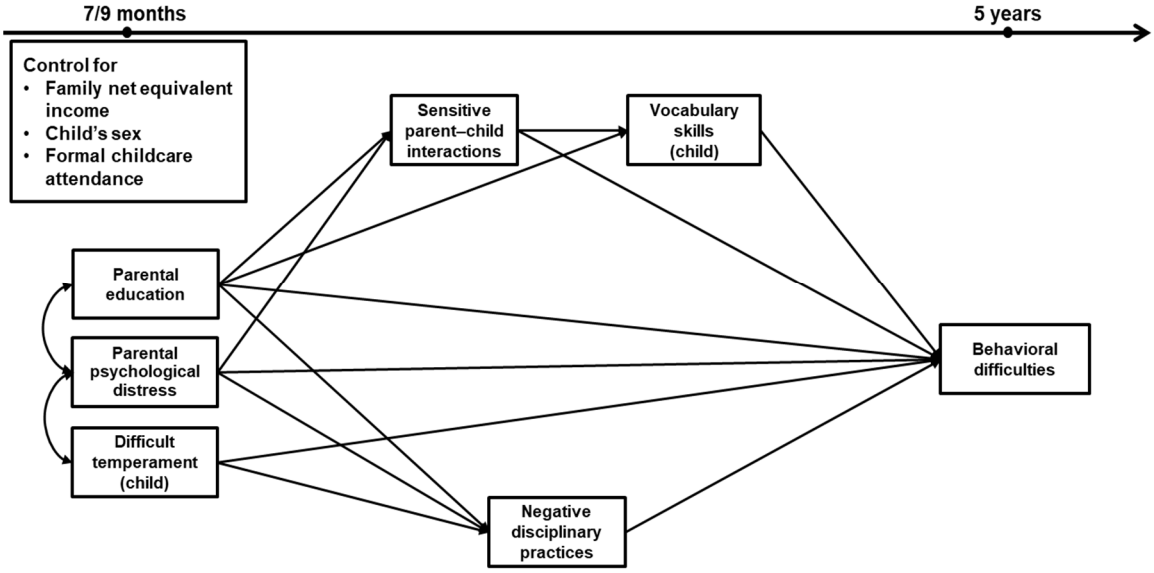
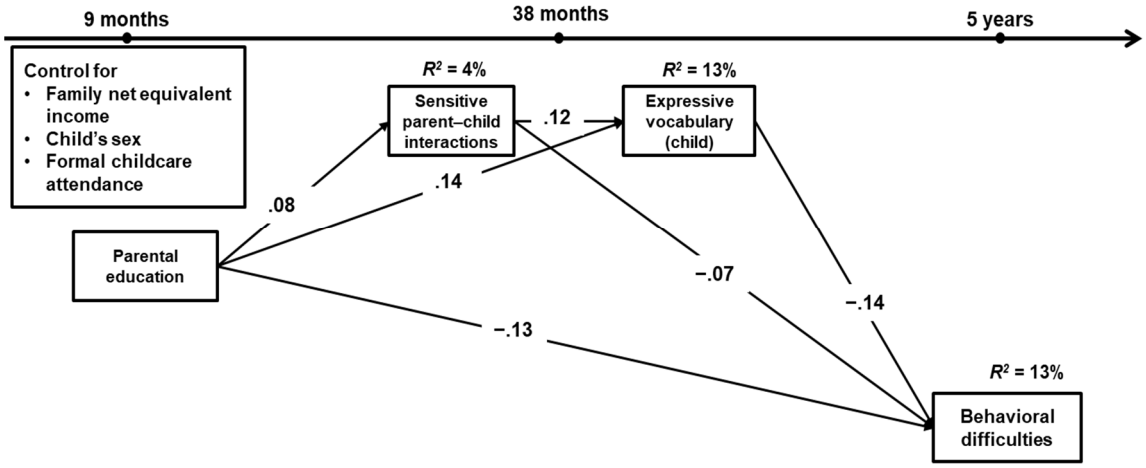
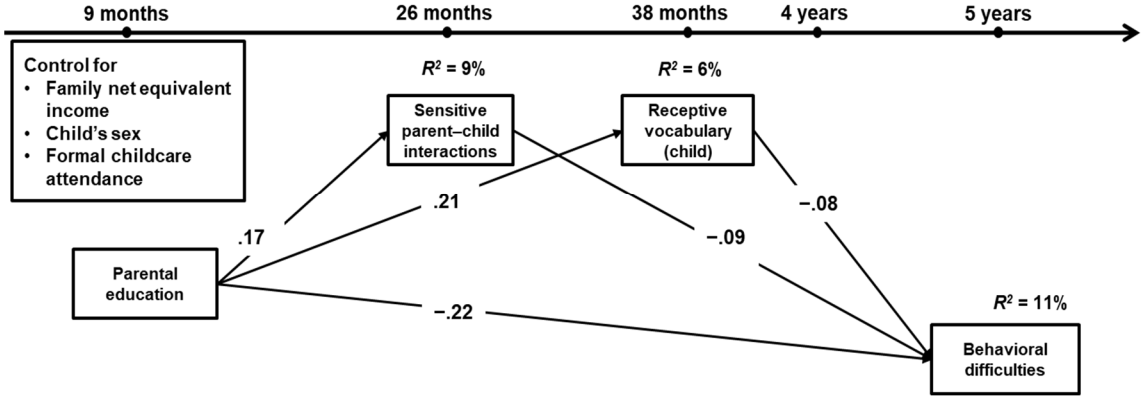


Figure S2. Standardized estimates of the conditional Model A1 using MCS in UK.



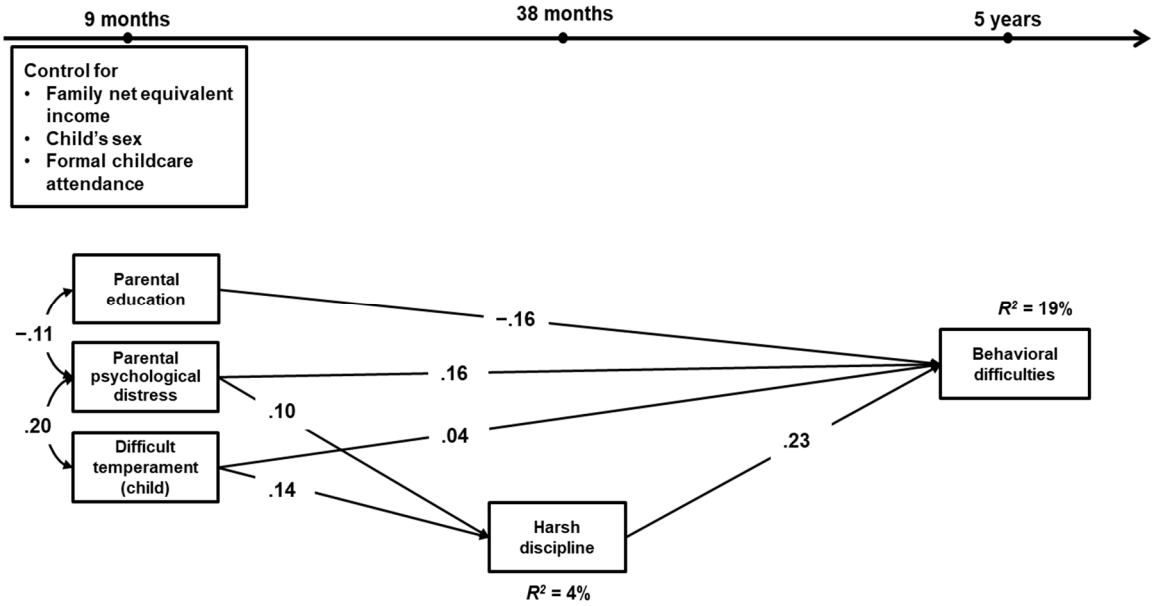
Note. All coefficients are significant at the $p < .05$ level. $N = 13{,}053$, $\chi^2 = 11.083$, $df = 5$, $p = .050$, CFI = .998, RMSEA = .010, SRMR = .006.

Figure S3. Standardized estimates of the conditional Model A1 using NEPS in Germany.



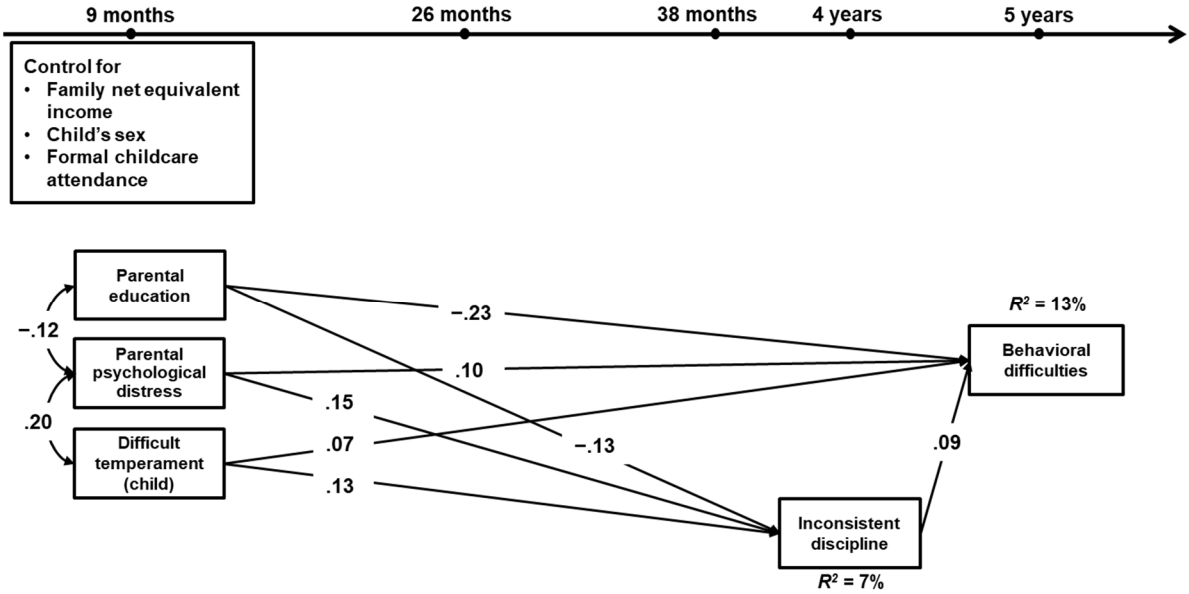
Note. All coefficients are significant at the $p < .05$ level. $N = 2{,}022$, $\chi^2 = 7.292$, $df = 5$, $p = .200$, CFI = .987, RMSEA = .015, SRMR = .015.

Figure S4. Standardized estimates of the conditional Model A2 using MCS in UK.



Note. All coefficients are significant at the $p < .05$ level. $N = 13{,}053$, $\chi^2 = 79.203$, $df = 3$, $p < .001$, CFI = .967, RMSEA = .044, SRMR = .014.

Figure S5. Standardized estimates of the conditional Model A2 using NEPS in Germany.



Note. All coefficients are significant at the $p < .05$ level. $N = 2{,}022$, $\chi^2 = 5.388$, $df = 3$, $p = .146$, CFI = .982, RMSEA = .020, SRMR = .016.

Appendix 3. Study 2: Specific parenting behaviors link maternal education to toddlers' language and social competence

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Maternal Socioemotionally Supportive and Cognitive-verbally Stimulating Parenting Behavior And Child Development

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Abstract

Given the multidimensional characteristics of parenting behavior, this study aimed to unpack the underlying association between maternal education and child development by distinguishing the influences of mother's specific parenting behavior on children's language and social skills. More precisely, drawing on 2,478 mother–child dyads from the German National Educational Panel Study (NEPS), we analyzed the observed maternal *socioemotionally supportive* and *cognitive-verbally stimulating parenting behavior* as separate mediating pathways linking maternal education at 7 months and parent-reported children's language at 26 months as well as children's social competence at 38 months. Furthermore, model controlled for family net income, single parenthood, migration background, mother's depressive feelings, and child's temperament. The results indicated that over and above the effect of the covariates maternal socioemotionally supportive parenting behavior only affected children's social competence, whereas their cognitive-verbally stimulating behavior only affected children's language skills. Furthermore, these two separable parenting behavior differentially mediated the effects of maternal education on toddler's language and social competence. Most notably, children's language additionally mediated the effects of maternal education on social competence. The findings suggest that the domain-specific intervention programs have potential for efficient promoting early language and social development.

Keywords: specific parenting behavior, social competence, language, toddler, maternal education

Maternal Socioemotionally Supportive and Cognitive-verbally Stimulating Parenting Behavior And Child Development

Early competencies in exhibiting prosocial behavior (e.g., being empathic) and establishing positive relationships with peers are importance dimensions of social competence for the effective social interactions between people (Rose-Krasnor, 1997). In early childhood, this kind of social competence and language skills are important developmental domains that influence children's later development and academic success (McClelland et al., 2000, 2006). Children acquire early social competence and language particularly through specific experiences at home, with parents playing the most important role in their socialization (Collins et al., 2000). In particular, research has shown that acquiring social competence and language skills differs by family background (e.g., Bradley & Corwyn, 2002). This makes it especially interesting to investigate how children acquire these skills from early on, because existing evidence suggests that early individual differences in these skills are relatively stable from kindergarten onward (e.g., Bornstein et al., 2014; Obradović et al., 2006).

In general, research on early positive and sensitive parenting behavior as a proximal condition or pathway linking family background and children's social competence and language has applied rather general models illustrating that positive parenting—such as sensitive, warm, and stimulating parenting behavior—promotes the overall developmental progress of children (e.g., Barnett et al., 2012; Nozadi et al., 2013; Pungello et al., 2009). However, scholars have suggested that future studies should investigate the effects of parenting in a multidimensional way, because different aspects of parenting behavior exert a differential impact on children's domain-specific developmental progress (e.g., Bornstein et al., 2008; Grusec & Davidov, 2010; Linberg, 2018). Thus, our primary goal was to examine how specific parenting behavior relates differentially to the development of social

competence and language in order to further understand the underlying mechanisms between maternal education (indicating family background) and child development.

Furthermore, based on the theoretically and empirically substantiated assumption that language is a crucial psychological tool in gaining mastery over behavior and cognition (Vygotsky, 1978), we simultaneously investigated whether children's early language additionally impacts on social competence. We specified two main mediational pathways connecting maternal education and child's behavioral outcomes: (a) via parenting behavior that impacts directly on the child's social development and (b) via parenting behavior that affects language development, which, in turn, promotes the child's social behavior (indirect effect of parenting behavior).

Family Background, Parenting, and Child Development

Drawing on the bioecological model which asserts that human development results from the interaction between individuals and their environment (Bronfenbrenner & Morris, 2006), parental education has been widely studied as an indicator of family background predicting children's developmental outcomes. On the one hand, higher educated parents generally have more resources that matter for children's development (Coleman, 1988). On the other hand, higher educated parents generally appreciate the importance of enriched learning environments, making them more like to provide children with more supportive interactions and a more verbally stimulating home learning environment that promote their development (e.g., Harding et al., 2015; Weinert et al., 2017).

In many western countries, the mother is still typically the primary caregiver in the early years, proximal mother–child interactions have been shown to influence toddlers' socioemotional and language development (e.g., Barnett et al., 2012; Hartas, 2011; Nozadi et al., 2013; Raviv et al., 2004; Bornstein et al., 2020). As an example, Newton et al. (2014)

confirmed not only a positive relation between observed sensitive parenting and children's prosocial behavior, but also the dominant impact of maternal education on maternal sensitivity and children's prosocial behavior over and above the effect of paternal education. Therefore, for this study we chose maternal education as a main factor of family background affecting maternal parenting behavior and child development.

Specific Parenting Behavior and Children's Social Competence and Language

The multidimensional concepts of parenting behavior and the assumption that some aspects of parenting behavior may contribute only to certain developmental domains (e.g., Dunn, 2010; Grusec & Davidov, 2010) makes it meaningful to extract different aspects of maternal parenting behavior that might be linked differentially to children's social competence and language development. Drawing on the concepts of parental sensitivity and scaffolding (see below), we therefore focused on two separate domain-specific facets of maternal parenting behavior that might impact differentially on children's outcomes: (a) mother's *socioemotionally supportive parenting behavior* and (b) her *cognitive-verbally stimulating parenting behavior*.

Socioemotionally Supportive Parenting Behavior and Social Competence

Based on the concept of parental sensitivity (i.e., an adequate perception and accurate interpretation of children's signals and needs as well as the appropriate responsiveness, see Ainsworth et al., 1978), socioemotionally supportive parenting behavior refers to parenting behavior distinguished by warmth, sensitivity, responsiveness, and emotional presence (Ainsworth, 1979; Bowlby, 1969). This facet of parenting behavior has been suggested to promote a secure parent–child attachment in infancy that lays an important basis for children's socioemotional development. Furthermore, previous findings substantiate the assumption that socioemotionally supportive parenting behavior fosters the development of

autonomy and self-control in toddlerhood (Dallaire & Weinraub, 2005), encourages prosocial behavior (Spinrad et al., 2007), enhances competence in peer relationships (Sroufe et al., 1993), and subsequently promotes more advanced social competence (Barnett et al., 2012).

A great deal of empirical research has supported the nexus between parenting behavior and young children's social competence, highlighting the crucial role of maternal sensitive parenting behavior (e.g., Barnett et al., 2012; Newton et al., 2014; Zhou et al., 2003). However, the way sensitive parenting behavior was measured varied across studies. Some studies included specific socioemotionally supportive parenting behavior as "maternal sensitivity." For example, Newton et al. (2014) measured sensitive parenting by assessing the parents' respect for the child's autonomy and their supportive presence, indicating the positive association between the acknowledgment of children and their prosocial behavior. Some other studies included more general indicators of overall sensitive parenting behavior as "maternal sensitivity." For example, working with videotaped semistructured interactions in the household, Barnett et al. (2012) measured maternal sensitive parenting on five dimensions—sensitivity, positive regard, animation, detachment (reversed), and stimulation of cognitive development. Although they found positive relations between these sensitive parenting behaviors at 12 months and children's prosocial behavior at 24 months and 36 months, it remains unclear whether it was socioemotionally supportive parenting behavior or other dimensions of parenting behavior (e.g., the stimulating dimension) that exerted effects on children's social competence.

Cognitive-Verbally Stimulating Parenting Behavior and Language

The scaffolding concept within the zone of proximal development (ZPD) indicates that providing appropriate assistance in the acquisition of new knowledge when a child is in

the ZPD will enhance that child's achievement (Bruner, 1983; Vygotsky, 1978). In particular, parents' verbally and cognitively stimulating behaviors provide children with a learning environment that helps to extend their existing language skills efficiently and move forward in language acquisition (Bruner, 1983). Thus, it is suggested that a cognitively stimulating and verbally sensitive parenting behavior can notably provide toddlers with a stimulating home learning environment that facilitates the acquisition of advanced language skills. In line with these theoretical assumptions, some studies have supported the link between stimulating parenting behavior and children's language skills (e.g., Murray & Yingling, 2000; Bornstein et al., 2020). For example, Bornstein et al. (2020) found not only the direct association between mothers' language stimulation at 5 months and children's language skills at 49 months, but also the association between mothers's overall sensitivity and children's language that accounted for the verbally interactions measured in the dyadic interactions.

However, regardless of the multidimensional characteristics of parenting behavior, most studies merged or aggregated the specific facets into a global indicator of overall sensitive parenting behavior to predict children's language skills (e.g., Barnett et al., 2012; Nozadi et al., 2013; Pungello et al., 2009). For example, Nozadi et al. (2013) investigated the association between "maternal sensitivity" (operationalized as attentive responses to children's emotions, behaviors, and interests) and toddlers' expressive language. The authors interpreted the significant association by assuming that sensitive mothers are more likely to create a stimulating environment for their children and to use more appropriate language, thereby creating a language-stimulating environment. However, they did not analyze the effect of the various specific parenting behaviors directly. Further, Pungello et al. (2009) measured "maternal sensitivity" by summing up five dimensions that were statistically most relevant to children's socioemotional development: global sensitivity,

detachment (reversed), positive regard, animation, and stimulation of cognitive development. However, once more, it is unclear whether the emergence of this significant relation between the aggregated indicator of "maternal sensitivity" and children's language in toddlerhood is due to the cognitively stimulating parenting behavior, the socioemotionally supportive parenting behavior, or both facets of parenting behavior influencing later child language.

Given the multidimensional characteristics of parenting behavior, the diverse operationalizations of "maternal sensitivity" make it hard to have a comprehensive understanding of the effects domain-specific parenting behavior on child's development. Thus, the primary goal of this study was to simultaneously investigate both aspects of parenting behavior as pathways differentially linking maternal education and toddlers' social competence and language skills. We hypothesized two domain-specific pathways: (a) a direct effect of socioemotionally supportive parenting behavior on social competence and (b) a direct effect of cognitive-verbally stimulating parenting behavior on child language. On the other hand, we expected other two non-domain-specific pathways to stay nonsignificant: (c) socioemotionally supportive parenting behavior and children's language skills and (d) cognitive-verbally stimulating parenting behavior and children's social competence.

Social Competence and Language Development

As mentioned above, cognitively stimulating and verbally sensitive parenting behavior can promote children's acquisition of advanced language skills; consequently, higher language skills provides children with two essential means of communicating and self-regulating their development of social competence (Bruner, 1983; Luria, 1961; Vygotsky, 1978). On the one hand, communication skills scaffold young children's efforts to better interpret social exchange and to understand peers (Garfield et al., 2001; Vygotsky,

1978). On the other hand, the self-regulating abilities guide children's behavior in difficult situations (e.g., conflict with peers) by using private or self-directed speech (Vygotsky, 1962). Theoretically, possessing both communication and self-regulating skills plays a key role in promoting children's social competence by reducing the strain of peer relationship problems and solving problems efficiently.

In line with this theoretical background, there is also strong empirical support particularly for the effect of children's early language skills on later social competence (e.g., Aro et al., 2012; Girard et al., 2016; Rose et al., 2018b). For example, a more advanced level of language skills at 3 years impacted significantly on children's further development of cooperative behavior between ages 3 and 7 (Rose et al., 2018a, 2018b); and advanced expressive language at age 3 was related to increased prosocial behavior at age 5 (Girard et al., 2016). In contrast, children with limited language skills are more likely to be rejected by peers, thus reducing their chances to develop social skills and increasing the risk of impairment in social competence (Menting et al., 2011).

However, many studies focused on clinical groups and only a few explored relations between children's language proficiency and their later social competence by using community-based samples in the very early years of life (Barnett et al., 2012; Longobardi et al., 2016). In addition, findings from these limited studies have been inconsistent. For example, using cross-lagged models, Barnett et al. (2012) did not find significant effects of children's language skills at 24 months on their social competence at 36 months, whereas Longobardi et al. (2016) reported a direct link between language skills at 18 months and social competence at 35 months.

Hence, in order to gain a better understanding of the association between typically developing children's early language development and their later social competence in

toddlerhood, the second goal of this study was to investigate early language skills as an additional pathway between maternal education and children's social competence, because whether children's language skills could mediate between maternal education and the acquisition of social skills remains an open question. Moreover, the aforementioned hypothesis that stimulating parenting behavior may affect children's language development suggests another pathway linking to children's social competence—that is, stimulating parenting behavior may also influence children's social competence indirectly through children's language. Therefore, we posited two more pathways linking maternal education and children's social competence: (e) a direct effect of language on social competence and (f) an indirect effect of cognitive-verbally stimulating parenting behavior on social development mediated by child language.

Covariates

Furthermore, in order to evaluate the effect of maternal education on parenting behavior and children's outcomes over and above the effects of other central family and individual characteristics, we considered five well documented factors as control variables. First, parents with a (1) migration background (first- or second-generation—i.e., at least one of the target child's parents or grandparents was born outside country of residence) are exposed to two different cultures, they have to adapt their parenting behaviors unlike parents without a migration background (Yaman et al., 2010). They may provide children with a bilingual or even multilingual environment. Both aspects are likely to affect parents' behavior and children's language and social outcomes. Second, (2) mother's depressive symptoms have been shown to affect their behavior, resulting in less engagement and consistency in interactions with their children (e.g., McLearn et al., 2006). In addition, studies have suggested that maternal depression relates to mother-reported difficult child behavior in toddlerhood (Shaw & Vondra, 1995), and seems to impede the acquisition of

social skills such as positive peer relations (Denham et al., 1991). Furthermore, financial hardship such as (3) low family income or (4) single parenthood at birth can increase parental distress, thereby making it harder for mothers to provide sensitive parenting behavior (Cavanagh & Huston, 2006; Newland et al., 2013). This, in turn, may diminish the language and social skills children develop (e.g., Barnett et al., 2012; Freund et al., 2019). Finally, children with (5) negative affectivity are more apt to develop behavior problems (Thomas & Chess, 1989). It has also been shown to influence early maternal parenting behavior (Freund et al., 2019).

The Present Study

In the present study, we aimed to investigate the mechanisms underlying the association between maternal education and toddlers' social competence and language by including specific parenting behaviors while controlling for other important family and individual characteristics (for working model, see the supplemental material, Figure S1). Drawing on longitudinal large-scale data, we addressed the following two research questions:

1. Do different aspects of parenting behavior (at 26 months) mediate the effects of maternal education on children's language skills (at 26 months) and social competence (at 38 months)? We expected to find domain-specific rather than non-domain-specific effects of socioemotionally supportive and cognitive-verbally stimulating parenting behavior on children's social and language outcomes.
2. Does children's early language additionally impact on children's social competence—that is, do different paths mediate the effect of maternal education on children's social competence? In particular, we anticipated that mother's

parenting behavior would impact directly on children's social competence as well as indirectly via child language.

Method

Participants

We used data from the ongoing German National Educational Panel Study (NEPS; Blossfeld & Roßbach, 2019; doi:10.5157/NEPS:SC1:6.0.0). This is a large-scale national longitudinal study addressing educational processes and trajectories. The current study used the newborn cohort containing a representatively drawn sample of 6- to 8-month-old children. In Wave 1 in 2012, a total of 3,431 families agreed to take part. The data set offers information on the target children and their families. In the children's first years, four measurement waves were conducted when children were around 7, 14, 26, and 38 months old. Parents provided demographic information and reported on their children's characteristics at each measurement point. This study included 2,478 mother–child dyads who participated in Wave 4. At Time point 1 (T1), mothers reported their years of education (M = 14.93, SD = 2.54), their age in years (M = 32.72, SD = 4.97), and their family net equivalent income (M = 1,723.86 Euro, SD = 868.53). Children in this sample were born in Germany from February to June 2012 (49% female, age in months at T1: M = 7.10, SD = 0.74). Around 44% of the children (N = 1,092) came from families with a migration background. The current study only conducted secondary data analysis and thus there was no need for Institutional Review Board approval.

Measures

Social Competence

When children were about 38 months old (T4), parents rated their children's behavior on two subscales of the German version of Strengths and Difficulties Questionnaire (SDQ;

Goodman, 1997)—Prosocial Behavior and Peer Relationship Problems—using a 3-point scale ranging from 0 (*not true*) to 2 (*certainly true*). Each subscale measures specific child behavior with five items. For the current study, we reversed the items assessing peer relationship problems, renaming this subscale Peer Relationships. Thus, higher scores on these two subscales indicate more engagement in prosocial behavior or fewer problems with peers. Both subscales were positively interrelated ($r = .37$, $p < .001$). Within our models, we included children's social competence as a latent construct with two factors and tested the measurement model beforehand. The confirmatory factor analysis (CFA) demonstrated good fits for both subscales within a two-factor model (CFI = .901, RMSEA = .047, SRMR = .049, factor loadings = .27–.86), compared to a one-factor model ($\Delta\chi^2 = 370.548(2)$, CFI = .702, RMSEA = .080, SRMR = .079, factor loadings = .22–.60).

Language Skills

At the age of 26 months (T3), parents reported children's German language skills on a language checklist (Elternfragebögen für die Früherkennung von Risikokindern 2; ELFRA 2; Grimm & Doil, 2006) comparable to the MacArthur Communicative Development Inventories (CDI; Fenson, 1993). This German language checklist contains three subscales—productive vocabulary (260 items), syntax (64 items), and morphology (11 items). The subscales are highly interrelated ($r = .81–.84$, $p < .001$). In our analyses, we modeled child language as a latent factor. The CFA indicated a good fit for this measurement (CFI = 1.00, RMSEA = .00, SRMR = .00, factor loadings = .90–.94).

Parenting Behavior

On the basis of the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD; NICHD Early Child Care Research Network, 1999), semistructured parent–child interactions in a play

situation were videotaped in the households of the families at age 26 months (T3). Parents were asked to play with their children for 10 min using a standardized set of toys presented in three bags (see Linberg et al., 2019, for a detailed description). Trained coders (50-hour rater training) rated each 10-min videotaped parent–child interaction for each parent–child dyad on qualitatively defined 5-point scales adapted from the rating instrument from the NICHD-SECCYD Study ranging from 1 (*not at all characteristic*) to 5 (*very characteristic*). Interrater reliability was good (weighted percentage between 92% and 94%).

The current study included only data on mother–child interactions (88%). Socioemotionally supportive parenting behavior included three coded dimensions of mother–child interaction: sensitivity to nondistress (sensitive reactions toward child signals), positive regard for the child (verbal and nonverbal expression of positive emotions toward the child), and emotionality (emotional presence). The cognitive-verbally stimulating parenting behavior consisted of two coded dimensions: general stimulation and language stimulation. General stimulation measures the complexity of the child's learning environment and the parent-stimulated involvement of the child, whereas language stimulation captures the amount and quality of verbal enrichment of the learning situation. Higher scores indicate more frequent and more complex play situations and verbal enrichment provided. In all analyses, we modeled mothers' parenting behavior as a latent construct containing the aforementioned two factors. CFA revealed significantly better fits for both measures within a two-factor model (CFI = .996, RMSEA = .095, SRMR = .019, factor loadings = .48–.96), compared to a one-factor model ($\Delta\chi^2$ = 1,075.787(1), CFI = .947, RMSEA = .306, SRMR = .073, factor loadings = .43–.92).

Maternal Education

Given the stability of maternal education from T1 to T4, we included mothers' total *years of education* attained at T1 when children were 7 months old as indicator of maternal education. We treated this indicator as a continuous variable in the analyses.

Control Variables

Parents reported family net income at T1. Family net equivalent income was then calculated using the OECD-modified equivalence scale (Hagenaars et al., 1994) that assigns a weight of 1.0 to the household head, 0.5 to each additional person older than 14 years, and 0.3 to each child under 14 years. Further, we log-transformed the net equivalent income to reduce its skewness. At T1, parents also reported whether they were living together with a partner (0 = *living with partner*) or not (1 = *single parenthood*). With respect to migration background, we coded children as *with migration background* (coded as 1) if at least one parent or grandparent was born outside Germany and if their household language was not only German; otherwise, as *native German* (coded as 0).

Moreover, mothers reported how frequently they had felt depressed and sad over the last 4 weeks on a 5-point scale ranging from 1 (*never*) to 5 (*always*). We utilized the mean value of the measurement across the three time points (r = .34–.41, p < .001), i.e., when children were aged 7 (T1), 14 (T2), and 26 months (T3), in order to avoid converge problem while using latent variables of other four main indicator (same reason for using mean value of child temperament). With regard to children's temperament, parents reported children's Negative Affectivity—one dimension from the Infant Behavior Questionnaire – Revised (IBQ–R; Gartstein & Rothbart, 2003; Vonderlin et al., 2012) on a 7-point scale ranging from 0 (*never*) to 6 (*always*) at T1, T2, and T3. Likewise, we utilized the mean value of these measurements across the three time points (r = .35–.45, p < .001), with higher scores

indicating that children tended to react to stressors with a high degree of emotionality, including anger, irritability, fear, or sadness.

Analytic Strategy

We used structural equation modeling (SEM) to examine associations between the variables under study. In the analyses, we modeled children's prosocial behavior and peer relationships, socioemotionally supportive and cognitive-verbally stimulating parenting behavior, and children's language skills as latent variables and estimated all direct and indirect effects. Due to the nonnormal distribution of socioemotionally supportive parenting behavior, stimulating parenting behavior, children's prosocial behavior, and peer relationships, we treated these indicators (items) on an ordinal level (Rhemtulla et al., 2012). We estimated all models with the robust weighted least-squares mean- and variance-adjusted (WLSMV) estimator as an optimal approach for dealing with nonnormal and ordinal variables (Bandalos, 2002).

Prior to performing the analyses, we applied multiple imputation by chained equations (MICE; White et al., 2011) to handle missing values (on average, more than 10% per independent variable) and additionally ran a robustness check on nonimputed data. According to Enders (2010), any variable that appears in the subsequent statistical analyses should be included in the imputation process. We included all 11 variables from the analysis model in our imputation model. We created m = 20 imputed data sets using Stata 15. Graphical diagnostics demonstrated that the imputed data matched the original data well (see the supplemental material, Figures S2–S12). Analyses were conducted with M*plus* 8.3 (Muthén & Muthén, 2017) on each of the imputed data sets and the results were combined automatically (Rubin, 1987).

We analyzed the data with two models: The first tested interrelations between maternal education, facets of parenting behavior, and child outcomes. The second model tested whether interrelations remained stable with the presence of the five covariates. As a robustness check, we additionally operationalized the second model with data without multiple imputations.

Results

Descriptive Analyses

Table S1 (in the supplemental material) and Table 1 present the descriptive statistics and bivariate correlations of all studied variables. Unless noted otherwise, the significant level was set at $p < .001$ for all significant effects in the correlation analysis. Results showed that higher educated mothers had a comparatively higher family net income ($r = .44$) and were less likely to have a migration background ($r = -.22$) or live as single parents ($r = -.12$) compared to lower educated mothers. Mothers' socioemotionally supportive parenting behavior related positively to their cognitive-verbally stimulating parenting behavior ($r = .54$). Both components of social competence were intercorrelated significantly ($r = .18$). A higher level of toddlers' prosocial behavior was not correlated significantly with maternal education, but was associated with children's advanced early language skills ($r = .09$), higher mothers' socioemotionally supportive ($r = .07$, $p < .01$), and cognitive-verbally stimulating parenting behavior ($r = .05$, $p < .01$). Toddlers' peer relationships were related positively to maternal education ($r = .14$), to their early language skills ($r = .16$), and to mothers' socioemotionally supportive ($r = .08$, $p < .01$) and cognitive-verbally stimulating parenting behavior ($r = .06$, $p < .01$). Moreover, higher maternal education was associated with higher levels of mothers' socioemotionally supportive ($r = .22$) and cognitive-verbally stimulating parenting behavior ($r = .15$).

Model 1 (Unconditional Model)

Model 1 examined the relations between the studied variables without control variables. The model demonstrated a good fit to the data (CFI = .972, RMSEA = .042, SRMR = .043). Figure 1 shows the results with significant standardized estimates ($p \leq .05$). There were significant direct effects of maternal education on toddlers' language skills at 26 months and peer relationships at 38 months; children with comparatively higher educated mothers had more advanced language skills and better peer relationships compared to children with lower educated mothers. Furthermore, maternal education related significantly to maternal cognitive-verbally stimulating and socioemotionally supportive parenting behavior at 26 months; and children with higher educated mothers experienced more cognitive-verbally stimulating and socioemotionally supportive parenting behavior from mothers. Notably, these two facets of parenting behavior emerged domain-specific rather than non-domain-specific effects on children's language and social competence, leading to indirect effects of maternal education on children's later language skills and social competence: Children who experienced more cognitive-verbally stimulating parenting behavior acquired more advanced language skills at 26 months, whereas those who experienced more socioemotionally supportive parenting behavior had better relationships with peers and behaved more prosocially at 38 months. Moreover, children's language skills were associated significantly with children's peer relationships as well as their prosocial behavior, adding to another indirect effect of maternal education on both components of social competence: Children with higher educated mothers had advanced language skills, and, in turn, exhibited more competent social behavior. Taking together, predictors and mediator variables in Model 1 explained about 15%, 3%, and 9% of the total variance in children's language, prosocial behavior, and peer relationships respectively.

Model 2 (Conditional Model)

After including all control variables, the Model 2 fitted the data well (CFI = .969, RMSEA = .039, SRMR = .039). Figure 2 shows the results with significant standardized estimates ($p < .05$). All emerged associations in Model 1 remained significant in Model 2 (coefficients decreased slightly). In brief, maternal education significantly predicted mothers' parenting behavior as well as children's language at 26 months and children's peer relationships at 38 months. As predicted, maternal socioemotionally supportive and cognitive-verbally stimulating parenting behavior were both differentially associated with children's social competence and language. Children's language was additionally related to their social competence. The significant direct and indirect effects of maternal education on toddlers' social competence via both aspects of parenting behavior and language skills (see the supplemental material—Table S2) illustrated that whereas maternal education had a significant direct effect on children's peer relationships, maternal education affected children's prosocial behavior only indirectly through different mediating pathways. Children's early language skills or maternal socioemotionally supportive parenting differentially mediated the effects of maternal education on children's later prosocial behavior and peer relationships. In addition, maternal cognitive-verbally stimulating parenting behavior also had a significant effect on children's prosocial behavior and peer relationships indirectly through their language—adding another pathway linking maternal education and children's social competence. Taking together, predictors and mediator variables in Model 2 explained about 16%, 8%, and 12% of the total variance in children's language, prosocial behavior, and peer relationships respectively.

Moreover, the results from the robustness check indicated that this model also fitted the original nonimputed data well (CFI = .971, RMSEA = .033, SRMR = .040). One emerged association in Model 2 (i.e., between socioemotionally supportive parenting behavior and peer relationships) was not significant in this model. Apart from this, the other

associations among variables and the explained variance were similar (for details, see the supplemental material—Figure S13).

Discussion

The current study aimed to identify the effects of specific facets of parenting behavior on children's development in toddlerhood, attempting to unpack the underlying mechanisms between maternal education and early child outcomes. The findings substantiate the assumption that maternal socioemotionally supportive parenting behavior can be separated from cognitive-verbally stimulating parenting behavior though interrelated facets of sensitive parenting behavior that have differential impacts on children's social competence at 38 months and language skills at 26 months. In particular, both facets of maternal parenting behavior serve as distinguishable mediating pathways between maternal education and early child outcomes. Furthermore, findings also demonstrate that children's language skills have an additional effect on their social competence, thus serving as an additional indirect path.

The present findings demonstrate that the "global" concept of sensitive parenting can and should be subdivided into distinguishable facets of parenting behavior when investigating their differential impact on the various domains of children's development. Although maternal socioemotionally supportive and cognitive-verbally stimulating parenting behavior intercorrelated significantly in our study, the results of CFA showed that both parenting behaviors are separable, because a two-factor model fits the data better than a one-factor model of global sensitive parenting behavior. Thus, maternal interactive behavior is shown to be domain-specific even in the first years of child development, indicating that mothers who are socioemotionally sensitive may not necessarily be comparably cognitive-verbally stimulating in their parenting behavior. This is in line with and further extends findings from Linberg's (2018) study indicating that sensitive interactive

behavior—as early as seven months of age—is not a unitary construct. Furthermore, the results from our SEM demonstrate that the different facets of parenting behavior impact differentially on different domains of child development. This evidence is consistent with previous findings and underscores the domain specificity of parenting behavior and its impact across toddlerhood (e.g., Murray & Yingling, 2000; Bornstein et al., 2020). It emphasizes the importance of extracting different facets of sensitive maternal parenting behavior when examining its specific functions.

In particular, the simultaneous investigation of the association between specific parenting behavior and children's social competence and language skills casts further light on the limitations of earlier investigations (Barnett et al., 2012; Pungello et al., 2009): The associations between parenting behavior and toddlers' social competence and language development are not explained by overall sensitive parenting. Instead, socioemotionally supportive parenting seems to be most relevant in affecting toddlers' social competence, whereas cognitive-verbally stimulating parenting behavior impacts particularly on toddlers' language development. Drawing on and combining the theoretical concepts of parental sensitivity (as suggested by attachment theory; Ainsworth, 1979; Bowlby, 1969) and parental scaffolding behavior (Bruner, 1983; Vygotsky, 1978), the evidence here suggests that children who experience warm and emotionally sensitive parenting in early childhood tend to behave more prosocially and to have better peer relationships in toddlerhood. Likewise, cognitively and verbally stimulating sensitive parenting behavior in the early years seems to be an important factor promoting toddlers' language acquisition.

Furthermore, in line with previous studies, our results underline the importance of maternal education for children's outcomes in the first years of life (e.g., Attig & Weinert, 2019; Newton et al., 2014), because maternal education proves to be related both directly and indirectly to children's language and social competence after controlling for other

important covariates. Although previous research using the same German sample has already documented maternal education as a robust indicator associated with disparities in children's early language (Attig & Weinert, 2019), our study not only extends the effect to social development but also reveals different pathways linking maternal education and children's language and social skills in toddlerhood. The associations between maternal education and child outcomes particularly indicate that children with highly educated mothers tend to have advanced language skills and better peer relationships even at the early age of 3 years. The indirect associations over the hypothesized and empirically substantiated pathways further provide comprehensive information about these specific underlying mechanisms. The reason for the effect of maternal education might be that mothers with comparatively higher educational qualification have more access to human, cultural, and social capital (Coleman, 1988), and that this capital (resources, assets), in turn, helps mothers support their children's development. In particular, maternal human capital in the forms of skills, knowledge, and capabilities contributes to their parenting behavior by helping provide an environment for children that promotes development (Coleman, 1988). As an example, mothers with greater human capital tend to exhibit more frequent and a higher level of supportive or stimulating parenting behavior, because these mothers may have acknowledged the importance of this kind of parenting behavior for child development, compared to mothers with comparatively less human capital (Harding et al., 2015).

Moreover, the additional association between children's language and social competence extends previous evidence (e.g., Aro et al., 2012; Girard et al., 2016; Rose et al., 2018b) highlighting that children's early language already affects their later social skills before the age of 3. In particular, the indirect effects between maternal education, cognitive-verbally stimulating parenting behavior, and social competence via early language suggest that children's verbal skills also serve as a salient pathway linking maternal education as

well as cognitive-verbally stimulating parenting behavior and children's social competence. Findings here are in line with the theoretical assumption that children with advanced language skills may be more effective in communicating with peers even in challenging situations, and that they may have more advanced regulating skills (Bruner, 1983; Luria, 1961; Rose et al., 2018b; Vygotsky, 1962) resulting in a higher level of social competence.

Strengths and Limitations

More generally, this study makes theoretical, methodological, and applied contributions to the literature by exploring the effects of maternal education on toddlers' social competence and language skills. Instead of examining the global effects of the overall differences in parenting behavior, we examined different aspects of maternal parenting behavior and distinguished their specific effects on early child outcomes. Apart from socioemotionally supportive parenting behavior, we also drew on theoretical and empirical research in order to include children's language as an additional developmental resource in our model. Moreover, we demonstrated that despite the expected and demonstrated mean differences in outcome variables between boys and girls, the structural relations specified in our model hold for both genders in comparable ways suggesting that mechanisms are similar. Regarding methodological strengths, this study used longitudinal large-scale data to gain an in-depth understanding of central influential factors in the early development of toddlers' social competence and language. Moreover, measurements were theoretically well-designed and used observed and parent-reported assessments with empirically substantiated fit characteristics. Given that missing data occur inevitably in longitudinal data, we addressed this issue with multiple imputation and tested the efficiency of this method by graphical diagnostics and a robustness check.

However, it is worth noting that no more than 20% of variance in children's language and social competence is accounted for by the indicators of maternal education, parenting behavior, and other potentially relevant family and individual characteristics included here. On the one hand, there could be some other important factors influencing child outcomes that we did not consider, such as the influence of fathers and the frequency of developmentally appropriate interactive parenting behaviors. On the other hand, although the explained variance is not very high, we still consider the findings from this study to be important. As suggested by various theoretical accounts and empirical observations, the home learning environment provided by parents is particularly crucial in early childhood. It immerses every aspect of child development, and what it indicates is essential for a better understanding of how environments and developmental processes interact (Gottfried et al., 2003).

Nonetheless, the current study is not without limitations. First, the given biases in Wave 1 as well as the attrition rate of 28% after four time points of data collection restricts a full generalization of the findings to the German population. Second, concerning measurements, children's language skills was reported by parents. This might be of limited accuracy, because parents might be influenced by social desirability and the quality of observation might vary from parent to parent. However, the validity of this parent-reported checklist for estimating language skills in toddlerhood may make up for this failing, because it has been shown to correlate highly with direct language measures (Sachse & Von Suchodoletz, 2008). In addition, children's language and its predictor (i.e., cognitive-verbally parenting behavior) were assessed at the same time point, indicating the need for caution when interpreting the evidence derived from this "cross-section." A longitudinal assessment of parenting behavior and children's language would strengthen the robustness of this evidence. Finally, although the observational measures of parenting behavior provide

valid insights into intimate parent–child interaction, the videotaped interactions were rated only in a 10-min play situation. This may limit the generalizability of the effects of interactive parenting behavior on child development. Future studies could measure parenting behavior in different contexts to investigate the complex parent–child interactions and their effects.

Practical Implications

Findings from our mediational model on maternal education (as a main influential family background factor), domain-specific maternal parenting (i.e., socioemotionally supportive parenting and cognitive-verbally stimulating parenting), as well as family and individual characteristics deliver a number of implications for early prevention and intervention to promote social competence and language development. More specifically, the present findings suggest that early specific professional parenting programs, which could help mothers to deliver more domain-specific parenting behaviors to their children, could reduce the impact of social disparities caused by different parental educational backgrounds on children's social development and could prevent problematic child behavior. Furthermore, such programs should be community-based so that they are easily and equally accessible. In addition, enhancing toddlers' language skills could also, in turn, help develop social competence. This could be operationalized by integrating language development within the parenting program or addressing children directly in language training programs. For example, Kindergartens could provide additional language stimulation for children with lower language competence, with family and children's characteristics being be taken into account while planning the aforementioned programs.

Conclusion

Given that children who experience more socioemotionally supportive parenting behavior have a higher level of social competence, given that children who experience more cognitive-verbally stimulating parenting behavior acquire advanced language skills, given that children who possess better early language skills have higher social competence, and given that mother's specific parenting behaviors and children's language skills partially mediate the effect of maternal education on children's social competence, we conclude that specific parenting behaviors serve as differential pathways illustrating the underlying mechanisms between maternal education and child outcomes in toddlerhood. In particular, children's early language skills serve as an additional pathway linking maternal education and children's social competence.

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Tables and Figures

Table 1

Bivariate Correlations (Pearson and Spearman) Between Study Variables

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1.	Prosocial behavior (T4)	—										
2.	Peer relationships (T4)	.18***	—									
3.	Maternal education (years, T1)	.03	.14***	—								
4.	Language skills (T3)	.09***	.16***	.28***	—							
5.	Socioemotionally supportive parenting (T3)	.07**	.08**	.22***	.14***	—						
6.	Cognitive-verbally stimulating parenting (T3)	.05*	.06*	.15***	.23***	.54***	—					
7.	Family net equivalent income (logarithm, T1)	.00	.09***	.44***	.21***	.16***	.19***	—				
8.	Depressive feelings (mother, T1–T3)	−.09***	−.12***	−.18***	−.15***	−.08***	−.09***	.05**	—			
9.	Temperament (child, T1–T3)	−.15***	−.09***	−.00	−.09***	−.05*	−.06*	.05*	.26***	—		
10.	Migration background (T1)	.03	−.05*	−.22***	−.15***	−.00	−.02	−.19***	.09***	−.02	—	
11.	Single parenthood (T1)	.00	−.01	−.12***	−.07**	−.09***	−.07**	−.30***	−.09***	−.03	.16***	—

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

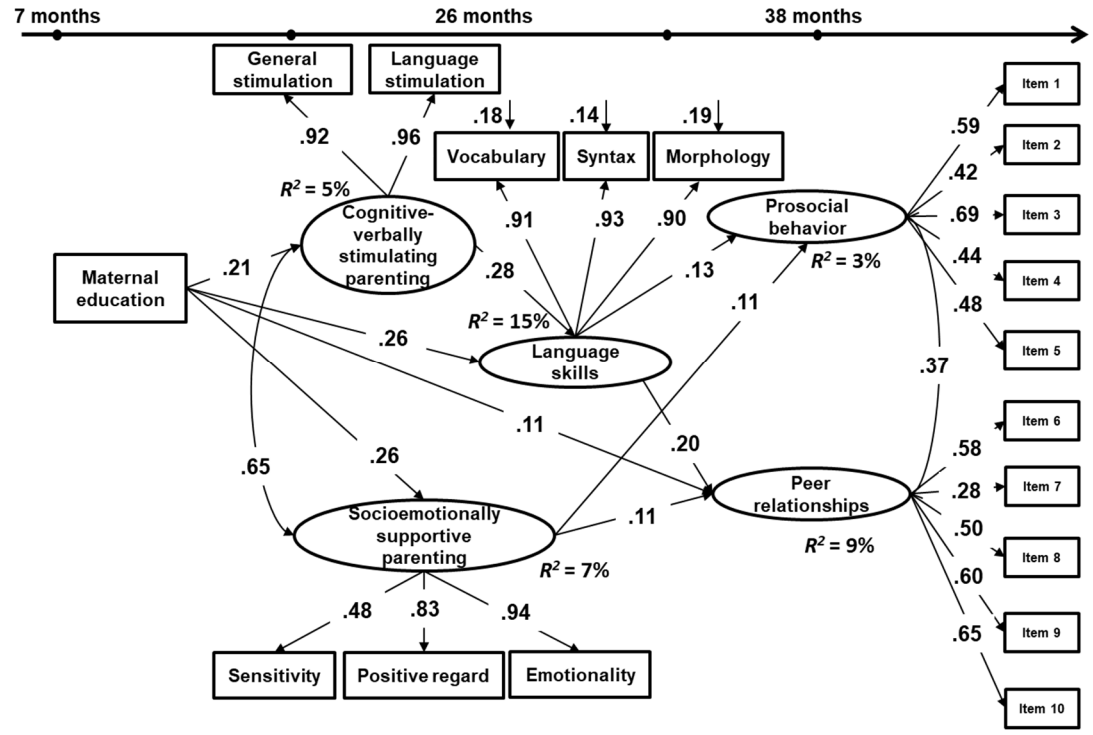

Figure 2. Results of conditioned model 1. Only significant standardized coefficients are reported ($p \leq .05$). N = 2,478; CFI = .972, RMSEA = .042, SRMR = .043.

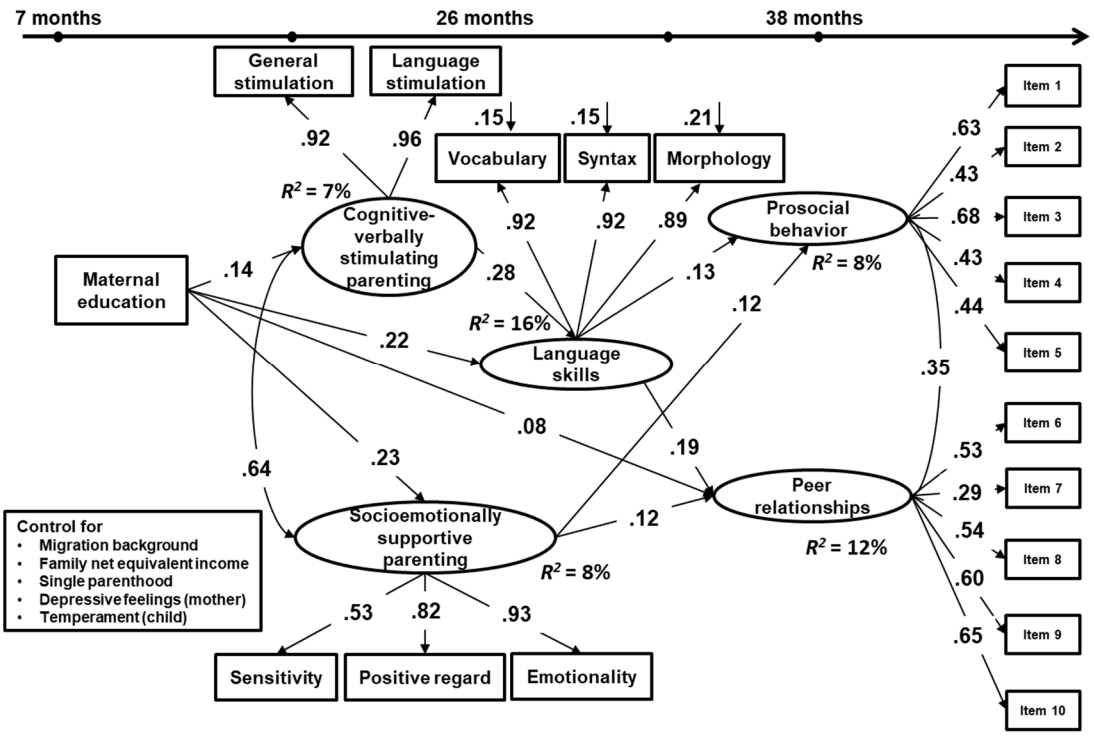

Figure 3. Results of full conditioned model 2. Only significant standardized coefficients are reported ($p < .05$). N = 2,478; CFI = .969, RMSEA = .039, SRMR = .039.

Supplemental Material

Table S1

Descriptive Statistics of Variables Under Study (N = 2,478)

Variable	*M*	*SD*	*Min*	*Max*
Outcomes (38 months)				
Prosocial behavior	7.68	1.57	0.00	10.00
Peer relationships	8.69	1.46	2.00	10.00
Predictor (7 months)				
Maternal education (years)	14.93	2.54	5.00	18.00
Mediators (26 months)				
Language skills (std_mean)	**−.033**	**.95**	**−2.10**	**1.83**
Productive vocabulary	140.74	65.90	0.00	260
Syntax	25.16	11.39	0.00	47
Morphology	7.66	4.87	0.00	16
Socioemotionally supportive parenting (*M*)	**3.70**	**.80**	**1.00**	**5.00**
Sensitivity	3.50	0.79	1.00	5.00
Positive regard	3.25	0.74	1.00	5.00
Emotionality	3.49	0.88	1.00	5.00
Cognitive-verbally stimulating parenting (*M*)	**3.25**	**.74**	**1.00**	**5.00**
General stimulation	3.19	0.79	1.00	5.00
Language stimulation	3.31	0.79	1.00	5.00
Control variables				
Family net equivalent income (€; 7 months)	1,334.19	868.38	62.62	5558.67
Depressive feelings (7–26 months)	2.11	0.74	1.00	5.00
Temperament (7–26 months)	3.88	0.91	0.50	6.00
	Boys		Girls	
Child's sex (7 months)	1,272 (51.33%)		1,206 (48.67%)	
	German		Migrants	
Migration background (7 months)	1,387 (55.96%)		1,091 (44.04%)	
	With partner		Single parent	
Single parenthood (7 months)	2,337 (94.31%)		141 (5.69%)	

Note. std_mean = standardized mean value.

Table S2

Standardized Significant Estimates for Direct and Indirect Effects by Social Competence

	Prosocial behavior			Peer relationships		
	β	*SE*	*p*	*β*	*SE*	*p*
Maternal education (direct effect)	—	—	—	.08	.03	**.03**
Maternal education (via language)	.03	0.01	**.00**	.04	.01	**.00**
Maternal education (via socioemotionally supportive)	.03	.01	**.03**	.03	.01	**.05**
Maternal education (via cognitive-verbally stimulating and language)	.01	.00	**.01**	.01	.00	**.00**

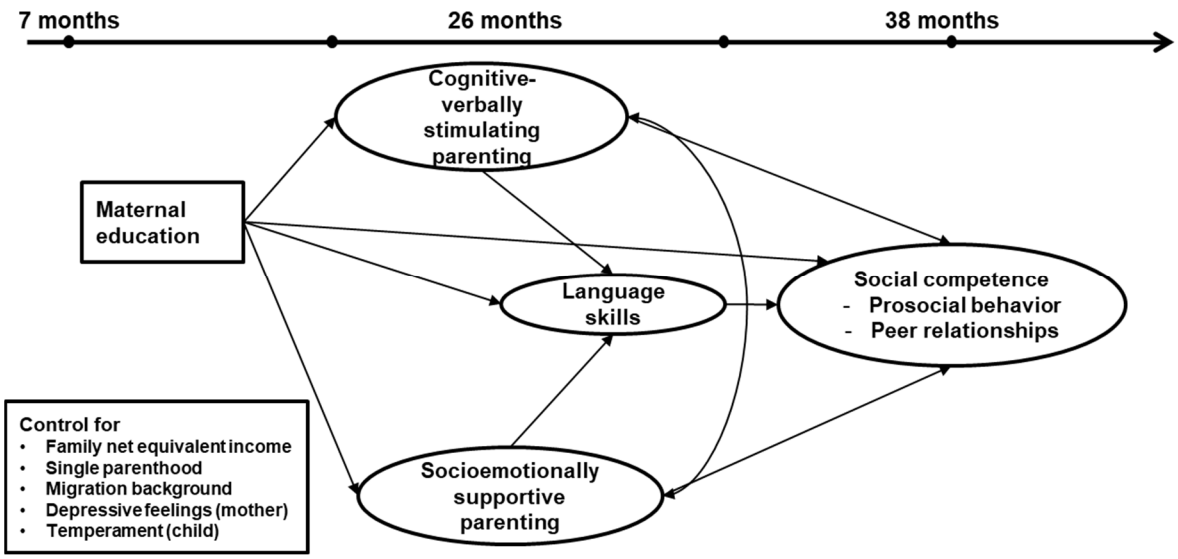

Figure S1. Working model for examining the associations in the current study.

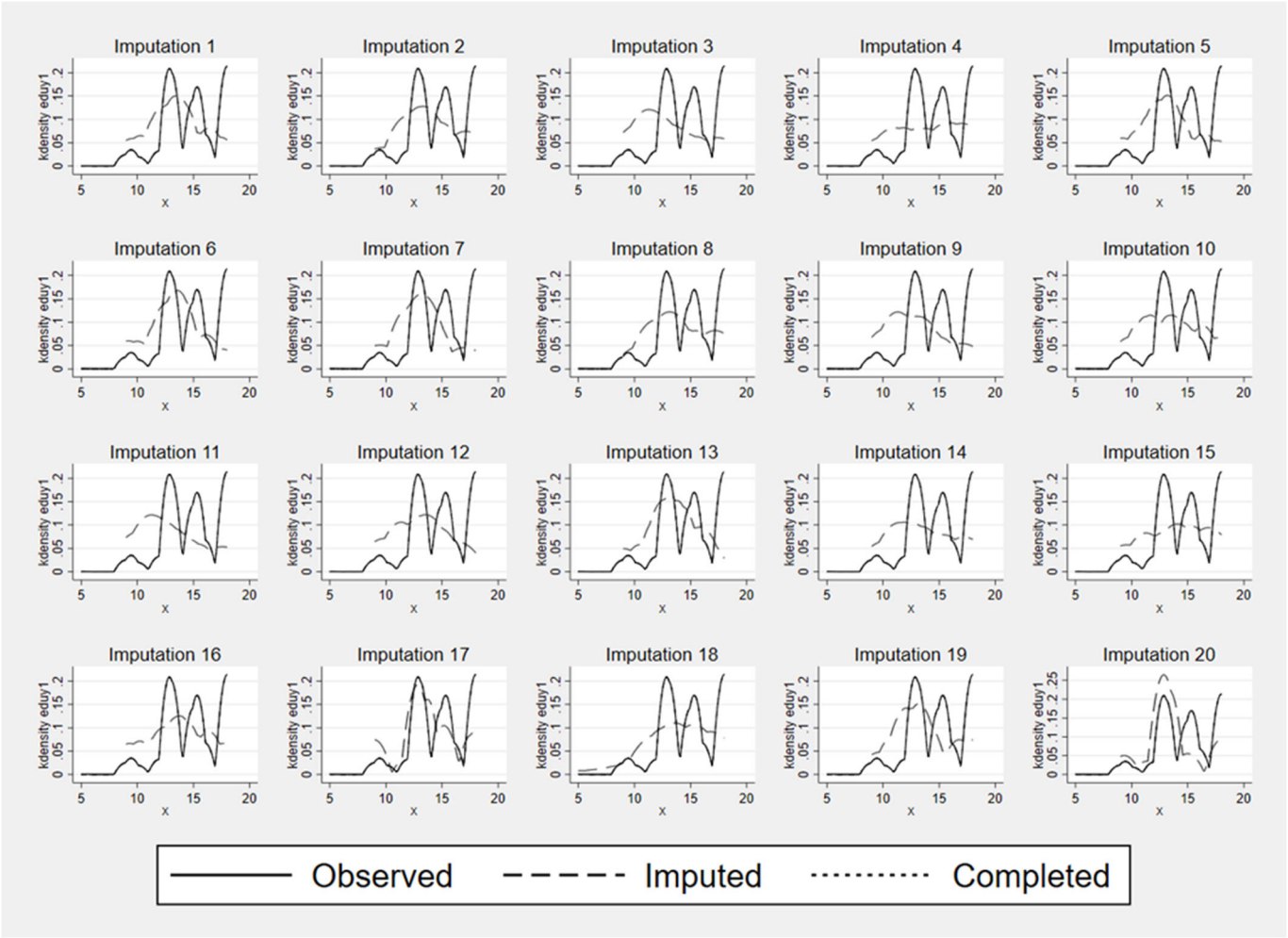

Figure S2. Observed, imputed, and completed data for maternal years of education at T1 (7 months).

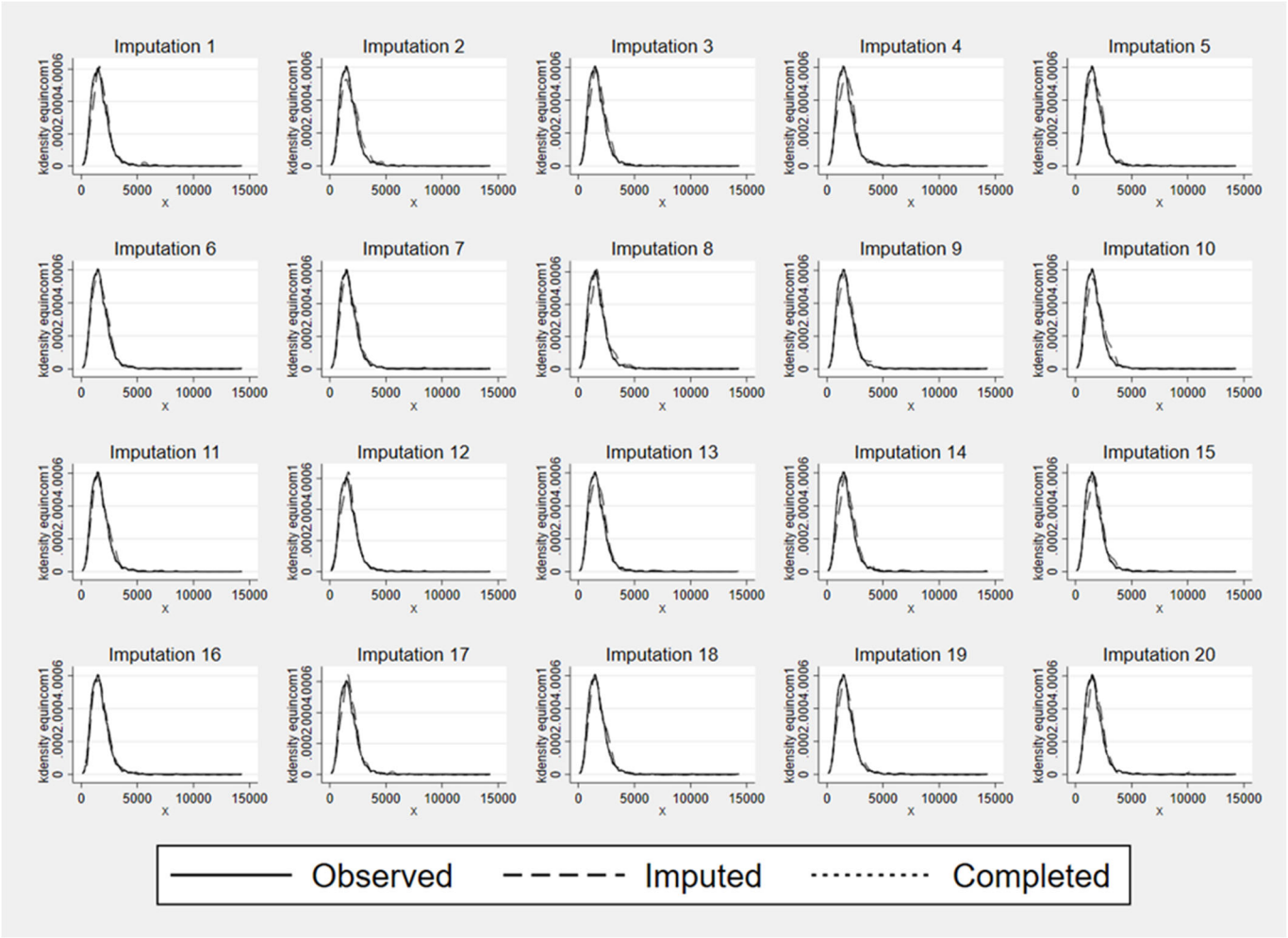

Figure S3. Observed, imputed, and completed data for family net equivalent income at T1 (7 months).

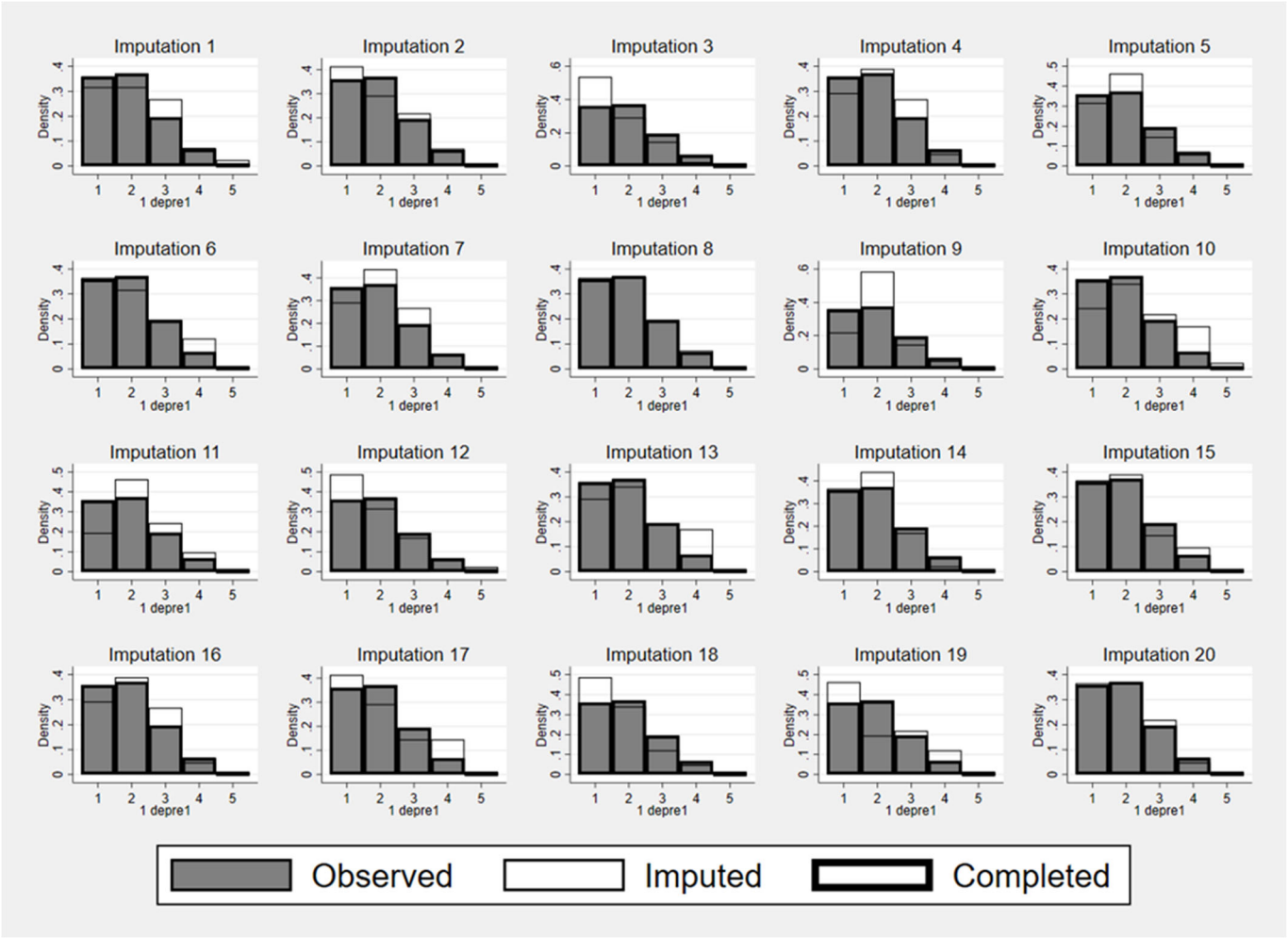

Figure S4. Observed, imputed, and completed data for depressive feelings at T1–T3 (7–26 months).

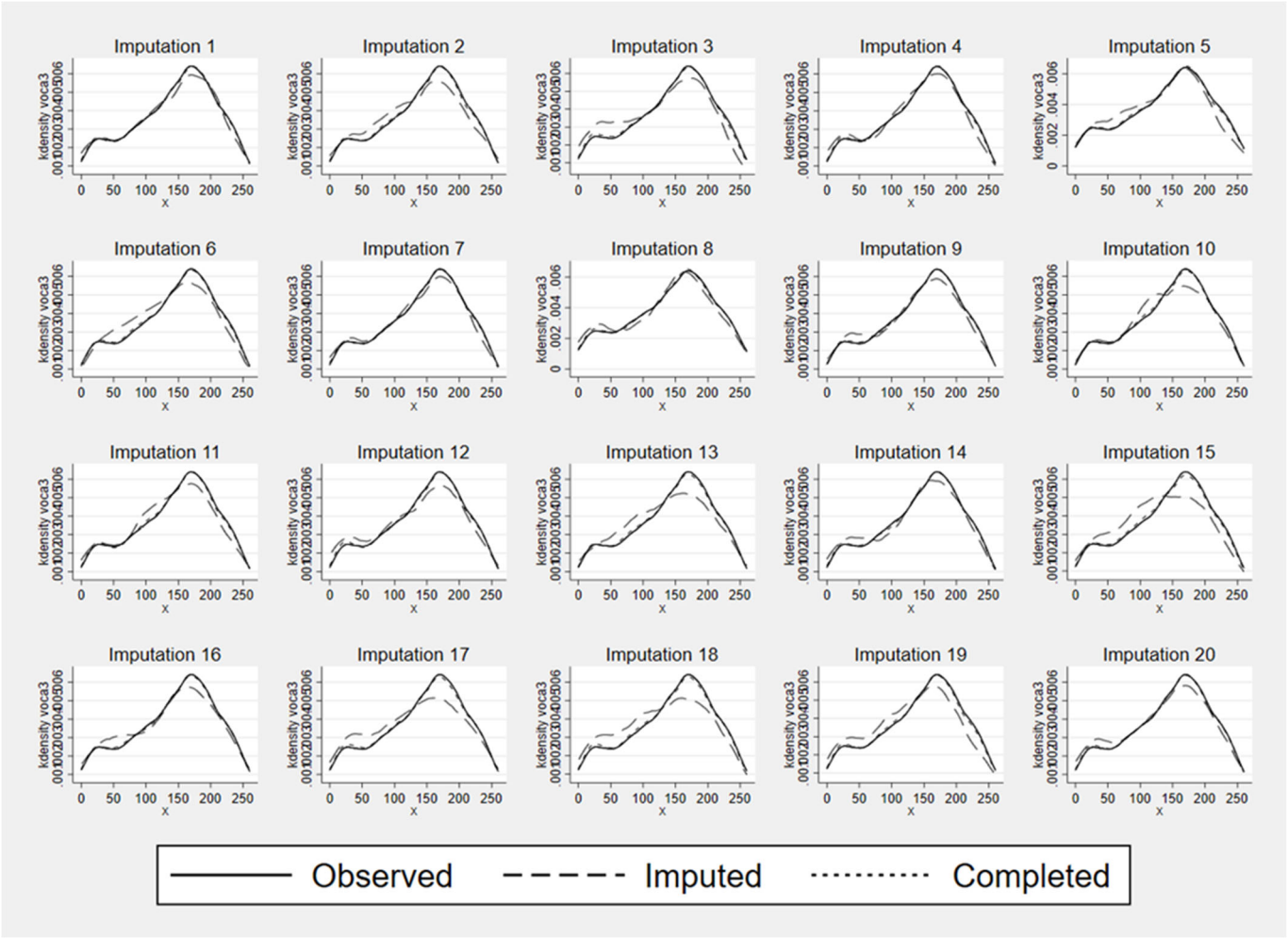

Figure S5. Observed, imputed, and completed data for vocabulary at T3 (26 months).

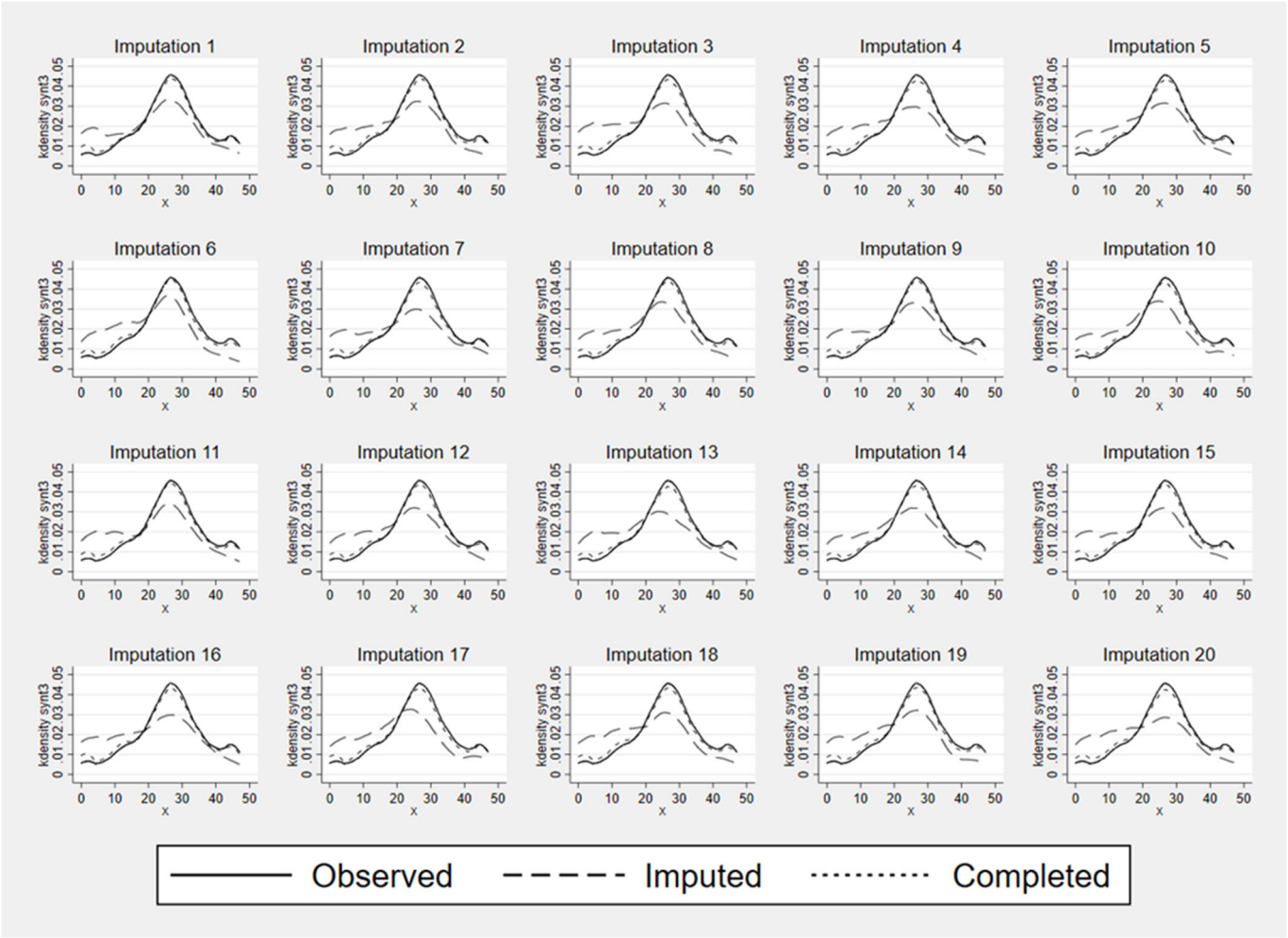

Figure S6. Observed, imputed, and completed data for syntax at T3 (26 months).

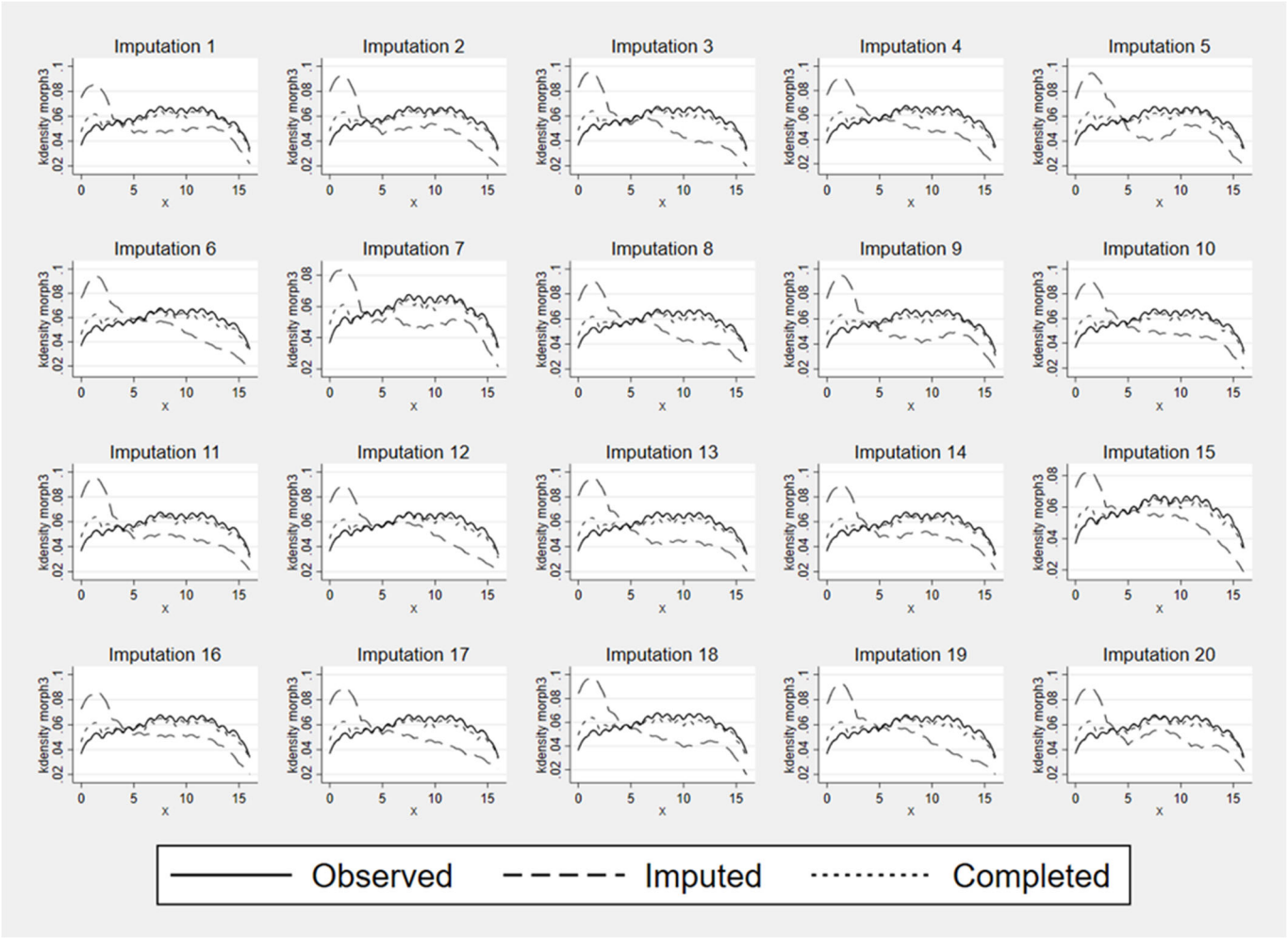

Figure S7. Observed, imputed, and completed data for morphology at T3 (26 months).

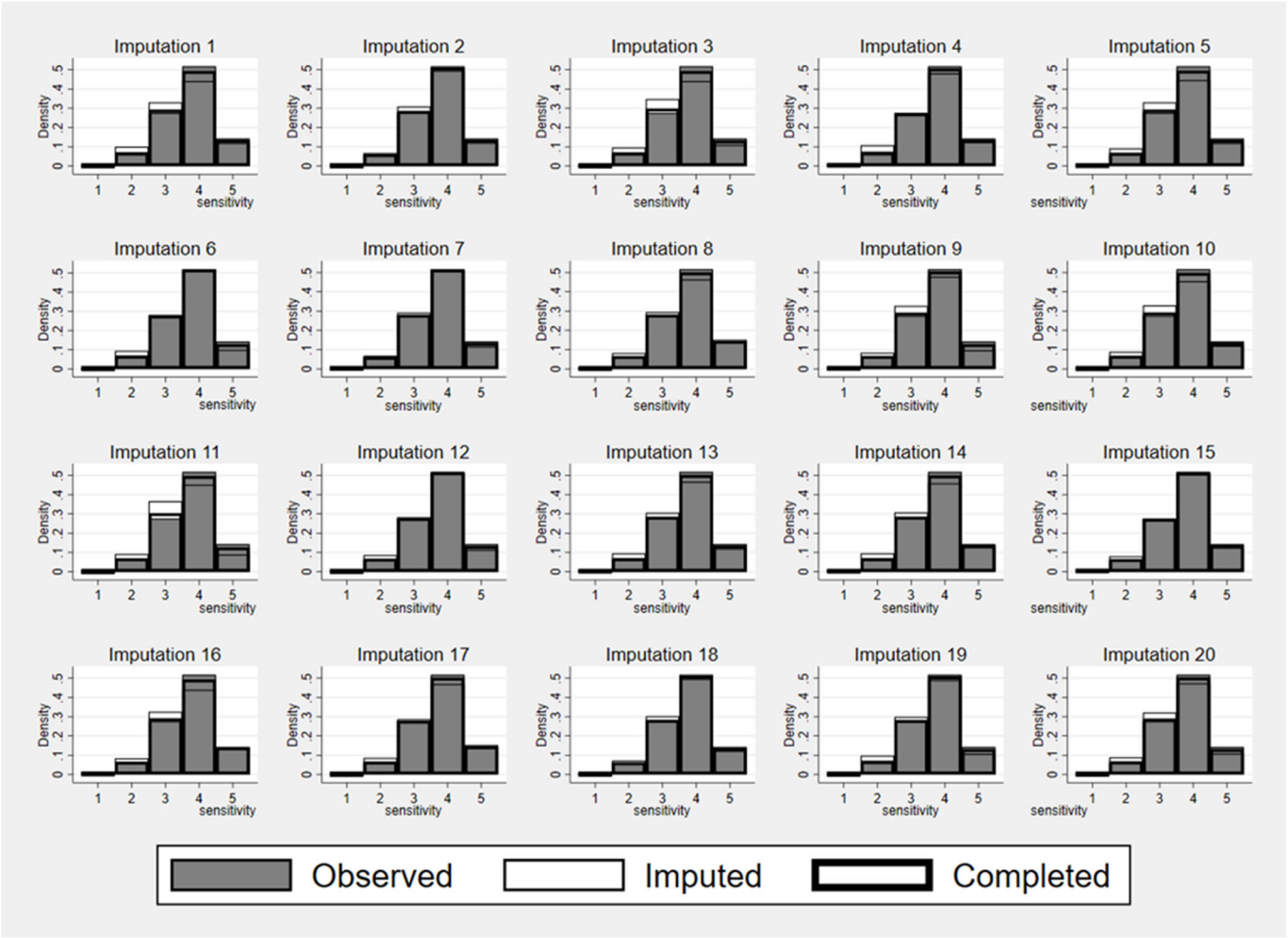

Figure S8. Observed, imputed, and completed data for sensitivity in mother–child interactions at T3 (26 months).

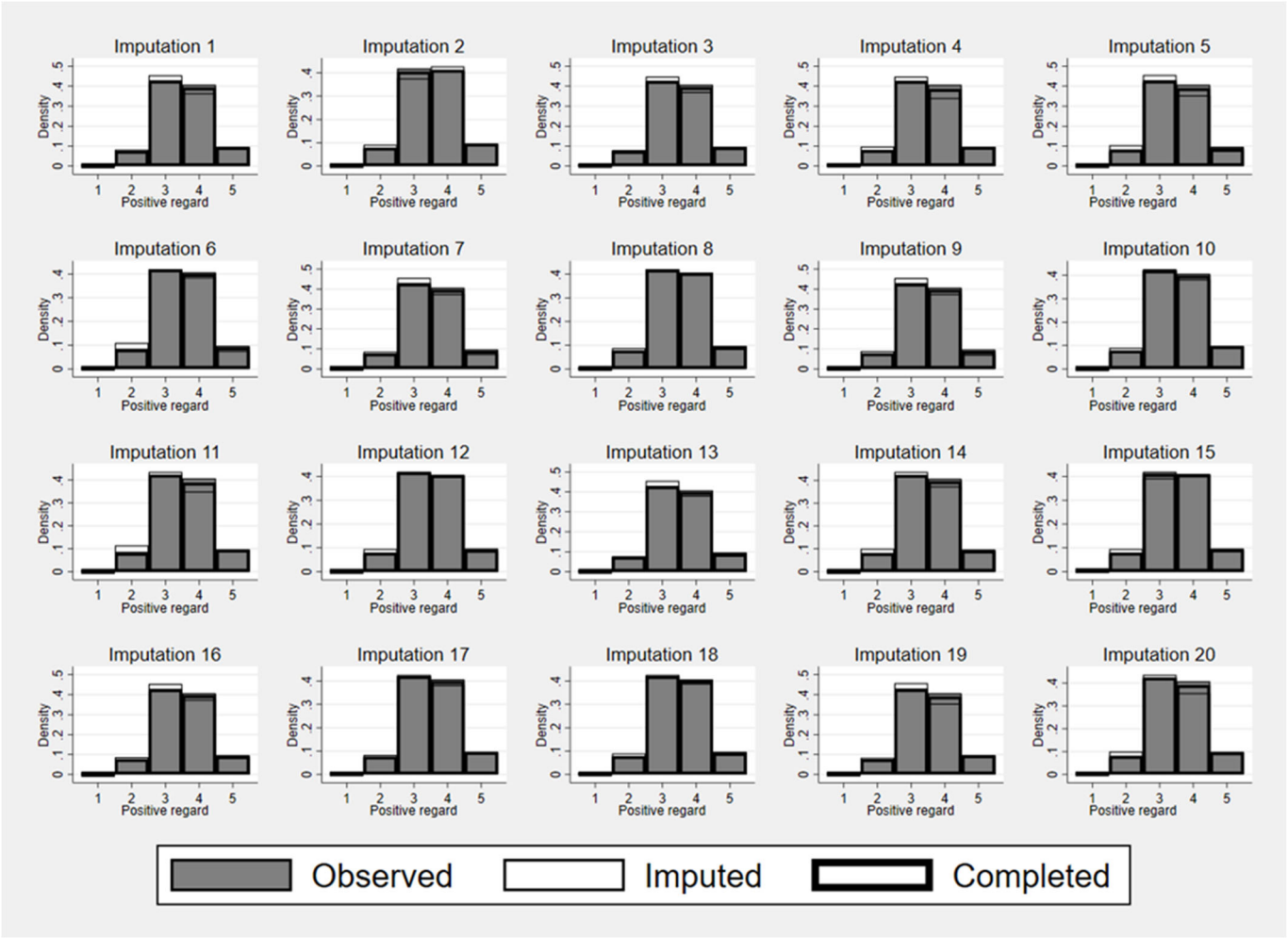

Figure S9. Observed, imputed, and completed data for positive regard in mother–child interactions at T3 (26 months).

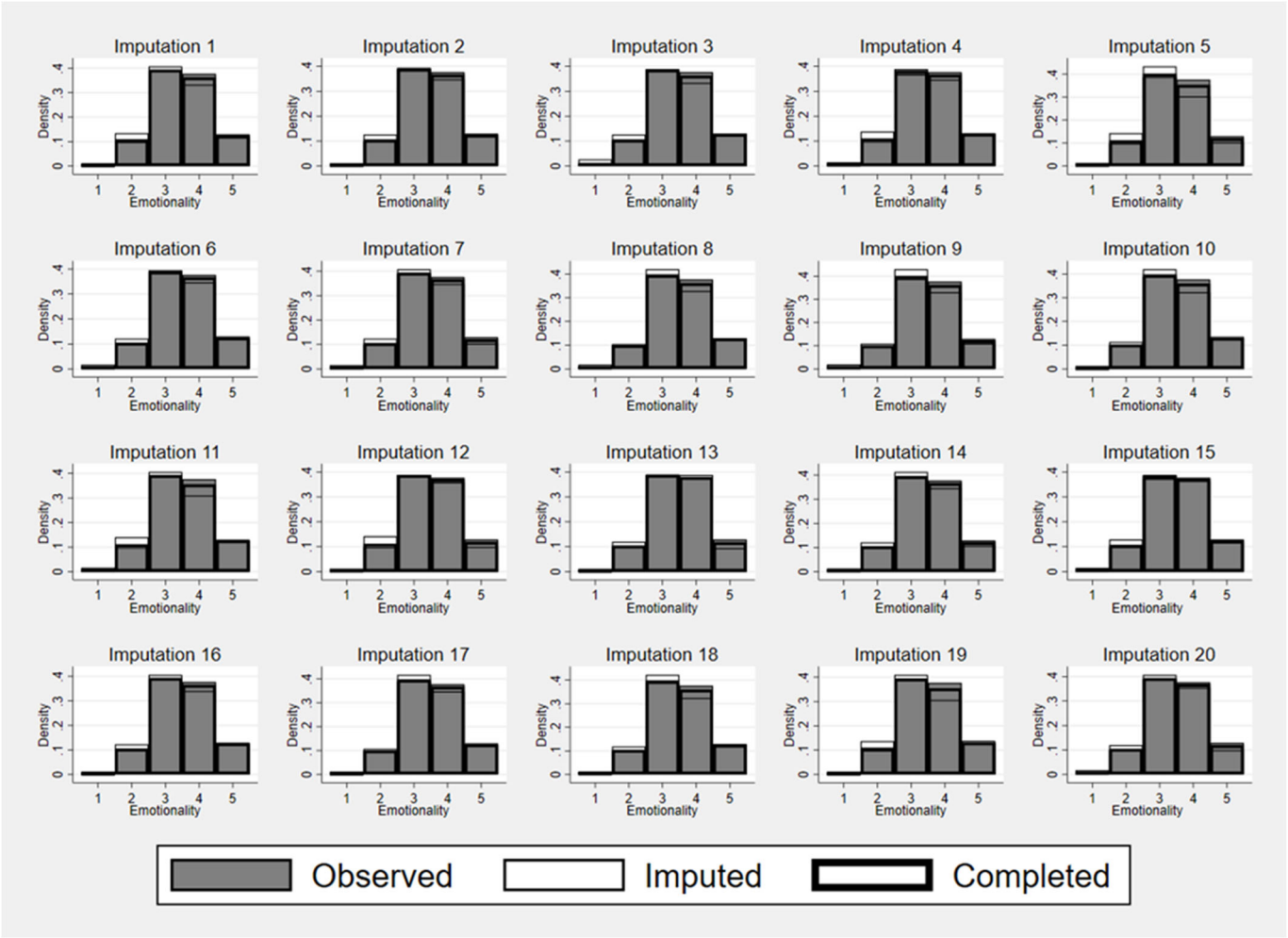

Figure S10. Observed, imputed, and completed data for emotionality in mother–child interactions at T3 (26 months).

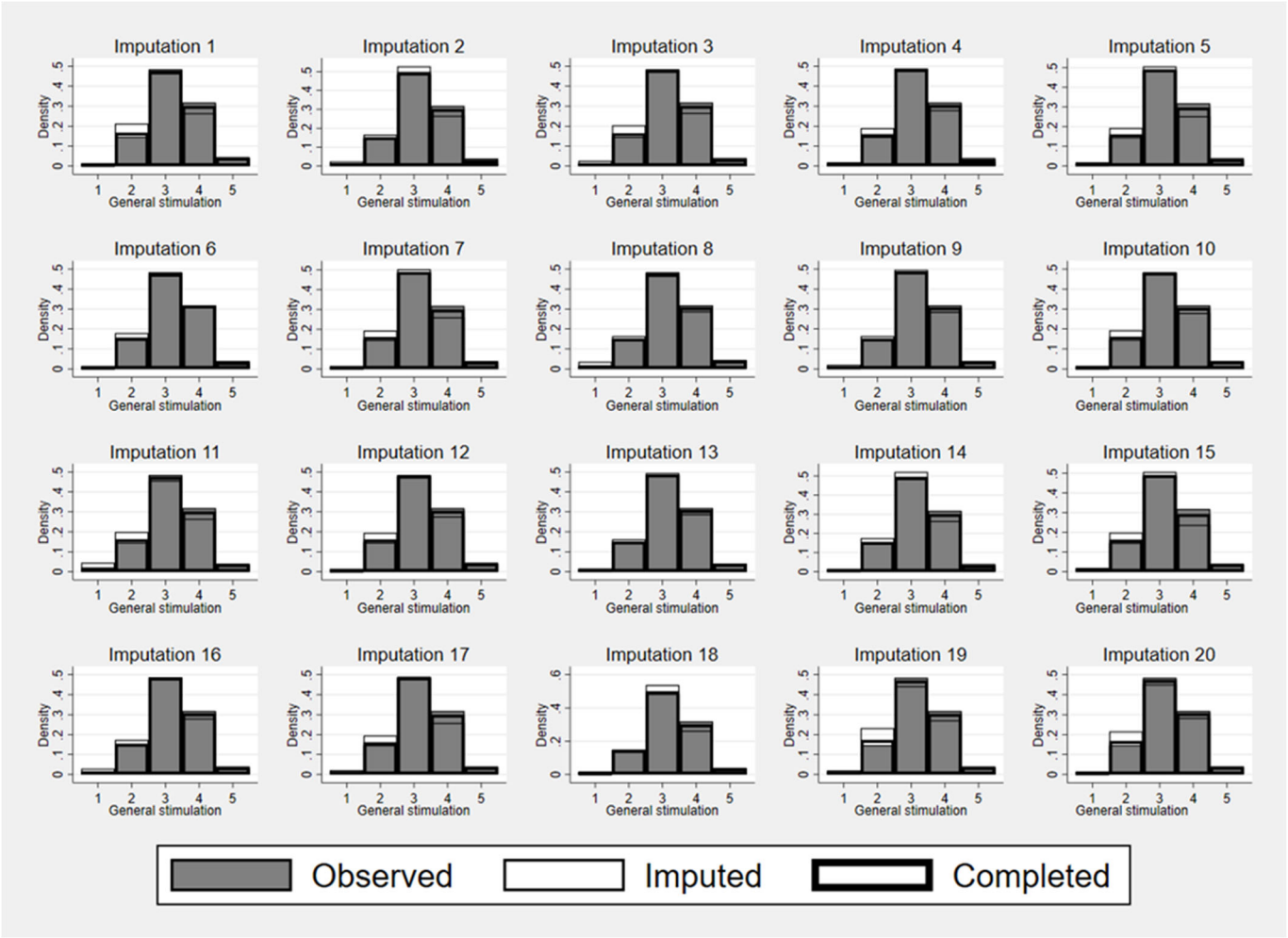

Figure S11. Observed, imputed, and completed data for general stimulation in mother–child interactions at T3 (26 months).

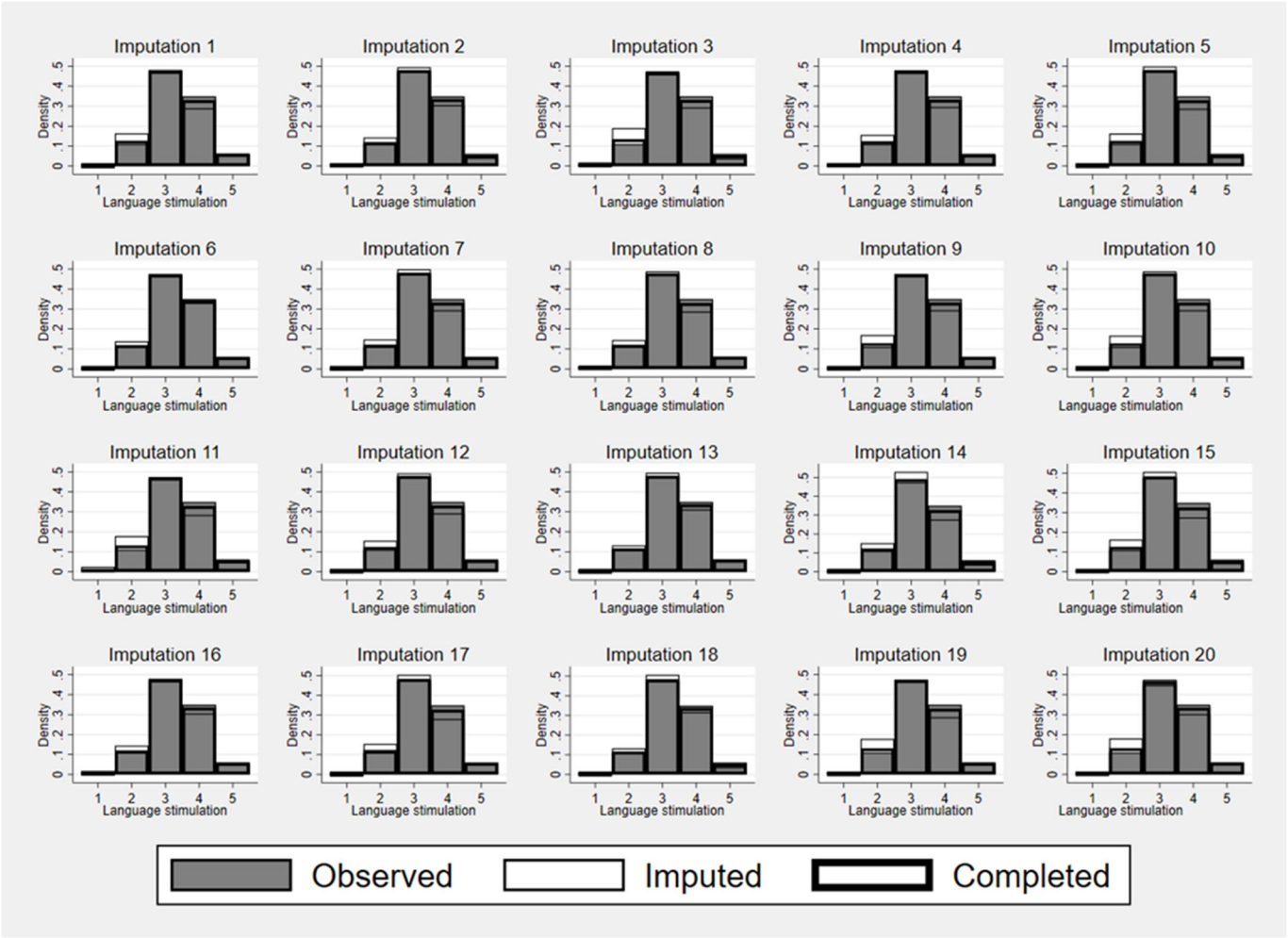

Figure S12. Observed, imputed, and completed data for language stimulation in mother–child interactions at T3 (26 months).

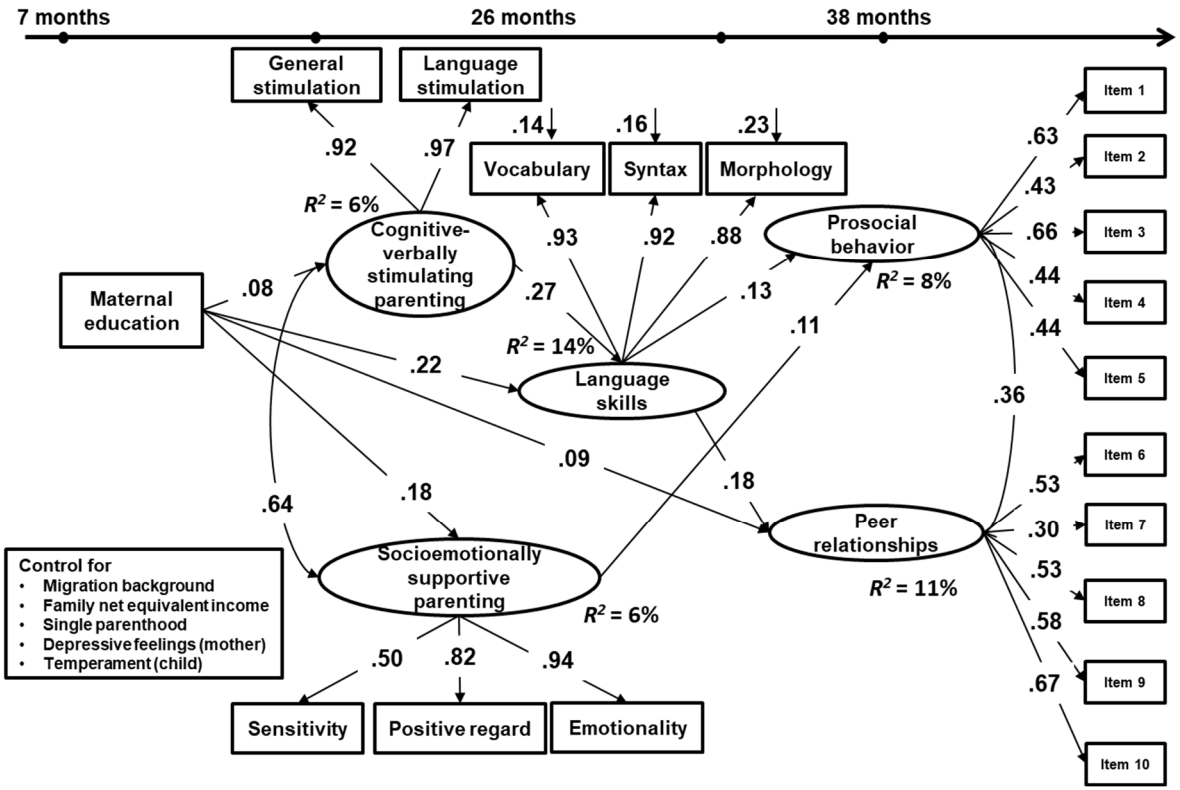

Figure S13. Results of conditioned structural equation model using data without multiple imputation. Only significant standardized coefficients are reported ($p < .05$). N = 2,478, CFI = .971, RMSEA = .033, SRMR = .040.

Appendix 4. Study 3: Relations between early majority language and socioemotional development in children with different language backgrounds

Huang, W., Weinert, S., & Volodina, A. (2022). Relations between early majority language and socioemotional development in children with different language backgrounds [Manuscript submitted for publication]. Department of Developmental Psychology, University of Bamberg.

Note.

This manuscript has been revised and resubmitted in *Child Development*. Due to permission problem, only the submitted version of this manuscript can be used here.

Relations between early majority language and socioemotional development in children with different language backgrounds

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Acknowledgement

The data used in the present study is publicly accessible (http://ukdataservice.ac.uk). The analytic code necessary to reproduce the analyses is publicly accessible (https://osf.io/2se7p/). Questionnaire used to assess children's socioemotional skills in the present study is publicly accessible (https://www.sdqinfo.org/py/sdqinfo/b3.py?language=Englishqz(UK)). The study's design and the analyses were not pre-registered.

Abstract

Given the mixed evidence regarding the association between children's developing majority language and socioemotional skills, this study explored the directionality thereof. Drawing on 12,951 children (3–5 years; 49% girls; 85% White, 6% Pakistani and Bangladeshi, 3% Black, 3% Mix, and 2% Indian) from the Millennium Cohort Study, the association were separately investigated for children with different language backgrounds. The cross-lagged models controlled for family background, early extrafamilial care attendance, and child's sex. Results indicated bidirectional association for monolinguals, a unidirectional effect of majority language on socioemotional skills for Dual Language Learners (DLLs) who speak English and minority language(s) at home, and a unidirectional effect of socioemotional skills on majority language for DLLs who only speak minority language(s) at home.

Keywords: language, socioemotional skills, dual language learners, early childhood, cross-lagged models

Relations Between Early Majority Language and Socioemotional Skills in Children With Different Language Backgrounds

Early language acquisition is embedded in a series of social interactions with adults and peers; at the same time, socioemotional skills which facilitate effective social interactions are deeply influenced by the process of language acquisition (Schieffelin & Ochs, 1986). Both language and socioemotional skills are important developmental domains that impact children's later academic success and well-being (Klein & Englund, 2021; Pace et al., 2019; Yew & O'Kearney, 2013). As the acquisition of early language and socioemotional skills largely depends on family contexts and particularly on the quality and quantity of language exposure to minority and majority languages (Rogoff, 2003; Tomasello, 2003; Vygotsky, 1978), it remains unclear whether the relations between children's developing language skills and socioemotional skills differs for monolinguals (i.e., children who are only exposed to and only speak the majority language) and Dual Language Learners (DLLs; i.e., children who are not only exposed to and do not only speak the majority language). Examining this question is of practical importance, because about 30% of children born in Britain have at least one parent from another country (Office for National Statistics, 2011), and the number of DLLs has increased over the past decade from 31% to 34.8% (Office for National Statistics, 2020). In other words, more than 30% of British children are exposed to (at least) one minority language in addition to the majority language (English).

Although theoretical approaches indicate a potential bidirectional association between these two domains (Bruner, 1983; Schieffelin & Ochs, 1986; Tomasello, 1992), previous studies have revealed mixed evidence concerning this association—that is, some found unidirectional effects either from (majority) language skills to socioemotional skills or the reverse, others found bidirectional or even no interrelation between them (e.g., Barnett

et al., 2012; Girard et al., 2016; Sparapani et al., 2018). Moreover, those studies have typically either focused on children with single language status (monolingual or bilingual sample; e.g., Ertanir et al., 2020; Paavola-Ruotsalainen et al., 2018; Ren et al., 2016; Ziv, 2013) or failed to consider this language-related heterogeneity (e.g., Girard et al., 2016; Longobardi et al., 2016; Sparapani et al., 2018). The impact of children's different language backgrounds on the association between these two domains is thus essentially unexplored. In addition, as DLLs' majority language skills largely depend on language exposure and usage of each language (Tomasello, 2003), DLLs are unlikely to be a homogenous group when it comes to their majority language skills. Thus, drawing on a nationally representative sample from the UK, this study investigated the longitudinal association between majority language skills and socioemotional skills among monolinguals and DLLs when controlling for the initial level of children's outcomes. Furthermore, we explicitly considered the heterogeneity in DLLs and differentiated two DLLs groups, i.e., *English and minority language(s) DLLs* (EM-DLLs; who speak both majority and minority languages at home) and *minority language predominant DLLs* (ML-DLLs; who exclusively speak the minority language at home), to compare with *monolingual English children* (MOEN; who exclusively speak the majority language at home).

Furthermore, because children's development results from the interactions of individuals and their environmental context (Bronfenbrenner & Morris, 2006), we also considered theoretically and empirically well-documented influential factors as control variables when investigating the underlying developmental relations, i.e., family's socioeconomic, educational, and cultural background, early extrafamilial Early Childhood Education and Care (ECEC) attendance, and child's sex.

Association between Language and Socioemotional Skills

From the perspective of the social-pragmatic view of language development and social learning, language acquisition relies on, but is not limited to, the basic processes of social learning (Tomasello, 1992). Diverse social interactions with more skilled caregivers or peers (e.g., in play situations) provide children with language stimulations that promote their language acquisition (Vygotsky, 1978). Socioemotional skills refer to a variety of social and emotional competencies that enable flexible and appropriate responses in social interactions. Presumably, socially competent children, e.g., children who exhibit more prosocial behavior and are able to establish positive relationships with peers, might be more likely to boost their language acquisition by constantly promoting effectiveness in social interactions (Rose-Krasnor, 1997). In contrast, children with aggressive behavior, inattention, or emotional problems may have less opportunities to participate in language-based exchanges with peers and may be even with adults; this could decrease their exposure to language as well as opportunities to produce language (Erdemir & Brutt-Griffler, 2020).

At the same time, a range of language behaviors has been shown to be important for children's successful participation in everyday social life. Language skills provide children with the essential means of communication and self-regulation to facilitate social interactions; thus, developing language skills are often even considered as part of social skills (Bruner, 1983). In particular, language allows children to express their needs, improve their emotion expression knowledge, better communicate with peers and adults, and solve social conflicts verbally (e.g., Keenan & Shaw, 2003; Schultz et al., 2001). If children's language skills are limited, they might have difficulty expressing themselves and, thus, be easily misunderstood by peers, leading to peer rejection and to a higher risk of aggressiveness or hyperactivity (Girard et al., 2016; Huang, Weinert, Wareham et al., 2022; Menting et al., 2011; Petersen & LeBeau, 2021). This decreases their likelihood to establish better peer relationships. Furthermore, language skills help children to learn and moderate

their behaviors and emotions (Schultz et al., 2001). In particular, self-regulating abilities can guide children's behavior in difficult situations using private or self-directed speech (e.g., anger management; Vygotsky, 1962). Both communication and self-regulating skills contribute to the acquisition of socioemotional skills. In addition, more advanced language skills may also help children to better understand others' perspectives and feelings, which may trigger prosocial behavior (Durkin & Conti-Ramsden, 2007; Huang, Weinert, von Maurice et al., 2022; Imuta et al., 2016).

In this regard, the association between children's language and socioemotional skills has been suggested to be reciprocal. Relying on these theoretical backgrounds, a number of empirical studies have examined the association between children's language and socioemotional skills. Overall, studies with typically developing children have shown an association between these two domains in early childhood. Although some of these studies documented a longitudinal predictive relation between children's early socioemotional skills and their later language skills (Paavola-Ruotsalainen et al., 2018; Ziv, 2013), they often failed to control for children's initial levels of language skills. This severely limits the conclusion that children's socioemotional skills actually affect their language skills. At the same time, evidence from clinical samples or samples which simultaneously considered children with various language backgrounds suggests a longitudinal effect of children's early majority language skills on their later socioemotional outcomes (e.g., Huang, Weinert, von Maurice et al., 2022; Longobardi et al., 2016; Menting et al., 2011; Petersen & LeBeau, 2021; Rose et al., 2018; Yew & O'Kearney, 2013). In particular, studies controlling for prior levels of children's socioemotional skills indicate that children with advanced language skills at preschool age were more likely to be cooperative and get along well with other children at later time points (Petersen & LeBeau, 2021; Rose et al., 2018).

Studies which simultaneously examined both directions of effect while controlling for the children's initial level of skills, however, have often found contradictory results. In particular, some longitudinal studies demonstrated either unidirectional effects of higher levels of language skills on later social competence (Girard et al., 2016; Rose et al., 2016) or bidirectional associations between language skills and social competence (Sparapani et al., 2018), while some research could not provide evidence for a significant relation between these two domains at all (e.g., Barnett et al., 2012). Notably, most of the aforementioned studies investigating the bidirectional effects did not differentiate children with various language backgrounds, i.e., some of the children spoke a minority language other than the majority language of the society at home (e.g., Girard et al., 2016; Rose et al., 2016); others studied children who suffered from a developmental language disorder (Sparapani et al., 2018). Hence, it is possible that the differences in children's (majority) language skills or in the conditions of language acquisition (e.g., bilingualism, attendance at extrafamilial child care) might contribute to these discrepant findings. It should be noted that although some of the studies controlled for language spoken at home (e.g., Rose et al., 2016), this does not allow us to see whether the associations between language and socioemotional skills are similar or different between groups. In fact, this has not yet been tested empirically.

To sum up, bidirectional associations between children's language and socioemotional skills have been suggested based on theoretical assumptions, but, the empirical evidence provides an unclear picture of results. It also remains unclear, whether the inconsistent findings are related to the abovementioned differences between studies or whether they are mainly due to other methodological limitations such as the failure to control for initial levels of children's language skills (e.g., Paavola-Ruotsalainen et al., 2018; Ziv, 2013). Controlling for initial levels is important because the association of early socioemotional skills with later language skills could reflect the opposite direction of effect

from language to socioemotional skills (i.e., the lagged association could be due to the stability of language skills), and vice versa. Hence, while considering children's different language backgrounds, this study tested the association between children's language and socioemotional skills controlling for initial levels of the respective skills.

Majority Language and Socioemotional Skills Among DLLs

With regard to children growing up with different language backgrounds, a sociocultural perspective of development (Rogoff, 2003; Vygotsky, 1978) suggests that children's development is the result of bidirectional interactions within family contexts, the quality of language interactions within these contexts, the degree of language exposure to and usage of the minority language as well as the majority language of the resident country. This constitutes a unique experience for language development of DLLs compared to monolingual children. The DLLs may often have limited majority language skills for daily interactions with peers due to additional exposure to minority language(s) (Deanda et al., 2016). In particular, disparities in expressive vocabulary in the majority language have been demonstrated to emerge between monolinguals and DLLs in early childhood, as compared to other language subdomains (Oller et al., 2007). Furthermore, because multilingual children may have less access to the majority language of the society in their families, they may need to draw more heavily on other sources and their socioemotional skills to access them, e.g., when interacting with peers or other adults.

As the level of very young DLLs' language skills (either in the majority or minority language) depends largely on the language exposure at home (and in extrafamilial care) as well as on how much children themselves actually speak each language (Tomasello, 2003), they are unlikely to constitute a homogenous group with regard to their majority language skills (Hoff, 2018; Lauro et al., 2020; Winsler, Burchinal, et al., 2014). For instance, some DLLs with a large exposure to the majority language may have already attained effective

communication skills in the majority language, whereas others may still be in the process of acquiring very basic skills in the majority language due to limited input and usage (Hoff, 2018). As the majority language is spoken in a variety of contexts in the resident country, the substantial variation in DLLs' majority language skills might enhance individual differences in their socioemotional skills (Winsler, Burchinal, et al., 2014; Winsler, Kim, et al., 2014). This brings up the question of whether the association between majority language and socioemotional skills differs for various DLLs groups as compared to monolingual children.

To date, little research has been conducted to explore the association between majority language and socioemotional skills among DLLs and those available rarely considered the heterogeneity in DLLs (Ertanir et al., 2020; Ren et al., 2015; Sun et al., 2018; Winsler, Kim, et al., 2014). For instance, drawing on preschoolers aged 36–69 months from 15 English-speaking child care centers, Ren et al. (2016) found that the majority language skills (English) of Mandarin-English DLLs' were positively related to their socioemotional skills as reported by teachers. However, we do not know the direction of this association, and it remains unknown whether the exposure to each language at home affects this association. A recent study by Ertanir et al. (2020) investigated the association among 33–77 month old DLLs (who speak different minority languages) from 19 preschools in Germany and found a predictive effect of DLLs' teacher-reported socioemotional skills on their later vocabulary skills but not the reverse. Although the information on the duration of language exposure to the majority language (German) at home has been reported, it remains unknown whether it affects the association between children's majority vocabulary and socioemotional skills. To our knowledge, only one study considered children's different language backgrounds while examining the bidirectional effects between children's majority language and socioemotional skills: Winsler, Kim, et al. (2014) found not only a concurrent

association between socioemotional skills of Spanish-English DLLs and the majority language (English) performance at age 4, but also a 1-year-lag effect indicating that DLLs with stronger initial socioemotional skills tend to make more progress in English after one-year attendance in preschool than those DLLs with lower initial socioemotional skills. Furthermore, those DLLs with a higher level of English exhibited higher levels of socioemotional skills compared to DLLs with a low level of English. However, these findings were based on DLLs from low-income families, which might not be generalizable to DLLs with other family backgrounds, such as from middle-income families.

Given the limitations of previous studies and the controversial results, a clearer understanding of the role of heterogeneity among DLLs in the relation between their developing language and socioemotional skills is warranted. Hence, this study differentiates the DLLs according to the degree of majority language usage at home (i.e., EM-DLLs vs. ML-DLLs), aiming to compare the association between language and socioemotional skills among monolingual children and these two DLLs groups.

The Impact of Family, Child Care Attendance, and Child's Sex on Language and Socioemotional Skills

Based on the bioecological model, children's development results from the interaction of individuals and their environmental contexts (Bronfenbrenner & Morris, 2006). Apart from the contribution of the quantity of language exposure to and usage to the considerable variability in language acquisition (with the potential to affect children's social and behavioral development), family background (e.g., parents' education level, family income, and migration background) and child's sex have been well documented to influence both children's language and socioemotional skills (e.g., Barnett et al., 2012; De Feyter & Winsler, 2009; Huang, Weinert, von Maurice et al., 2022; Lauro et al., 2020; Rose et al., 2018; Wirth et al., 2020).

Evidence drawing on samples with different language backgrounds suggests that family background (e.g., parents' educational level, family income) has an indirect effect through various home learning environments such as verbally stimulating parenting behavior (e.g., Harding et al., 2015; Huang, Weinert, von Maurice et al., 2022). Migration background which is often operationalized by parents' country of origin has been associated with young children's lower majority language skills (e.g., De Feyter & Winsler, 2009; Huang, Weinert, von Maurice et al., 2022) and lower socioemotional skills (particularly in internalizing outcomes; see Belhadj et al., 2014, for detailed review). Given the cultural, linguistic, and contextual differences in DLLs and monolingual children, considering aspects of family background (i.e., parental educational level, family income, and migration background) as control variables may enhance the robustness of the examined association between children's majority language skills and socioemotional skills (De Feyter & Winsler, 2009; Winsler, Burchinal, et al., 2014).

In addition to the family contexts, the extrafamilial Early Childhood Education and Care (ECEC) provides children with an additional opportunity to interact with peers and caregivers other than the parents. For DLLs particularly, attendance at ECEC might represent an opportunity to be exposed to and to use the majority language, as well as to establish interactions with peers speaking the majority language (Erdemir & Brutt-Griffler, 2020). Furthermore, numerous studies have demonstrated a positive relation between early attendance at ECEC and more advanced majority language skills—with the strongest relation for DLLs from families with low exposure to the majority language (Kohl, Willard, et al., 2019). For our sample, not all children (in the UK) attended ECEC at a very young age, as the compulsory school starts at age 5. This makes it important to control for children's early attendance at ECEC. Finally, studies regarding child's sex have found that girls possess overall more advanced language skills and are more likely to exhibit more

prosocial behavior than boys in early childhood (Girard et al., 2016; Paavola-Ruotsalainen et al., 2018; Rose et al., 2018; Wirth et al., 2020).

The Present Study

The primary goal of this study was to advance the understanding of the association between children's language and socioemotional skills in early childhood by taking children's language backgrounds into consideration and controlling for the initial levels of respective skills. Further, we also considered the effects of the family and ECEC contexts, as well as child's sex on the investigated developmental relations. In addition, we included one model using the full sample as a comparison to the models considering children's language backgrounds. This could help us better understand whether the unclear previous findings were due to children's language backgrounds. Drawing on a nationally representative sample from the UK, we explored the following two research questions:

1. What are the directions of the effects between young children's majority language and socioemotional skills in the whole group of children, i.e., without considering children's language background? Although the existing theoretical accounts suggest a bidirectional association between these two domains, the majority of studies controlling for the initial level of skills have found that there is, at the least, an effect of children's language on their socioemotional skills (e.g., Girard et al., 2016; Petersen & LeBeau, 2021; Rose et al., 2018), whereas the opposite effect was controversial. Therefore, we expected to find a unidirectional effect of children's language on their socioemotional skills.
2. Does the association between children's majority language and socioemotional skills differ for children with different language backgrounds? Due to the variation of majority language skills among monolingual children and DLLs (Hoff, 2018; Lauro et al., 2020; Winsler, Burchinal, et al., 2014), we posited to

find different associations between majority language skills and socioemotional skills across groups. In particular, we expected to find a unidirectional effect of children's language skills on their socioemotional skills for monolingual children. Due to the scarcity of findings related to the association between majority language skills and socioemotional skills of DLLs, we wanted to conduct an exploratory examination between these two domains among children who spoke both English and minority language(s) at home (i.e., EM-DLLs). In other words, we do not formulate a specific hypothesis for EM-DLLs. However, children who spoke exclusively minority language(s) at home (i.e., ML-DLLs) may possess very limited majority language skills that might not affect their socioemotional skills. These children may need to draw on their socioemotional skills to access the majority language and to improve majority language skills. Thus, for ML-DLLs, we expected to find an effect of socioemotional skills on majority language skills.

Method

Participants

The Millennium Cohort Study (MCS)

The Millennium Cohort Study (MCS) is an ongoing observational, multidisciplinary cohort study that began in 2000–2001. The MCS includes a representative sample of 18,552 families from across the UK in the first wave, including 253 sets of twins and 11 sets of triplets. In Wave 2, 692 additional families participated in the study; however, these new families were excluded from our analyses because the information on ECEC attendance at 9 months is missing. Twins and triplets were not included in the analyses, because of the known anomalous language outcomes among multiple birth children (McMahon et al.,

1998). Applying sample design weights permits statements for the whole UK (see Plewis, 2007, for details of sampling design).

The MCS collects a diverse range of data on children, their siblings, and parents via both direct interview and self-completion questionnaires (Hansen et al., 2010). There have been seven waves to date (from 9 months to 17 years). In Waves 1 and 2, parents provided information on family demographics and child's characteristics. This study included information on 12,951 children who continuously participated in the study till the third panel wave and had information on their English vocabulary skills and socioemotional outcomes at age 5 (49% female). The analyses used data from the first three waves. Children's ages in respective waves were 9 months (M = 9.20, SD = 0.51), 3 years (M = 37.62, SD = 2.46), and 5 years (M = 62.63, SD = 2.97). In Wave 2, around 39% of the parents had a low educational level, 17% had a middle educational level, and 44% had a high educational level (details see below). The monthly family net equivalent income in Wave 2 averaged 1,449.63 pounds (SD = 956.12). Around 21% of the parents were born outside the UK. The ethnic groups of children in this study were White (85%), Pakistani and Bangladeshi (6%), Black or Black British (3%), Mix (3%), and Indian (2%).

The current study only conducted secondary data analysis and thus there was no need for Institutional Review Board approval.

Measures

Language Background

At age 3, parents reported whether English was the language usually spoken at home, and if the usual household language was not only English. Parents further indicated who in the household spoke other language(s) (i.e., mother, father, cohort child, or other household members). We considered both groups of children who spoke not only English at home as DLLs. In particular, we identified those children who only spoke English at home as

monolingual English children (*MOEN; n* = 11,410; 88%), those who spoke both English and minority language(s) at home as *EM-DLLs* (*n* = 1,181; 9%), and those who spoke only minority language(s) at home as *ML-DLLs* (*n* = 360; 3%). In relation to the minority languages, most of them were Urdu (20%), Punjabi (16%), Welsh (12%), and Bengali (11%).

Socioemotional Skills

Children's socioemotional skills were assessed by the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) containing five subscales: Conduct Problem (e.g., often fights with other children or bullies them), Hyperactivity (e.g., easily distracted, concentration wanders), Emotional Symptoms (e.g., many worries, often seems worried), Peer Problems (e.g., picked on or bullied by other children), and Prosocial Behavior (e.g., shares readily with other children). At ages 3 and 5, parents rated their children's behavior on these five subscales (5-items each) using 3-point scales ranging from 0 (*not true*) to 2 (*certainly true*). The former four subscales focus on four types of difficulties and the latter one on strength. A Total Difficulties score was generated as the sum of the first four subscales (ranging between 0 and 40). A higher rating in Total Difficulties reflects increased behavioral or emotional difficulties (see Goodman, 1999, for further details). In contrast, a higher rating in the Prosocial Behavior (sum score ranging between 0 and 10) indicates more engagement in prosocial behavior. The Cronbach's alphas for Prosocial Behavior were .66 at age 3 and .67 at age 5, and for the Total Difficulties score were .78 at age 3 and .80 at age 5. For the analyses, we used separate sum scores as continuous variables indicating children's prosocial behavior and total behavioral difficulties.

Language Skills

Children's expressive vocabulary was assessed by the Naming Vocabulary subtest from the British Ability Scales Second Edition (BAS II; Elliott et al., 1996), when they were about 3 and 5 years. The test comprises a stimulus booklet presenting a total of 36 colorful

pictures that the child is asked to name (e.g., picture of a shoe). Starting and stopping points differ depending on the child's age and performance: The better they do, the more items they are given. The test is stopped at any point when the child has made five consecutive errors. The standardized ability scores (adjusted for item difficulty) from the Naming Vocabulary were used as continuous variables indicating children's language skills.

Family Background

Parental education. The parent-reported education according to the UK education system (from Wave 2) was recoded into the Comparative Analysis of Social Mobility in Industrial Nations-Classification (CASMIN-Classification; Brauns et al., 2003). The CASMIN-Classification consists of nine educational categories tracking both academic and vocationally oriented education. It allows for the representation of institutional differences in national education and training systems. Due to low numbers in certain categories, the CASMIN indicators were condensed into three broad groups: low, middle, and high (see Table S1 for details). Thus, we treated parental education as a categorical variable. Two dummy variables were used in the analysis models: low education level and middle education level (reference category: high education level).

Family net equivalent income. Parents' gross and net income from Wave 2 were included in this study. Family monthly net equivalent income was transferred through the available weekly family net equivalent income and used in this study. Further, we log-transformed the net equivalent income to reduce its skewness.

Parents' migration background. In Wave 2, when children were 3 years old, parents provided information on whether they were born in the UK or abroad. Within the sample we used in this study, there were 2,724 parents (either of them or both) born outside the UK (coded as 1) and 9,995 were born in the UK (coded as 0).

Attendance at ECEC under 36 Months

At 9 months and 38 months, the responding parent reported how long (in months) the target child had attended ECEC (i.e., care by childminder or day nursery) previously. For this study, attendance at ECEC under 36 months was used as a continuous variable.

Child's sex

At 9 months (MCS), parents reported their child's sex (boy = 0; girl = 1).

Analysis Strategy

The analyses were conducted in autoregressive cross-lagged models. The models were evaluated by using structural equation modeling in M*plus* 8.3 (Muthén & Muthén, 2017). As a first step, four conditional nested models were estimated to determine which model best represented the associations between majority language skills and socioemotional skills: Model 1: No coupling, Model 2: Unidirectional coupling (early language skills predicting later socioemotional skills), Model 3: Unidirectional coupling (early socioemotional skills predicting later language skills), and Model 4: Bidirectional couplings (i.e., full coupling). Model fit was compared across the four models using the Satorra-Bentler scaled chi-square difference tests and by comparing standard fit indices.

Second, drawing on the model determined through the first step, we ran a multiple-group analysis to examine potential differences in the pattern of associations between MOEN, EM-DLLs, and ML-DLLs. Firstly, we examined an unconditional model and then the conditional model including all control variables. In the conditional model, family background (i.e., low educational level, middle educational level, family net equivalent income, and migration background), attendance at ECEC under 36 months, and child's sex were entered as predictors at both assessment time points.

In structural equation modeling, the full information maximum likelihood (FIML) has been demonstrated to be superior to traditional methods addressing missing data (Enders & Bandalos, 2001) or as yielding equivalent results compared to multiple imputation

(Graham, 2003). Thus, we used FIML to handle missing data (1%–6% per variable). All analyses included survey weights to account for the stratified cluster sample design of the study and attrition bias due to non-response across the surveys.

Results

Descriptive Statistics

Tables 1 and 2 present descriptive statistics on all study variables for the full sample and separately for MOEN, EM-DLLs, and ML-DLLs. We conducted one-way ANOVAs to determine whether the key variables (i.e., prosocial behavior, total difficulties, expressive vocabulary at age 3 and 5) differed between groups with various language backgrounds. There were statistically significant differences between groups in children's prosocial behavior (age 3: $F(2,12508) = 3.17$, $p < .05$; age 5: $F(2,12633) = 8.02$, $p < .001$), total difficulties (age 3: $F(2,12512) = 768.90$, $p < .001$; age 5: $F(2,12636) = 464.04$, $p < .05$), and expressive vocabulary (age 3: $F(2,12220) = 1025.55$, $p < .001$; age 5: $F(2,12790) = 916.12$, $p < .001$) at ages 3 and 5. Tukey post-hoc tests revealed that children's prosocial behavior was significantly lower in ML-DLLs compared to MOEN at ages 3 and 5, and lower in EM-DLLs compared to MOEN at age 5 (ps $< .05$). However, there were no significant differences in prosocial behavior between the MOEN and EM-DLLs, EM-DLLs and ML-DLLs at age 3, or EM-DLLs and ML-DLLs at age 5. At ages 3 and 5, children's total difficulties were significantly higher in ML-DLLs and EM-DLLs compared to MOEN (ps $< .001$); the differences between ML-DLLs and EM-DLLs were not significant. Regarding children's expressive vocabulary in the majority language, it was significantly lower in ML-DLLs and EM-DLLs compared to MOEN, as well as lower in ML-DLLs compared to EM-DLLs at ages 3 and 5 (ps $< .001$).

Turning next to the correlational analyses, the bivariate correlations are presented separately for the full sample, MOEN, EM-DLLs, and ML-DLLs in Tables S2 and S3.

Unless noted otherwise, the significance level was set at $p < .001$ for all significant effects. Overall, individual skill differences proved to be significantly stable across time points, i.e., children showing comparatively more prosocial behavior, more behavioral difficulties, and more advanced expressive vocabulary in the majority language at age 3 were more likely to show higher levels of respective outcomes at age 5 (full sample: *r*s = .45, .60, and .54; MOEN: *r*s = .47, .61, and .46; EM-DLLs: *r*s = .34, .56, and .59; ML-DLLs: *r*s = .25, .48, and .57 for prosocial behavior, total difficulties, and expressive vocabulary, respectively). For both MOEN and EM-DLLs, children with advanced expressive vocabulary at age 3 tended to exhibit more prosocial behavior and to have less behavioral difficulties two years later (MOEN: *r*s = .12 and −.22; EM-DLLs: *r*s = .20 and −.20), and vice versa (MOEN: *r*s = .09 and −.18; EM-DLLs: *r*s = .13 and −.21). For ML-DLLs, those who had advanced expressive vocabulary in English at age 3 were more likely to have less behavioral difficulties at age 5 ($r = -.14$, $p < .05$), and those who exhibited more prosocial behavior or less behavioral difficulties at age 3 were more likely to have advanced English expressive vocabulary at age 5 ($r = .16$, $p < .05$ and $r = -.26$).

Autoregressive Cross-Lagged Models

The fit indices and Satorra-Bentler scaled chi-square difference tests for the full sample across the four models (i.e., no coupling, the two unidirectional coupling models, and the bidirectional couplings) indicated that Model 4 had significant improvement in model fit over other models (see Table 3). The results of Model 4 for the full sample (see Figure 1) showed that all the autoregressive pathways were significant, indicating that children's skills at age 3 were positively associated with respective skills at age 5. There were also significant concurrent associations for all skills at both time points. Cross-lagged pathways (controlling for autoregressive effects) showed that advanced early expressive

English vocabulary predicted later higher levels of socioemotional skills; lower behavioral difficulties at age 3 predicted later advanced expressive vocabulary in the majority language.

Regarding results of multigroup analyses, the model fit indices indicated that the unconditional and conditional models fitted the data well (χ^2 = 151.601, *df* = 6, $p < .001$, CFI = .983, RMSEA = .075, SRMR = .028; χ^2 = 144.029, *df* = 6, $p < .001$, CFI = .990, RMSEA = .073, SRMR = .014). The results from both models were similar. Only two effects in the unconditional model, i.e., from prosocial behavior at age 3 to expressive vocabulary at age 5 for monolinguals and from expressive vocabulary at age 3 to total difficulties at age 5 for EM-DLLs, were no longer significant in the conditional model. All other effects remained significant with highly similar coefficients in the conditional model. Thus, we only report the results from the conditional model. For detailed results of the unconditional model and the effects of control variables, see the Supplemental Material—Figure S1 and Table S4.

Figure 2 displays the significant results ($p < .05$) separately for MOEN, EM-DLLs, and ML-DLLs. The results show that the autoregressive pathways were significant for all groups, which indicates that children who showed comparatively more prosocial behavior, less behavioral difficulties, or had advanced expressive vocabulary (in majority language) at age 3 tended to possess respective skill levels at age 5. There were comparable concurrent associations for MOEN and EM-DLLs—that is, children with comparatively higher levels of expressive English vocabulary exhibited more prosocial behavior and less behavioral difficulties at both time points. For ML-DLLs, the significant concurrent associations only emerged with respect to their socioemotional skills, i.e., children who exhibited more prosocial behavior tended to show less behavioral difficulties at ages 3 and 5. The cross-lagged effects differed between groups. For MOEN, children with advanced expressive vocabulary at age 3 were more likely to show greater positive developments of individual

differences in socioemotional skills, i.e., showed more developmental progress in prosocial behavior and lower behavioral difficulties at age 5; children who exhibited lower behavioral difficulties at age 3 tended to have greater development in their expressive vocabulary, namely possessed higher levels of expressive vocabulary in the majority language at age 5. For DLL groups, results indicated opposite unidirectional associations between these two domains, i.e., EM-DLLs' expressive vocabulary at age 3 predicted development in their prosocial behavior, ML-DLLs' behavioral difficulties at age 3 predicted development in their expressive vocabulary in the majority language.

Discussion

The current study aimed to examine the directionality of association between children's early majority language and socioemotional skills by using a national representative sample from the UK. Given the language-related heterogeneity among children, we explored whether this association differed for monolingual children and two different DLLs groups controlling for the initial level of children's skills. For the full sample, our results primarily support the assumption that children's majority language skills (i.e., expressive vocabulary) at age 3 affect socioemotional skills (i.e., prosocial behavior and total behavioral difficulties) at age 5. We also found the opposite effect from total behavioral difficulties at age 3 to their expressive vocabulary at age 5. Furthermore, our findings demonstrate the overall highest levels of majority language and socioemotional skills in MOEN and lowest respective skills in ML-DLLs. Second, our findings substantiate the assumption that the association between these two domains differs for children with various language backgrounds—that is, we found a bidirectional association between children's majority language skills and socioemotional skills for MOEN; a unidirectional effect of children's expressive vocabulary (in majority language) on prosocial behavior for EM-DLLs, and a unidirectional effect of children's total behavioral difficulties on their expressive

vocabulary (in majority language) for ML-DLLs. Finally, similar results from the unconditional and conditional models indicate that the emerged associations are robust to the inclusion of control variables: Parental education, family net equivalent income, migration background, attendance at ECEC under 36 months, and child's sex.

The bidirectional association between children's majority language skills and their socioemotional skills is demonstrated in this study by controlling for children's initial level of skills. These findings align with the theoretical assumption that advanced language skills facilitate social interaction in daily life by better understanding others, expressing themselves more efficiently, solving conflicts verbally, and triggering more prosocial behavior (Bruner, 1983; Durkin & Conti-Ramsden, 2007; Keenan & Shaw, 2003; Schultz et al., 2001). At the same time, children who exhibit less behavioral difficulties seem to be more likely to boost their language exposure and productions by increased social interactions with peers and may be also with adults (Tomasello, 1992; Vygotsky, 1978). This is in line with studies which found bidirectional effects between these two domains (Sparapani et al., 2018) and extends findings from studies which only found unidirectional effects of majority language on socioemotional skills (Girard et al., 2016; Petersen & LeBeau, 2021; Rose et al., 2016, 2018).

Our study advances prior analyses of Girard et al. (2016)—who examined the association between children's expressive vocabulary and prosocial behavior using the same sample—by differentiating children with different language backgrounds. Furthermore, we also extend findings from prior works (Ren et al., 2016; Winsler, Kim, et al., 2014)—which investigated this association among DLLs—by demonstrating the directionality of this association and the different mechanisms between DLLs groups. The results for MOEN are highly similar to those for the full sample, whereas those for DLLs are different. This indicates that previous findings without differentiating children's language backgrounds

cannot simply apply to children who also acquire minority language(s) in addition to the majority language (Barnett et al., 2012; Girard et al., 2016; Rose et al., 2016; Sparapani et al., 2018).

With regard to the DLL groups, the unidirectional association for EM-DLLs (from expressive vocabulary to prosocial behavior) indicates that the majority language skills make the essential contribution to the development of prosocial behavior of DLLs who have basic communication skills in the majority language. On the other hand, the unidirectional association for ML-DLLs (from total difficulties to expressive vocabulary) points out that DLLs who are not exposed to the majority language of the society at home, i.e., who only use the minority language at home, might have limited opportunities to acquire the majority language (Hoff, 2018; Lauro et al., 2020), which in turn is less likely to affect their socioemotional skills. In this regard, we additionally ran a model drawing on monolingual children whose vocabulary test score were 1.5 standard deviation below the mean value and found a comparable nonsignificant association between early expressive vocabulary skills and later socioemotional skills (see Table S5 and Figure S2). These results substantiate our hypothesis that the variations of these associations were due to the differences in the majority language skills. However, ML-DLLs' socioemotional skills were shown to facilitate majority language development probably by increasing the opportunity to access and produce the majority language. It could be that DLLs may use their minority language to establish social interactions with peers who also speak the same minority language, which in turn, increase the opportunity to develop socioemotional skills. Although previous studies did not find a significant relation between the minority language and socioemotional skills (Ren et al., 2016; Sun et al., 2018), as we noted, studies investigating the minority language skills are still limited, more studies are needed before drawing the conclusion.

Moreover, our findings on DLLs partially differ from findings of Ertanir et al. (2020) who reported only a unidirectional effect of DLLs' socioemotional skills on their later majority language skills. In particular, for EM-DLLs, we did not find a significant effect of socioemotional on majority language skills. The reasons for this discrepancy might be twofold. First, the variations in methodologies regarding the measures of socioemotional skills might contribute to the contrasting findings. In particular, in our study, socioemotional skills were reported by parents, whereas Ertanir et al. (2020) used teacher-reported socioemotional skills. Because teachers and parents might have different frames of reference to assess children's behavior, teacher-reported and parent-reported socioemotional skills might differ (e.g., Kohl, Bihler, et al., 2019; Lewis et al., 2015). Furthermore, while socioemotional skills in our study were indicated by prosocial behavior and total behavioral difficulties, Ertanir et al. (2020) aggregated six subscales (i.e., cooperation, integration in the group, playing behavior, prosocial behavior, peer relationship problems, and emotion regulation) of socioemotional skills which might enhance the variance of this variable. Second, while the study by Ertanir et al. (2020) drew on a preschool DLLs sample, our DLLs sample included 1,362 children (among 1,621 DLLs) who had not been to ECEC at all under 36 months. Children who attended ECEC may had more chances to acquire the majority language by having more positive social interactions with native speakers (peers and caregivers). In order to address this issue, we ran an additional robustness check which only included children who attended ECEC before 36 months (n = 259). However, the model shows an unacceptable model fit (χ^2 = 34.164, df = 2, p = .312, CFI = .894, RMSEA = .252, SRMR = .040), so we could not interpret the results (see Table S6 and Figure S3).

Strengths and Limitations

The major strength of the current study is the longitudinal design and use of a national representative sample to gain a better understanding of the association between

young children's majority language skills and social competence by controlling for initial levels of children's later outcomes. Our study extends (limited) prior work by investigating this association separately for monolinguals and two different DLLs groups (whose family languages are other than English). Furthermore, drawing on theoretical approaches and empirical findings, we considered a number of influential control variables to enhance the specificity of the investigated effects.

There are some limitations to this study. First, we examined a relatively short span of development (3 to 5 years of age). Future studies could extend the time period and test whether these findings hold for older children to reveal whether changes in the magnitude of the association between language skills and socioemotional skills or even the direction of association are observed. Note that, e.g., Rose et al. (2018) predicted changes of individual differences across a 4-year period into primary school age and found only a unidirectional effect of early language skills on socioemotional development across these years. Unfortunately, we could not extend our models beyond 5 years of age as, in the MCS, no measure of expressive vocabulary was collected in Wave 4 when children were 7 years old. Second, socioemotional skills were based on parent-report, rather than teacher-report as compared to previous studies. This might be of limited accuracy due to social desirability and differences in parental observation. However, not all children in our study attended ECEC at age 3 and the teacher-reported data are only available for older children. Yet note that differences between parent and teacher reports might also be due to context-specificity of child behavior. Further, although the SDQ is a well-established screening instrument for assessing children's socioemotional development, future studies might extend our findings by using multi-informant assessment and more in-depth questionnaires. Third, although the focus of our study is majority language and socioemotional skills, it would be additionally important to have measures of children's minority language skills. This would allow us to

examine the relations between language and socioemotional skills in DLLs children in a more comprehensive way (e.g., Sun et al., 2018). Furthermore, in our study, we only considered expressive vocabulary as a measure of child language. Although disparities in expressive vocabulary according to family language background have been shown to emerge between monolinguals and DLLs (Oller et al., 2007) and expressive vocabulary is related to skills in other domains, it is still only one facet of children's language competence. Thus, future studies might consider further facets of language skills such as receptive vocabulary, grammatical skills when investigating relations between language and socioemotional skills (see, e.g., Rose et al., 2018). Our measure differentiating between the two DLLs groups does not capture the broad variety of differences between children growing up with more than one language. Thus, more in-depth analyses might be warranted. Nevertheless, even the measure of expressive vocabulary shows that the interrelation between developmental domains might vary across different groups of children.

Practical Implications

Findings from our study shed light on the directionality of the association between language and socioemotional skills of young children with different language backgrounds. These findings have implications for meeting the needs of young children with different language backgrounds, signifying a potential need to enhance their majority language development and socioemotional skills in early childhood. In order to best equip children's development, parents may need to foster children's majority language development which can enable successful social interactions in the society. Especially for those DLLs who speak little or no majority language at home, parents would be advised to choose ECEC for their children, in order to increase the opportunity of getting in touch with native speakers and to immerse their children in the majority language environment. Advanced social skills seem to be important in this case. Caregivers from ECEC could pay more attention to promoting

DLLs' majority language skills. For example, establishing conversations about prosocial behaviors and inner states could not only enhance the development of prosocial behaviors directly (Brazzelli et al., 2021), but also increase the verbal interactions (in the majority language). Furthermore, child-directed prevention, such as discussing and practicing (group) rules (Burger, 2015), could also efficiently promote successful interactions with peers.

Conclusion

Given that diverse social interactions are crucial for the development of language and socioemotional skills, this study supported the assumption of bidirectional association between majority language skills and socioemotional skills for young monolingual children over a two-year period. Furthermore, findings also demonstrated that the association between these two domains differs for children with different language backgrounds. That is, for DLLs who have acquired basic majority language skills, the majority language skills play an important role in the development of their socioemotional skills. Conversely, for DLLs who have limited majority language skills, their socioemotional skills seem to be essential for developing their majority language skills. Programs which increase opportunities to access the majority language addressing children's early socioemotional skills could be particularly beneficial for DLLs.

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Tables and Figures

Table 1

Descriptive Statistics of Study Variables for the Full Sample (N = 12,951)

Variable	*M(SD)*	*Range*	*Min*	*Max*
Age 3				
Prosocial behavior (sum)	7.09(2.04)	0–10	0	10
Total difficulties score	9.14(4.97)	0–40	0	30
Expressive vocabulary (ability score)	73.80(17.67)	10–141	10	141
Age 5				
Prosocial behavior (sum)	8.31(1.74)	0–10	0	10
Total difficulties score	7.07(4.78)	0–40	0	34
Expressive vocabulary (ability score)	107.89(16.24)	10–170	10	170
Control Variables				
Parental education level[a] (age 3)	2.06(0.91)	1–3	1	3
Family net equivalent income (£; age 3)	1449.63(956.12)	50.92–5902.78	50.92	5902.78
Parents' immigrant background (yes = 1)	0.21(0.41)	0–1	0	1
Child's sex (girl = 1; 9 months)	0.49(0.50)	0–1	0	1
Attendance at ECEC under 36 months (months)	3.37(7.67)	0–36	0	36

Note. DLLs = dual language learners; ECEC = early child education and care under 36 months; [a]1 = low, 2 = middle, 3 = high.

Table 2

Descriptive Statistics of Study Variables Separately for Children with Different Language Backgrounds

Variable	Monolingual English Children (n_{moen} = 11,410)				DLLs							
					English and minority language ($n_{em\text{-}dlls}$ = 1,181)				Minority language predominant ($n_{ml\text{-}dlls}$ = 360)			
	M(SD)	*Range*	*Min*	*Max*	*M(SD)*	*Range*	*Min*	*Max*	*M(SD)*	*Range*	*Min*	*Max*
Age 3												
Prosocial behavior (sum)	7.10(2.02)	0–10	0	10	7.10(2.23)	0–10	0	10	6.75(2.28)	0–10	0	10
Total difficulties score	9.02(4.91)	0–40	0	30	10.14(5.34)	0–40	0	29	10.46(5.50)	0–40	0	30
Expressive vocabulary (ability score)	76.00 (15.87)	10–141	10	141	56.73 (20.18)	10–141	10	141	47.98 (22.03)	10–141	10	112
Age 5												
Prosocial behavior (sum)	8.33(1.72)	0–10	0	10	8.16(1.86)	0–10	0	10	8.03(2.01)	0–10	0	10
Total difficulties score	6.98(4.74)	0–40	0	34	7.70(4.95)	0–40	0	29	8.30(5.18)	0–40	0	27
Expressive vocabulary (ability score)	109.96 (14.75)	10–170	10	170	94.33 (17.86)	10–170	10	170	87.27 (19.50)	10–170	10	131
Control Variables												
Parental education level[a] (age 3)	2.09(0.91)	1–3	1	3	1.91(0.93)	1–3	1	3	1.68 (0.90)	1–3	1	3
Family net equivalent income (£; age 3)	1503.96 (959.53)	50.92–5902.78	50.92	5902.78	1098.17 (866.32)	50.92–5902.78	62.36	5437.73	880.85 (651.47)	50.92–5902.78	72.11	5156.19
Parents' immigrant background (yes = 1)	0.12 (0.33)	0–1	0	1	0.86 (0.34)	0–1	0	1	0.94 (0.24)	0–1	0	1
Child's sex (girl = 1; 9 months)	0.49(0.50)	0–1	0	1	0.50(0.50)	0–1	0	1	0.49(0.50)	0–1	0	1
Attendance at ECEC under 36 months (month)	3.53(7.80)	0–36	0	36	2.53(6.99)	0–36	0	36	1.58(5.47)	0–36	0	34

Note. DLLs = dual language learners; ECEC = early child education and care under 36 months; [a]1 = low, 2 = middle, 3 = high

Table 3

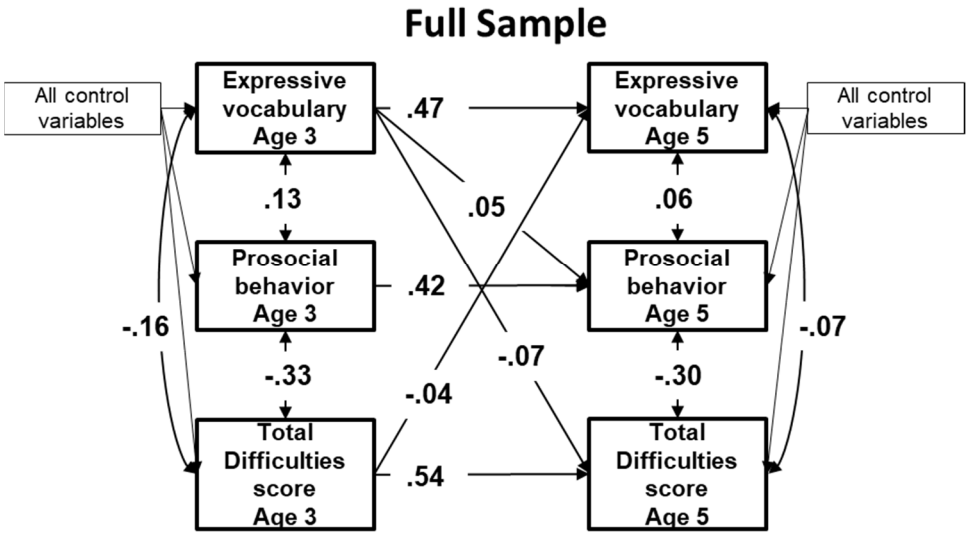
Model Fit Results for the Full Sample (N = 12,951)

Model	$\chi^2(df)$	CFI	RMSEA	SRMR	$\chi^2_{diff}(df)$[a]
1. No coupling	230.831(6)	.984	.054	.018	
2. Unidirectional (language skills → socioemotional skills)	161.886(4)	.989	.055	.014	
Difference between M2 and M1					68.977(2)***
3. Unidirectional (socioemotional skills → language skills)	213.025(4)	.986	.063	.017	
Difference between M3 and M1					18.042(2)***
4. Bidirectional	140.709(2)	.990	.073	.014	
Difference between M4 and M2					21.337(2)***
Difference between M4 and M3					72.407(2)***

Note. M1 = Model 1; M2 = Model 2; M3 = Model 3; M4 = Model 4; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; [a]The Satorra-Bentler scaled chi-square difference test.
***$p < .001$. *$p < .05$

Figure 1

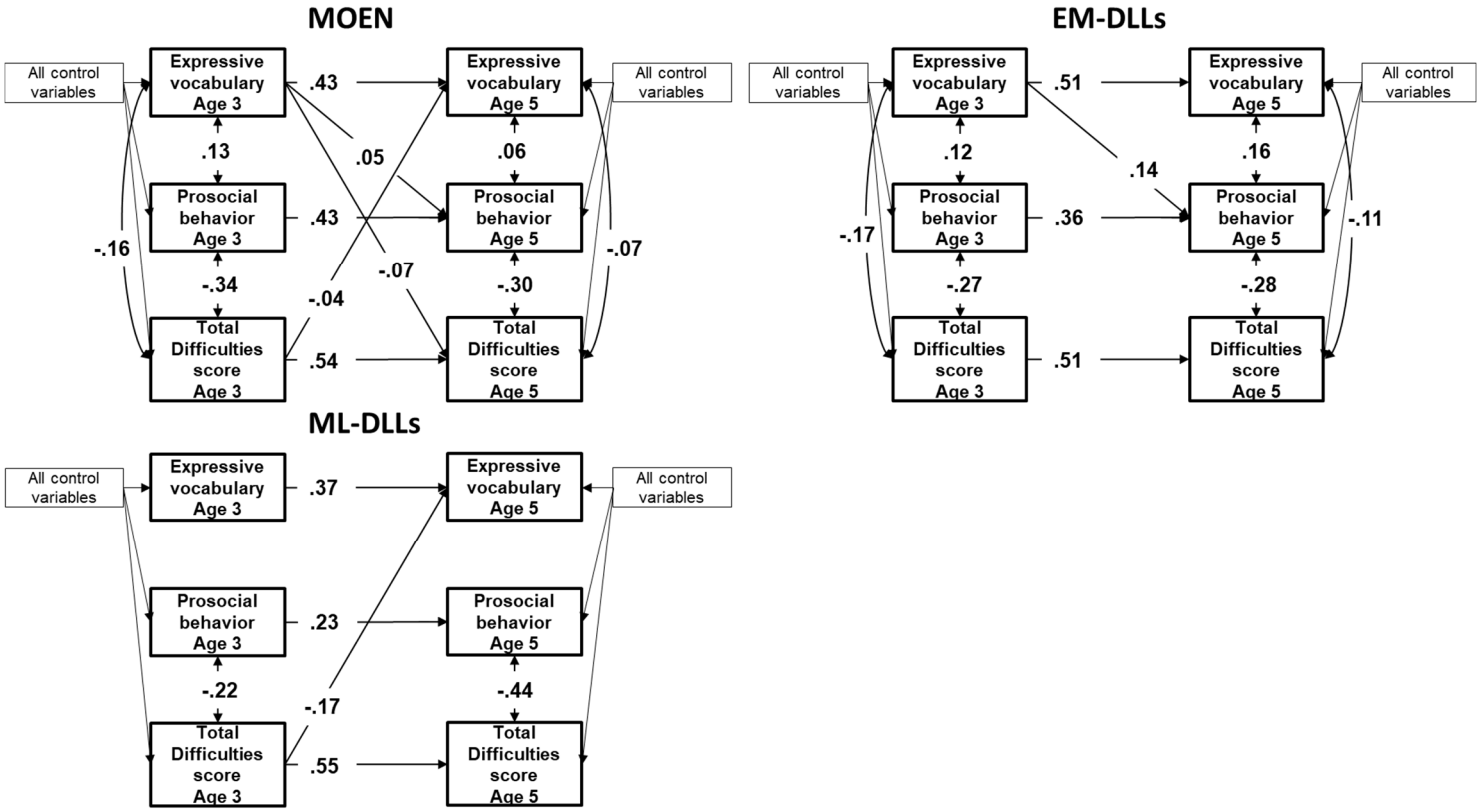
Standardized Estimates of the Bidirectional Coupling Model for the Full Sample



Note. All coefficients are significant at the $p < .05$ level. N = 12,951, $\chi^2 = 140.709$, $df = 2$, $p < .001$, CFI = .990, RMSEA = .073, SRMR = .014.

Figure 2

Standardized Estimates of the Conditional Bidirectional Coupling Model



Note. All coefficients are significant at the $p < .05$ level. n_{moen} = 11,410, $n_{em\text{-}dlls}$ = 1,181, $n_{ml\text{-}dlls}$ = 360, χ^2 = 144.029, *df* = 6, $p < .001$, CFI = .990, RMSEA = .073, SRMR = .014. MOEN = English monolingual children; EM-DLLs = English and minority languages dual language learners; ML-DLLs = minority language predominant dual language learners.

Supplemental Material

Table S1

UK Qualifications and CASMIN Categories

Reduced categories	CASMIN full code and description	UK qualifications	n
Low	1a Inadequately completed general elementary education	None of these qualifications (this excludes any overseas qualifications) No qualifications	4,965
	1b Inadequately completed general elementary education	GCSE grades D–G (academic)	
	1c Basic vocational qualification or general elementary education and basic vocational qualification	NVQ SVQ GSVQ level 1 (vocational)	
	2a Intermediate vocational qualification or intermediate general education plus basic vocational qualification	NVQ SVQ GSVQ level 2 (vocational)	
Middle	2b Intermediate general qualification	O level GCSE grade A-C (academic)	2,128
	2c (Vocational) Full general maturity certificate (vocational)	NVQ SVQ GSVQ level 3 (vocational)	
	2c (General) Full general maturity certificate (academic)	A AS S Levels (academic)	
High	3a Lower tertiary certificate	Diplomas in higher education, nursing or other medical qualifications, NVQ level 4	5,729
	3b Higher tertiary certificate	First degree, Higher degree, professional qualifications at degree level, NVQ level 5	

Table S2

Bivariate Correlations Between Study Variables for the Full Sample (Above Diagonal) and Monolingual English Children (Below Diagonal)

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Prosocial behavior (3 years)	—	.45***	−.34***	−.24***	.14***	.09***	−.08***	.01	.07***	−.00	.13***	.03***
2.	Prosocial behavior (5 years)	.47***	—	−.27***	−.39***	.13***	.13***	−.08***	.02*	.09***	−.03***	.15***	.03**
3.	Total difficulties score (3 years)	−.35***	−.28***	—	.60***	−.23***	−.20***	.23***	.01	−.27***	.04***	−.09***	−.06***
4.	Total difficulties score (5 years)	−.25***	−.40***	.61***	—	−.21***	−.21***	.22***	−.00	−.26***	.04***	−.11***	−.05***
5.	Expressive vocabulary (3 years)	.15***	.12***	−.22***	−.22***	—	.54***	−.24***	.01	.29***	−.27***	.11***	.06***
6.	Expressive vocabulary (5 years)	.08***	.11***	−.18***	−.20***	.46***	—	−.26***	−.00	.31***	−.27***	.02*	.11***
7.	Parental low education level (3 years)	−.08***	−.07***	.23***	−.22***	−.21***	−.22***	—	−.35***	−.47***	.04***	−.00	−.15***
8.	Parental middle education level (3 years)	.01	.02	.01	.00	−.01	−.03**	−.35***	—	−.03***	−.05***	−.00	−.01
9.	Family net equivalent income (3 years)	.07***	.08***	−.27***	−.25***	.24***	.26***	−.46***	−.04***	—	−.12***	.00	.18***
10.	Parents' immigrant background (yes = 1)	.01	−.00	−.03**	−.01	−.04***	−.05***	−.05***	−.02*	.01	—	.00	−.04***
11.	Child's sex (girl = 1)	.13***	.15***	−.10***	−.12***	.13***	.03**	.00	−.01	.00	−.01	—	−.00
12.	Attendance at ECEC under 36 months	.03***	.03**	−.05***	−.04***	.03***	.08***	−.14***	−.01	.16***	.01	−.00	—

Note. DLLs = dual language learners; ECEC = early child education and care.
*$p < .05$. **$p < .01$. ***$p < .001$

Table S3

Bivariate Correlations Between Study Variables for Dual Language Learners: EM-DLLs (Above Diagonal) and ML-DLLs (Below Diagonal)

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Prosocial behavior (3 years)	—	.34***	−.26***	−.17***	.16***	.13***	−.11***	.02	.08**	−.07*	.11***	.12***
2.	Prosocial behavior (5 years)	.25***	—	−.24***	−.34***	.20***	.23***	−.12***	.03	.12***	−.12***	.16***	.05
3.	Total difficulties score (3 years)	−.27***	−.07	—	.56***	−.27***	−.21***	.17***	.00	−.22***	.15***	−.06	−.12***
4.	Total difficulties score (5 years)	−.11	−.42***	.48***	—	−.20***	−.20***	.19**	−.03	−.21***	.14***	−.08*	−.06*
5.	Expressive vocabulary (3 years)	.10	.09	−.20*	−.14*	—	.59***	−.36***	.11***	.35***	−.39***	.05	.19***
6.	Expressive vocabulary (5 years)	.16*	.20***	−.26***	−.24***	.57***	—	−.37***	.10**	.33***	−.24***	.01	.19***
7.	Parental low education level (3 years)	−.12	−.22***	.28***	.24***	−.45***	−.40***	—	−.37***	−.48***	.18***	−.07*	−.16***
8.	Parental middle education level (3 years)	.01	.01	−.02	−.01	−.05	.01	−.39***	—	−.02	−.13***	.06*	−.01
9.	Family net equivalent income (3 years)	.07	.11	−.28***	−.24***	.45***	.35***	−.45***	−.02	—	−.21***	.00	.25***
10.	Parents' immigrant background (yes = 1)	−.09	−.03	.12	.11	−.36***	−.29***	.09	.08	−.19***	—	.02	−.09**
11.	Child's sex (girl = 1)	.10	.16**	−.08	−.10	−.07	.05	.00	.00	−.01	−.03	—	.00
12.	Attendance at ECEC under 36 months	.09	.04	−.08	−.06	.32***	.19***	−.12*	−.07	.26***	−.20***	−.09	—

Note. EM-DLLs = English and minority language dual language learners; ML-DLLs = minority language predominant dual language learners; ECEC = early child education and care.
*$p < .05$. **$p < .01$. ***$p < .001$

Table S4

Standardized Coefficients of the Control Variables in the Bidirectional Coupling Model

	Monolinguals English Children (n_{moen} = 11,410)						DLLs											
							English and minority language ($n_{em\text{-}dlls}$ = 1,181)						*Minority language predominant* ($n_{ml\text{-}dlls}$ = 360)					
	Prosocial behavior		*Total difficulties score*		*Expressive vocabulary*		*Prosocial behavior*		*Total difficulties score*		*Expressive vocabulary*		*Prosocial behavior*		*Total difficulties score*		*Expressive vocabulary*	
	Age 3	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age 5*	*Age 3*	*Age5*
LOWED	**−.06**	−.01	**.16**	**.05**	**−.17**	**−.12**	−.04	−.01	.08	**.11**	**−.24**	**−.09**	−.10	**−.25**	**.23**	.06	**−.32**	**−.17**
MIDED	.00	.02	**.06**	.01	**−.07**	**−.08**	−.01	.02	.05	.00	−.00	.03	−.03	**−.18**	.02	.08	**−.12**	−.09
INCOM	**.03**	**.03**	**−.20**	**−.07**	**.16**	**.10**	.05	.06	**.18**	−.01	**.16**	**.09**	−.03	−.02	−.19	−.01	**.20**	.08
IMMG	.00	−.01	−.01	.00	**−.05**	**−.04**	−.01	−.02	**.09**	.01	**−.22**	.01	.06	.01	.01	.02	**−.10**	−.07
SEX	**.14**	**.09**	−.10	**−.05**	**.13**	**−.03**	**.15**	**.10**	−.06	−.03	**.10**	−.03	.07	**.15**	−.06	−.06	.02	.01
ECEC	.01	−.00	.00	.00	−.02	**.03**	**.09**	−.04	−.03	−.02	**.10**	**.06**	.13	−.04	.03	.01	**.23**	.00

Note. DLLs = Dual language learners; LOWED = parental low education level; MIDED = parental middle education level; INCOM = family net equivalent income; IMMG = Parents' immigrant background (yes = 1, no = 0); SEX = child's sex (boy = 0, girl = 1); ECEC = attendance at early childhood education and care under 36 months; coefficients in bold are significant at the $p < .05$ level.

Table S5

Descriptive Statistics of the Outcome Variables for Monolinguals With Low Vocabulary

Variable	Monolingual English Children (low vocabulary) (n_m = 742)			
	M(SD)	*Range*	*Min*	*Max*
Age 3				
Prosocial behavior (sum)	6.34(2.42)	0–10	0	10
Total difficulties score	12.37(5.57)	0–40	0	30
Expressive vocabulary (ability score)	33.68(10.01)	10–141	10	44
Age 5				
Prosocial behavior (sum)	7.70(2.06)	0–10	0	10
Total difficulties score	9.38(5.42)	0–40	0	29
Expressive vocabulary (ability score)	87.34(16.42)	10–170	10	131

Note. Low vocabulary = 1.5 standard deviation below the mean of the full sample.

Table S6

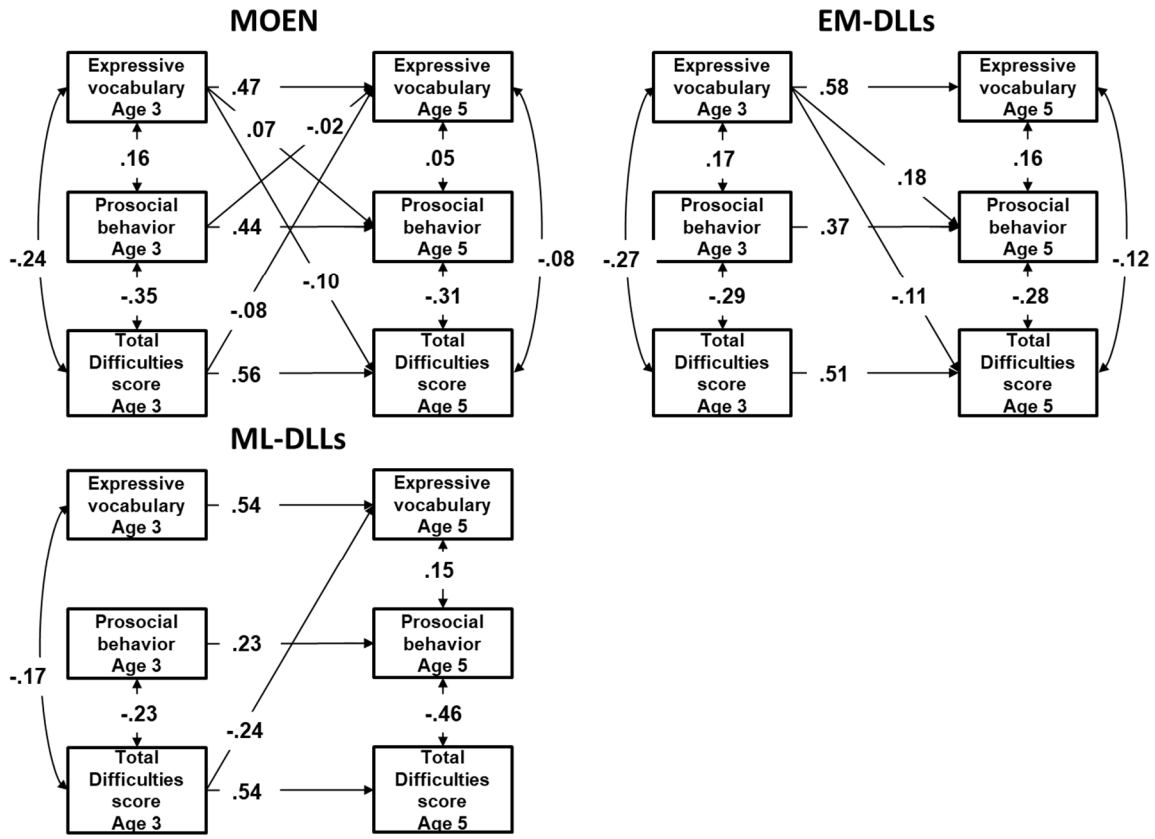
Descriptive Statistics of the Outcome Variables for DLLs With Attendance at ECEC Under 36 Months

Variable	DLLs (with attendance at ECEC under 36 months) (n_{ecec} = 253)			
	M(SD)	*Range*	*Min*	*Max*
Age 3				
Prosocial behavior (sum)	7.50(1.89)	0–10	1	10
Total difficulties score	8.77(5.20)	0–40	0	29
Expressive Vocabulary (ability score)	65.06(18.73)	10–44	10	141
Age 5				
Prosocial behavior (sum)	8.36(1.62)	0–10	3	10
Total difficulties score	7.06(5.31)	0–40	0	27
Expressive Vocabulary (ability score)	101.39(18.35)	10–170	33	170

Note. DLLs = Dual language learners; ECEC = early childhood education and care.

Figure S1

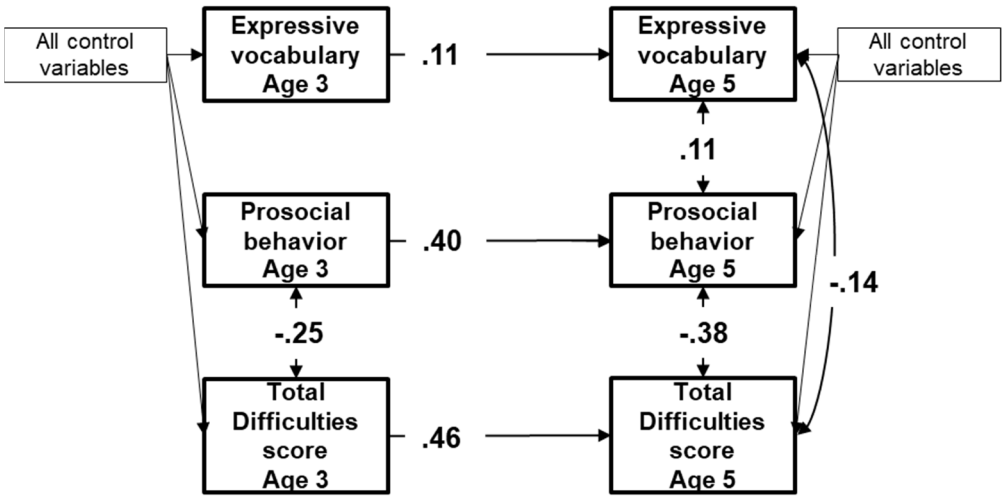
Standardized Estimates of the Unconditional Bidirectional Coupling Model



Note. All significant paths ($p < .05$) are presented in solid lines. Dashed lines refer to non-significant paths. All coefficients are significant at the $p < .05$ level. n_{moen} = 11,410, $n_{em\text{-}dlls}$ = 1,181, $n_{ml\text{-}dlls}$ = 360, χ^2 = 151.601, df = 6, $p < .001$, CFI = .983, RMSEA = .075, SRMR = .028. MOEN = English monolingual children; EM-DLLs = English and minority language dual language learners; ML-DLLs = minority language predominant dual language learners.

Figure S2

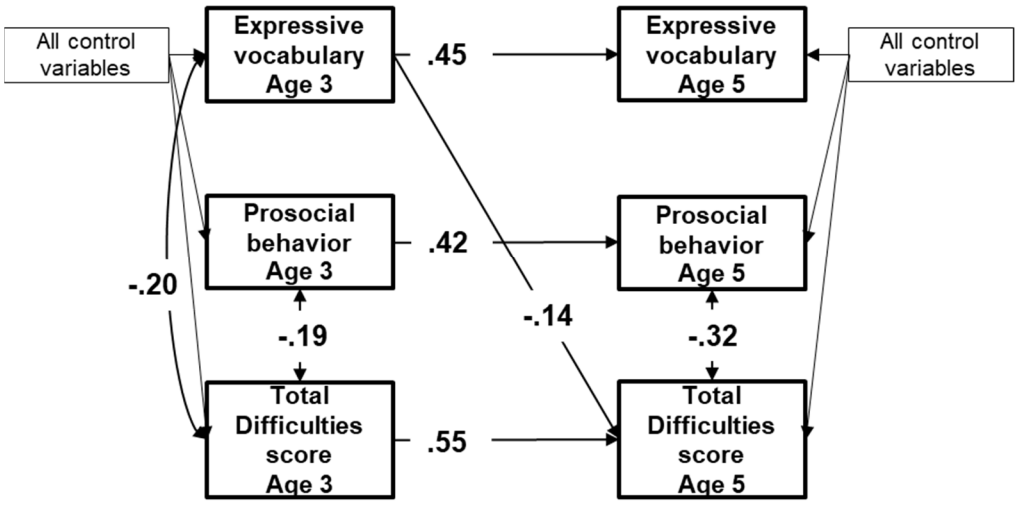
Standardized Estimates of the Conditional Bidirectional Coupling Model for Monolinguals With Low Vocabulary



Note. All coefficients are significant at the $p < .05$ level. N = 742, $\chi^2 = 5.814$, $df = 2$, $p = .179$, CFI = .990, RMSEA = .051, SRMR = .014. Low vocabulary = 1.5 standard deviation below the mean of the full sample.

Figure S3

Standardized Estimates of the Conditional Bidirectional Coupling Model for DLLs With Attendance at ECEC Under 36 Months



Note. All coefficients are significant at the $p < .05$ level. N = 253, $\chi^2 = 34.164$, $df = 2$, $p = .312$, CFI = .894, RMSEA = .252, SRMR = .040.