



The home literacy environment and television exposure as mediators between migration background and preschool children's linguistic abilities

María Valcárcel Jiménez¹ · Astrid Wirth¹ · Efsun Birtwistle^{1,2} · Frank Niklas¹

Accepted: 23 May 2023 / Published online: 26 August 2023
© The Author(s) 2023

Abstract

The development of key linguistic abilities is essential for young children and their academic success at school, in particular for children with a migration background who are at a greater risk of developing language deficits. Here, family interactions can provide valuable opportunities to support children's linguistic learning within the Home Literacy Environment (HLE). Although the importance of the HLE for children's language acquisition has often been investigated, research has not focused on specific facets of the HLE and other influencing factors that may be associated with early linguistic abilities such as television exposure (TE). A sample of 190 preschool children ($M_{\text{age}} = 63.58$ months, $SD_{\text{age}} = 4.42$) was used to analyse the associations of the facets of the HLE and TE with children's early linguistic abilities, namely phonological awareness (PA), vocabulary, and letter knowledge. In particular, this study aims to understand the role of the HLE facets and TE as potential mediators between migration background and children's early linguistic abilities, when controlling for socioeconomic status (SES), children's sex and age. The findings indicate that the association between migration background and children's early linguistic abilities was fully mediated by all four facets of the HLE and by TE. Consequently, these mediators may be good targets for intervention and the support of preschool children's linguistic development.

Keywords Home literacy environment (HLE) · Television exposure (TE) · Preschool children · Migration background · Linguistic abilities

Migration background and children's linguistic abilities

Family background characteristics such as migration background and socioeconomical status (SES) are closely associated with linguistic abilities (Schmidt, 2016). According to the Federal Statistical Office (2022), about 40% of preschool children have a migration background (i.e., the children or at least one of their parents were not born in Germany) and are more prone to language deficits in one or both languages, such as weaker receptive and expressive vocabulary (Eisenwort et al., 2018). Although, about 56% of the families with a migration background mainly speak German at home (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth in Germany, 2020), they often show a poor performance in language tasks and phonological awareness (PA) compared to children without a migration background even before formal schooling begins (Dubowy et al., 2008; Niklas et al., 2011). As a result, children from families with a migration background are disproportionately more exposed to unstable educational trajectories (Autor:innengruppe Bildungsberichterstattung, 2022).

Similar results were also found in German elementary school concerning linguistic competencies such as reading comprehension (e.g., McElvany et al., 2009; Tiedemann & Billmann-Mahecha, 2007), although experts consider German as a language with shallow orthographic depth, and thus easier to learn than, for instance, English (Seymour et al., 2003). One possible explanation for this may be, that German at an early age is hardly or not at all spoken at home in many families with a migration background, but rather the mother tongue of the parents is actively used (Novita & Kluczniok, 2022). In addition, children with a migration background often have no or very little direct contact with the German language before attending the kindergarten (Dubowy et al., 2008). For example, children with a family language other than German often enter kindergarten at an older age (Kohl et al., 2019; Leyendecker et al., 2014) and they also enter primary school with no prior reading instruction required in German kindergarten, making the spoken language at home an important factor for language development and comprehension (Niklas & Schneider, 2017).

For instance, if the family language is not the language of instruction in formal settings, this may lead to deficits in language comprehension (Tiedemann & Billmann-Mahecha, 2007). Moreover, studies indicate that many parents with a migration background are less supportive concerning their children's learning to read (Niklas et al., 2013) and that they may engage less in reading activities compared to parents without a migration background (Raikes et al., 2006). Consequently, less frequent informal literacy activities may occur within these families which is associated with a poorer receptive vocabulary (Novita & Kluczniok, 2022).

When interpreting these findings, it is important to note that migration background and SES are strongly related in many countries and also in Germany (Weis et al., 2019). For instance, when families with a similar SES are compared, the differences in educational outcomes between children with and without migration background are strongly reduced (Hussmann et al., 2017). However, even when the family SES is controlled for, children with a migration background still face the disadvantages of acquiring German as a second language and show weaker linguistic outcomes such

as receptive vocabulary, grammar and reading comprehension (Heppt et al., 2014; Novita et al., 2022).

Whereas research often has focused on SES and its relationship with children's linguistic abilities, fewer studies considered migration background directly (Niklas et al., 2013; Novita & Kluczniok, 2022). Even though research shows that there are clear linguistic disparities between children with and without migration background (Autor:innengruppe Bildungsberichterstattung, 2022; Dubowy et al., 2008), little is known about the association of migration background with some environmental factors that support children's linguistic development such as the Home Literacy Environment (HLE). Here, a greater quality HLE may be able to compensate for the disparities associated with migration background.

Facets of the home literacy environment

In the past three decades, numerous studies demonstrated the close association of the HLE with children's linguistic and social development as well as their academic performance (e.g., Boonk et al., 2018; Bus et al., 1995; Rose et al., 2018). For example, children who grow up in a high quality HLE often show better linguistic competencies (Bonifacci et al., 2022; Lambrecht et al., 2019). The HLE is a multidimensional construct, which includes all the elements, resources, and learning opportunities provided to children (such as shared reading activities, storybook exposure, and parental support in learning) that facilitate the acquisition and development of their linguistic abilities (Burgess et al., 2002; Niklas, 2015).

Bronfenbrenner's ecological theory (1979) emphasizes the importance of the HLE for children's linguistic development. It distinguishes between structural and processual influences. Structural characteristics, such as migration background and SES, focus on the framework conditions of language acquisition, while the processual aspects such as the HLE focus more on the processes of learning. In accordance with this theory, structural characteristics of a family such as migration background are closely associated with the HLE, which in turn influence children's linguistic abilities (Aikens & Barbarin, 2008; Niklas et al., 2013a, b). This means that family background characteristics mainly exert an indirect influence on children's linguistic abilities, whereby their influence is essentially mediated via the HLE (Lambrecht et al., 2019; Niklas et al., 2013). Consistent with these findings, recent studies indicate that the SES is not (Bonifacci et al., 2022) or only very weakly (Novita et al., 2022) associated with reading comprehension, PA, vocabulary, and letter knowledge.

Consequently, it is reasonable to assume that the direct impact of family migration background on children's linguistic development is significantly weaker, if the family learning environment includes supportive activities such as frequent and high-quality shared reading (Niklas, 2015).

Yet, little is known about the role of individual facets of the HLE and their impact on children's linguistic abilities (Inoue et al., 2020). In this study, using the framework of ecological and sociocultural theories, the following four facets of the HLE are analysed in order to determine their mediating role between migration background and children's linguistic abilities.

Shared reading at home

Reading to children plays an important role in literacy development because it supports the acquisition of language precursor skills such as receptive and expressive vocabulary and PA and promotes children's motivation to read (Baker et al., 1997; Niklas et al., 2020; Saracho, 2017). In particular, high quality parent-child interactions while reading are positively associated with early language skills such as vocabulary, letter knowledge, grapheme awareness and text comprehension (Raikes et al., 2006; Trivette et al., 2012; Wesseling et al., 2017; Whitehurst & Lonigan, 1998).

In addition, both onset and frequency of shared reading contribute meaningfully to children's literacy development, in particular to vocabulary, grammatical knowledge, oral narrative skill, letter recognition, and PA (Kotrla Topić et al., 2020; Lenhart et al., 2022; Niklas et al., 2016). Not only the onset of reading and the parental reading behaviour are important, but also children's own reading behaviour. Wirth et al. (2020) found that children who are frequently read to by others also tend to look often at picture books on their own.

Number of books

The number of books at home is a key aspect of a family's cultural capital, which includes cultural resources such as books, artwork, or magazine subscriptions (Heppt et al., 2022). A larger number of children's books contributes to a greater quality of the HLE, as it constitutes a potential learning stimulation and it mediates the relationship between parent's occupational status and education on one hand and language academic achievement on the other hand (Heppt et al., 2022). Children living in a learning environment that offers broad access to books tend to have a greater vocabulary and a better PA (Niklas et al., 2013).

Knowledge about children's books

The knowledge about children's books is found to be a good indicator of the HLE (Burgess et al., 2002; Sénéchal & LeFevre, 2002). Parents who read to their children more frequently have a better and broader knowledge of children's books (Niklas et al., 2013a, b). The knowledge about children's books is closely associated with the total reading volume, and it can be assessed reliably with children book title checklists that also include foil titles and thus prevent social desirability answer patterns (e.g., Grolig et al., 2017; Sénéchal & LeFevre, 2002). For instance, Grolig et al. (2017) showed that the score of such a checklist is strongly associated with children's PA and vocabulary.

Parental attitudes towards literacy

Parents act as role models in the family, and their attitudes towards reading and language also have an impact on their children's reading behaviour and linguistic abilities. Parents who believe that reading is an entertaining and enjoyable activity, inspire their children with a positive attitude towards reading and thus support chil-

dren's linguistic development (Baker et al., 1997). For example, Egan et al. (2022) found positive associations between parent's reading enjoyment and other facets of the HLE such as the number of books at home and shared reading. Consequently, such positive parental attitudes may enhance the HLE's quality and children's linguistic performance (Niklas et al., 2020). Moreover, McElvany et al. (2009) found that both parental attitudes and support were good predictors of children's academic achievement.

While there is a unanimous agreement that HLE activities contribute to children's linguistic development, there is still a need to identify how families with a migration background provide a high quality learning environment and opportunities to their children. Moreover, there is still a debate going on about another important aspect of children's learning environment, namely television exposure (TE), and its potential influence on children's linguistic and literacy development.

Television exposure

The debate about the use of screens, described as television or screen exposure that are measured with the quantity of TE, has risen in the past decades (Radesky & Christakis, 2016). On average, preschool children in Germany watch television for up to an hour every day or almost every day (Federal Office of Statistics, 2019).

Although children are constantly exposed to television, the consequences of this digital environment are inconsistent in terms of language acquisition and learning. On the one hand, television may offer language input, and thus may positively influence language development. It provides multiple opportunities for promoting language abilities and cognitive skills as children learn not only through direct interaction, but also through observation and listening to others. For instance, Anderson et al. (2001) showed that preschool programmes such as Sesame Street have a positive effect on early linguistic abilities such as letter knowledge. In their systematic review, Kostyrka-Allchorne et al. (2017) found that educational television programmes tend to foster learning, particularly for preschoolers. In addition, TE may help to expand vocabulary knowledge, if screen pictures represent real world objects (Diergarten & Nieding, 2012).

On the other hand, the majority of children usually use television for entertainment purposes, which is, just as an early onset of TE, negatively related to linguistic development (Ennemoser & Schneider, 2007; Kostyrka-Allchorne et al., 2017) and with the HLE (Schmiedeler et al., 2014). Therefore, it has been argued that a high TE is more likely to result in a reduction of important learning opportunities for linguistic interactions (Kostyrka-Allchorne et al., 2017; Madigan et al., 2020). Here, parent-child interactions that promote verbal exchange, children's language acquisition, and communication are in conflict with TE and the acquisition of linguistic skills may thus be interrupted (Kirkorian et al., 2009). For example, parent-child reading at home occurs less frequently in families whose children have a high TE (Kotrla Topić et al., 2020). Moreover, a high TE at an early age is associated with a greater risk of delayed cognitive, language and motor development (Kannass et al., 2010; Lin et al., 2015) and generally with weaker language skills (Madigan et al., 2020).

Not only the question about quality and quantity of TE seems to be important, but also the situational context while watching television, children's individual characteristics, and family environment (Kostyrka-Allchorne et al., 2017). Kirkorian et al. (2009) investigated the impact of background television on parent-child interactions and concluded that quality and quantity of parent-child interactions and parental engagement were lower as a result of a television running in the background. Interestingly, Lavigne et al. (2015) found that television co-viewing was negatively associated with the quantity, but positively associated with the quality of parent language directed to the child. In addition, Dore et al. (2020b) found a quadratic relation between the dosage of media use and language gains, indicating that a moderate media exposure was associated with the largest vocabulary development. Moreover, the family SES seems to play an important role. A high background TE exerts a negative effect on children's vocabulary development in families with a high SES, but it is beneficial for children's vocabulary, when families have a low SES (Farangi & Mehrpour, 2022). In addition, Leyendecker et al. (2014) found that families with a migration background in Germany reported much higher TE for their children than families without a migration background. These families also attached less importance to reading aloud, their children started attending kindergarten later, and the likelihood of their children participating in parent-child classes or other extracurricular activities was significantly lower, even if their parents belonged to the group with the highest level of education.

Consequently, further research on the quality, quantity and situational context of TE is needed to understand the relationship between TE and children's linguistic abilities.

Children's early linguistic abilities

Developing adequate early linguistic abilities is essential for academic success, later career, and the development of complex language skills, such as reading comprehension and writing (e.g., Burgess et al., 2002; Sénéchal et al., 1998). Although formal literacy acquisition in Germany does not begin until primary school, the first language exposure takes place in the family through interaction with parents and siblings within children's Home Learning Environment (Vygotsky, 1978). For example, parent engagement in home learning activities was associated with children's school readiness skills (Barnett et al., 2020).

Early linguistic abilities comprise abilities, knowledge and behaviour that include code-related skills such as PA and letter knowledge on the one hand, and oral language skills such as productive and receptive vocabulary on the other hand (Whitehurst & Lonigan, 1998). PA is the ability to recognise the structure of language, mostly operationalized through rhyme, sound recognition tasks or detecting syllables (Suorrti & Lipponen, 2016). A meta-analysis concluded that phoneme awareness was the strongest predictor of reading skills, when compared with rhyme awareness and verbal short-term memory (Melby-Lervåg, 2012).

These early linguistic abilities are important precursors of reading and writing. For instance, Schatschneider et al. (2004) found that early linguistic abilities are good

predictors of later reading outcomes during the first years of school, suggesting a key role of emergent literacy in the development of children's later literacy skills. Tamis-LeMonda et al. (2019) also found that receptive vocabulary and letter-word identification at a preschool age were associated with fifth grade academic skills in vocabulary, reading, mathematics and cognition.

Another important precursor is letter knowledge, which is defined as the knowledge of letter names or alphabetic knowledge (Whitehurst & Lonigan, 1998). Mastery of the alphabet enables rapid conversion of written language into sounds and prevents the time delay between letters while reading aloud, which also facilitates reading comprehension (Ehri, 2020; Whitehurst & Lonigan, 1998). These findings emphasize the importance of knowing grapheme-phoneme relations at an early age. For instance, letter knowledge growth during prekindergarten and kindergarten was related to better emergent literacy skills (Carr et al., 2020). Consequently, children who know more letters at an earlier age are also better prepared to learn reading and writing in school (Reutzel et al., 2019). Both, PA and letter knowledge are important precursors of reading comprehension, as these code-related skills enhance word recognition (Hjetland et al., 2020).

Another pathway, which directly improves reading comprehension is vocabulary (Hjetland et al., 2020). It includes semantic, syntactic, and conceptual knowledge (Milton, 2009). A large vocabulary supports children's later reading comprehension, as it enhances reading speed and reading accuracy (Ennemoser et al., 2012; Joshi, 2005). Consequently, a large vocabulary also enables coherence building in reading, which is necessary for the overall comprehension of a text (McElvany et al., 2009).

Research hypotheses

In this study, the associations between migration background, four different facets of the HLE, children's TE, and children's linguistic outcomes were analysed, while controlling for family SES and children's sex and age. The following hypotheses were tested:

- 1) Migration background should be negatively associated with the different facets of the HLE and with children's language abilities, but positively associated with TE. Consequently, children without a migration background should live in a greater quality HLE, show greater German linguistic abilities, and experience lower TE compared to children with a migration background. Further, TE should be negatively associated with linguistic abilities.
- 2) In addition, based on Bronfenbrenner's ecological model (1979), the four different facets of the HLE might act as mediators between migration background and linguistic abilities, even when controlling for family SES and children's age and sex.
- 3) Finally, a mediation effect of TE between migration background and linguistic abilities was expected, even when controlling for family SES and children's age and sex.

Figure 1 shows the expected associations between family migration background and children's linguistic abilities, mediated by various facets of the HLE and TE.

Method

Sample

Data assessment took place within the context of a large-scale longitudinal study in Germany (Project "Learning4Kids"; please refer to Niklas, Annac, & Wirth, 2020) and was approved by the ethics committee of the University of Munich. Here, 190 preschool children (48.4% male and 51.6% female) and their families participated in the study and parental consent was obtained. The children were between 51 and 75 months old ($M_{\text{age}} = 63.58$, $SD_{\text{age}} = 4.42$).

Data collection

The sample was recruited in kindergartens of a large city in South Germany. Here, kindergarten directors were informed about the project, and forwarded the provided information to the parents. All child assessments were conducted by trained research assistants and took place in the families' homes on one day between mid-June and early August 2020. The visits lasted approximately 2.5 hours and comprised assessments of child abilities, while the parents were asked to fill-in a survey. More detailed information on the project and all test procedures can be found in Niklas, Annac, and Wirth (2020).

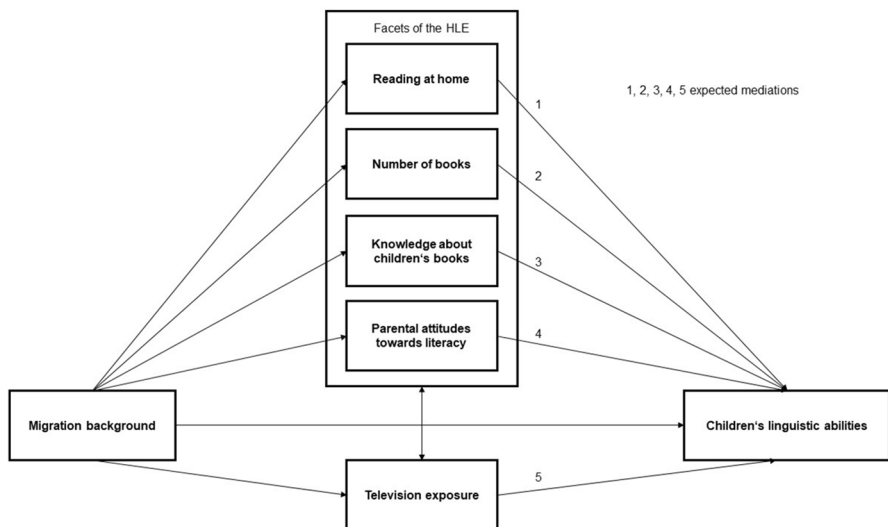


Fig. 1 Presentation of the hypotheses. Note: HLE=Home Literacy Environment

Test instruments

Parental survey

A parental survey (see online supplemental material 1) was used to assess family background characteristics as well as children's TE and the facets of the HLE. The survey was translated into the most common spoken foreign languages in Germany (e.g., English, Turkish, Arabic, Russian, Vietnamese, etc.).

Socioeconomical status An index of the SES was developed comprising parents' highest educational qualification, highest prestige of the parental occupation and net household income (Wegener, 1988). The Magnitude-Prestige Scale is based on the 283 categories of the international standard classification of occupations (ISCO) according to "prestige", that is, how much people with these occupations are respected in our society today. A power transformation is used to normalize this scale so that the lowest value is 20 and the highest 186.8. The prestige scale ranged in our sample from 22.4 (unskilled labourer) to 186.8 (physician). On average, the highest prestige score in a family from this sample was 92.78 ($SD=36.13$), which indicates an above average SES compared with other German samples (see Niklas et al., 2020; Novita et al., 2022). More than half of the parents had a university degree or a higher qualification (57.4%, $n=109$). About half of the families earned 3,419€ or more per month. Only 3.7% of families ($n=7$) reported a net household income of "780€ or less". The three indicators were z-transformed and averaged.

Migration background Children were considered to have a migration background, when German was not exclusively the family language. In total, 41% of the families in the sample ($n=76$) had a migration background. Within the families with a migration background, 13.3% spoke mostly German in the family, 42.7% spoke German and another language, and 44.0% spoke mostly another language (e.g., Turkish ($n=9$), English ($n=6$), Kurdish ($n=6$), Romanian ($n=6$), Arabic ($n=5$), Vietnamese ($n=3$), Albanian ($n=3$), Italian ($n=3$), Russian ($n=3$) and other ($n=2$) such as Bosnian, Bulgarian, Spanish, Greek, Uzbek, French, Thai). In addition, 22 languages were spoken by just one individual family in our sample.

Television exposure TE was assessed as a sum score index comprising three items. The first two items measured TE during (a) a usual workday and (b) a usual day on the weekend ("how many hours does your child watch movies, videoclips, series on television (TV) or on the PC / laptop / tablet?"). Response options ranged from 4 = "more than 3 hours", to 3 = "2–3 hours", 2 = "1–2 hours", 1 = "30–60 min", and 0 = "less often/never". The third item assessed whether the TV is "usually on when you are home, or do you turn it on only for certain shows/times?". The response scale

ranged from 2 = “TV is usually on”, to 1 = “TV is only on at certain times”, to 0 = “we/our children do not watch TV”.

Shared reading at home Five items were used to assess reading at home. First, parents were surveyed about the onset of shared reading with their child. Second, parents were asked, how often they currently read to their child. Response options ranged from 4 = “several times a day”, to 3 = “daily”, to 2 = “several times a week”, and 1 = “once a week” to 0 = “less often/never”. The same scale was used for the third item: “Does your child look at picture books by himself/herself?”. Finally, parent-child shared reading (in minutes) was reported on a working day as well as on a Saturday or Sunday. Both, the onset of shared reading and parental reading were transformed into a Likert-scale. Here, the answers were assigned values of 0 through 4 with higher values indicating an earlier onset and longer shared reading times. All items were added up to a sum score.

Number of books First, parents were asked to indicate the number of books in their household (all print media in all languages included, but no e-books). Response options ranged from 6 = “more than 200 books”, to 5 = “151–200”, 4 = “101–150”, 3 = “51–100” and 2 = “11–50”, to 1 = “1–10” and 0 = “none”. Second, parents indicated the number of children’s books and picture books they own. Response options ranged from 6 = “more than 100 books”, to 5 = “51–100”, 4 = “21–50”, 3 = “11–20”, 2 = “6–10” to 1 = “1–5” and 0 = “none”. Both items were combined in a mean score as indicator for books in the family’s household.

Knowledge about children’s books Parents were asked to indicate which of 30 titles of children books were familiar to their child, using a German book title recognition test for children’s books (TRT-V; Grolig et al., 2017). The list of books was compiled with attention to the recency and representativeness of the books. The test also included ten fake book titles and parents were informed about this to avoid social desirability and guessing tendencies (Grolig et al., 2017). The difference between hit rate (ratio of correct books chosen) and false hit rate (ratio of fake titles chosen) is the final score, that we used in our study.

Parental attitude towards literacy Parents were asked how much they agreed with the following four statements: “We like reading in our family”, “In our family, we often talk about things we’ve read”, “My child is very interested in being read to and is looking forward to it” and “Reading is an important activity in our family”. Response

options ranged from 4 = “very strongly”, 3 = “strongly”, to 2 = “slightly”, 1 = “to a lesser extent” to 0 = “not at all”. The four items were combined in a mean score.

Measure of the linguistic abilities

Children’s linguistic abilities were assessed with an extensive battery of standardized tests in German, as it is the instructional and formal language in kindergartens and schools the children are exposed to (see Table 1 for an overview and Cronbach’s alpha). For each correct answer, children scored one point, whereas incorrect answers received zero point.

Active and passive vocabulary

To assess the active vocabulary, 15 items from the “Aktiver Wortschatztest für 3- bis 5-jährige Kinder- Revision” (AWST-R; Kiese-Himmel, 2005) were used. Children were required to name 15 picture cards, a total of four verbs (e.g., “throw”) and 11 nouns (e.g., “deer”). Nine sets (12 items per set) from the German version of the Peabody Picture Vocabulary Test (PPVT; Lenhard et al., 2015) were used to assess passive vocabulary. To ensure that the children understood the task, two sample items were presented first, and feedback was given to the children. After that, no further feedback was provided. For this test, children were presented with four pictures and they had to point to the correct picture (e.g., “Point with your finger to lab technician”).

Phonological awareness

Two subtests of the Würzburg Preschool Test (WVT; Endlich et al., 2017) measuring PA were applied. The first one was a rhyming task with eight items. After two example items with feedback, the test started without further support. Children had to decide which of the four given words that were also shown on pictures did not rhyme (e.g., “Igel-Hai-Gewei-Ei”). The second one was an initial phoneme identification task with eight items. Children were asked to identify and name the first sound and the remaining word (e.g., “Frosch” and “Ffff...rosch” as answer).

Receptive and productive letter knowledge

Both receptive and productive letter knowledge were examined with subtests of the WVT (Endlich et al., 2017) and were assessed with 10 items each. In the receptive test, the children had to identify the correct letter among four letters presented to them (e.g., U-O-I-V. Can you show me /O/?). In the productive letter knowledge test, the children had to actively name letters (e.g., What is the name of this letter? /t/ as answer).

The six standardized subtests were combined into a children’s linguistic abilities scale. For this purpose, the six subtests were z-standardized and averaged.

Table 1 shows the descriptive statistics and reliability of all study variables and constructs.

Analysis overview

Data analyses were conducted using SPSS 24 (IBM, 2016). Descriptive statistics and correlational analyses will be presented first. Next, five mediation analyses were conducted using the PROCESS macro for SPSS (Hayes, 2017) to test whether the facets of HLE and TE served as mediators between migration background and linguistic abilities in the sample, while controlling for family SES and children's sex and age as covariates.

Results

Descriptive statistics and correlational analyses

Table 2 presents the results of the correlational analyses of the facets of the HLE and TE with migration background, the linguistic abilities and control variables.

The four facets of the HLE were positively intercorrelated and also positively associated with children's linguistic abilities. In addition, children with a migration background lived in a lower quality HLE and showed weaker linguistic abilities than children without a migration background. As expected, migration background was positively associated with TE which, in turn, was negatively associated with all facets of the HLE and children's linguistic abilities. No significant associations between the facets of the HLE, children's TE, and children's linguistic abilities with children's age and sex were found with the exception of a small but significant correlation between children's age and parental attitudes. However, children with a migration background had a lower SES and watched more television than children without a migration background. In contrast, children with a high SES lived in a higher quality HLE and showed better linguistic abilities.

Testing the mediation hypotheses

To further investigate the association between migration background and children's linguistic abilities, five mediation analyses were conducted using the four facets of the HLE and TE as mediators. Here, migration background was entered as the predictor for children's linguistic abilities. Standardized coefficients for the total and direct effects are presented in Fig. 2.

Figure 2 shows the associations between migration background and children's linguistic abilities, separately mediated by the four facets of the HLE and TE, while controlling for children's age and sex and family SES. Significant standardized indirect effects of migration background on children's linguistic abilities mediated by reading at home with an effect size of -0.21 (confidence interval (C.I.) $[-0.37, -0.08]$), by the numbers of books with an effect size of -0.21 (C.I. $[-0.36, -0.08]$), by the children book title recognition task with an effect size of -0.43 (C.I. $[-0.68, -0.25]$),

Table 1 Descriptive statistics for all study variables (sample size, means, standard deviations, observed minima and maxima, and internal consistency (Cronbach's α))

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	Cronbach's α
Sex ^a	190	0	1	0.52		
Age	190	51	75	63.58	4.42	
Socioeconomical status ^{b,d}	187	-2.89	1.32	-0.02	0.83	0.74
- highest prestige of the parental occupation	168	22.4	186.8	92.78	36.13	
- parents' highest educational qualification	187	0	7	5.67	1.91	
- net household income	176	0	6	4.85	1.73	
Migration background ^c	187	0	1	0.41		
Television exposure	176	0	3.33	1.28	0.76	0.77
- Usual workday	188	0	4	2.80	1.07	
- On the weekend	189	0	4	2.44	1.09	
- Television on?	179	0	2	0.95	0.48	
Shared reading at home	153	0	3.50	1.79	0.70	0.69
- Onset of shared reading in (months old)	174	0	63	11.63	11.52	
- Frequency of shared reading	183	0	4	2.68	1.10	
- Frequency children's reading	185	0	4	2.61	1.06	
- Parental reading on a working day (in minutes)	173	0	90	22.96	14.45	
- Parental reading on the weekend (in minutes)	166	0	150	30.69	19.79	
Number of books at home	188	0	6.00	4.15	1.70	0.92
- All books (except e-books)	188	0	6.00	4.05	1.92	
- Children books	190	0	6.00	4.25	1.60	
Knowledge about children's books	190	-0.35	0.90	0.38	0.27	0.86
- % correctly identified books	190	0	90	40.74	23.83	
Parental attitudes	187	0	4	2.76	0.93	0.88
- We like reading in our family	190	0	4	2.77	1.09	
- We talk about things we've read	189	0	4	2.25	1.03	
- Child interested in being read to	188	0	4	3.19	1.01	
- Reading is an important activity	188	0	4	2.85	1.12	
AWST-R	189	0	14	7.01	4.15	0.83
PPVT	189	8	102	62.60	24.58	0.76
PA rhyme	188	0	8	3.81	2.47	0.79
PA initial sound	189	0	8	3.11	2.79	0.89
LK receptive	190	0	10	5.76	2.78	0.79
LK productive	187	0	10	3.83	3.29	0.89
Linguistic abilities ^d	187	-1.57	1.65	0	0.73	0.82

Note. AWST-R=Active vocabulary; PPVT=Passive vocabulary; PA=Phonological awareness; LK=Letter knowledge.

^a girls=0, boys=1; ^b Socioeconomical status, combined index of three z-transformed indicators (highest family education, highest family occupation, adjusted household income); ^c family language, only German=0, other language than German=1; ^d z-transformed

and by parental attitudes towards literacy with an effect size of -0.12 (C.I. $[-0.26, -0.02]$) were found.

Similarly, a mediation effect was found for TE. The indirect effect size of migration background on children's linguistic abilities mediated by television exposure was -0.14 (C.I. $[-0.27, -0.05]$).

Table 2 Cross-sectional correlational analysis

	2	3	4	5	6	7	8	9	10
Sex	0.04	-0.11	0.01	0.05	-0.04	0.00	0.03	-0.08	0.07
Age (2)	-	-0.14	0.04	0.09	-0.13	-0.14	0.08	-0.15*	0.08
SES (3)	-	-	-0.34**	-0.42**	0.44**	0.68**	0.52**	0.54**	0.53**
Migration background (4)	-	-	-	0.41**	-0.43**	-0.50**	-0.64**	-0.38**	-0.39**
Television exposure (5)	-	-	-	-	-0.44**	-0.53**	-0.51*	-0.48**	-0.45**
Shared reading at home (6)	-	-	-	-	-	0.54**	0.55**	0.69**	0.41**
Number of books (7)	-	-	-	-	-	-	0.72**	0.62**	0.60**
KCB (8)	-	-	-	-	-	-	-	0.50**	0.57**
Parental attitudes (9)	-	-	-	-	-	-	-	-	0.46**
Linguistic abilities ^a (10)	-	-	-	-	-	-	-	-	-

Note. Pearson's r correlation coefficients. *N* = 183–190. SES = Socioeconomic status; KCB = Knowledge about children's books. ^a Combined index of phonological awareness, vocabulary, and letter knowledge. **p* < .05 ***p* < .001

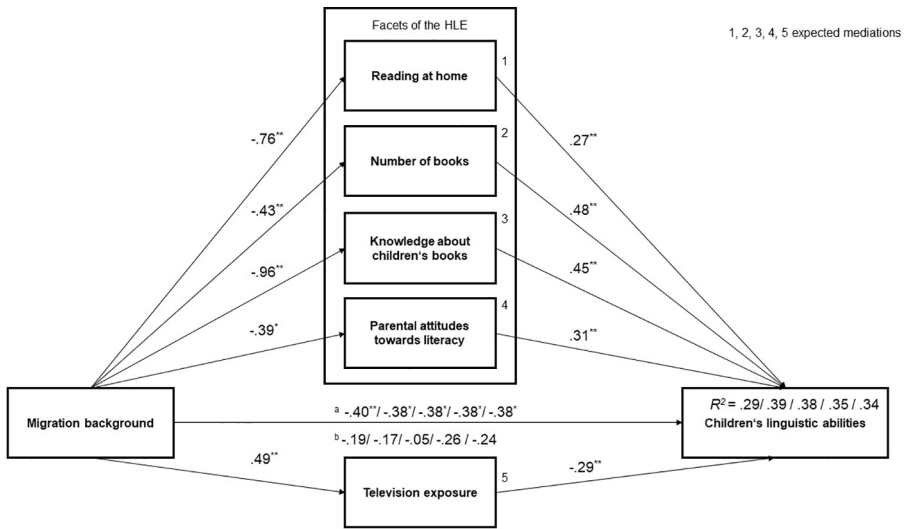


Fig. 2 Overview of the associations between migration background and children's linguistic abilities, separately mediated by reading at home, number of books, knowledge about children's books (KCB), parental attitudes towards literacy and television exposure (TE). Note: Standardized beta coefficients. All analyses are controlled for family SES and children's age and sex. R^2 represents the determination coefficient of every mediation model in this order: reading at home, number of books, knowledge about children's books, parental attitudes, and television exposure. ^aTotal effects (migration background as only predictor of children's linguistic abilities). ^bDirect effects (effects of migration background on children's linguistic abilities when HLE and TE are separately included as mediators). **p* < .05 ***p* < .001.

In all mediation analyses, migration background was no longer a significant predictor of children's linguistic competencies, after any one of the mediators was entered in the model. Consequently, the four facets of the HLE and TE fully mediated this association.

Discussion

Although research has focussed on the HLE and children's linguistic abilities for decades, little is known about migration background and its relationship with TE, individual facets of the HLE and child linguistic outcomes. Early linguistic abilities are essential for academic success and later career. However, children with a migration background often show difficulties when acquiring the language of instruction in formal settings. The purpose of this study was to examine whether TE, four different facets of the HLE, and migration background were associated with children's linguistic abilities and specifically, whether and to which extent these different HLE facets and TE act as mediators between migration background and children's linguistic abilities while controlling for family SES and children's age and sex. The main results indicate that migration background is not directly associated with children's linguistic abilities, but indirectly via TE and different facets of the HLE (see also Niklas et al., 2013a, b; Schmiedeler et al., 2014).

The four facets of the HLE were moderately to strongly positively related with each other and to children's early linguistic abilities. Similar findings have been reported by previous studies (Burgess et al., 2002; Egan et al., 2022; Lambrecht et al., 2019; Niklas et al., 2016; Rose et al., 2018). As expected, children with a migration background showed weaker linguistic abilities. This finding aligns with other studies indicating that, at least in Germany, children with a migration background often have language development deficits in one or both languages and display poor language skills in vocabulary and PA (Dubowy et al., 2008; Eisenwort et al., 2018; Niklas et al., 2011; Novita et al., 2022). In addition, children with a migration background lived in lower quality HLEs (see also McElvany et al., 2009; Niklas et al., 2016; Novita & Kluczniok, 2022). These families owned fewer books, had less knowledge about German children's books, showed a less frequent shared reading behaviour, and deemed shared reading as less important compared to families without a migration background. In comparison, in these families, more time was spent watching television ($M_{TE-MB} = 1.71$, $SD_{TE-MB} = 0.85$; $M_{TE-noMB} = 1.02$, $SD_{TE-noMB} = 0.56$).

The results further indicate that TE competes with HLE. Similar to other studies, TE was negatively associated with HLE, specially with the number of books, with SES, and with early linguistic abilities (Madigan et al., 2020; Niklas et al., 2013a, b; Schmiedeler et al., 2014), but TE was positively associated with migration background. The prediction of early linguistic abilities by migration background became no longer significant, once TE was considered.

Liebeskind et al. (2014) showed that the number of books was associated with verbal parent-child interactions, which was also linked to better language skills. The authors argued that a large book collection provides space for language enhancing conversations and interactions. Children's storybooks also contain more complex

vocabulary compared to everyday conversations and therewith support children's language acquisition (Sulzby, 1985). In addition, the number of books is positively related to parental support of children's learning to read (Burgess et al., 2002).

Similarly, in the mediation analyses, migration background did not predict early linguistic abilities directly any longer when the four facets of the HLE were considered as mediators and SES was controlled for. Consequently, the association between migration background and children's early linguistic abilities was explained by the HLE mediators, indicating that not the migration background itself, but rather the associated parent-child-interactions and family characteristics play an important role for children's linguistic abilities (see also Niklas, 2015). This finding aligns with OECD reports (2020) showing that migration background is not associated with child competencies in some countries.

Given that a high quality HLE is associated with better child outcomes, the HLE and TE clearly are good targets for family interventions (e.g., Baralt et al., 2022; Mol et al., 2008; Niklas & Schneider, 2017; Niklas et al., 2020). Here, various facets of the HLE that were closely associated were identified, but still distinct from each other and could all be the target of such interventions.

Limitations

Several limitations of this study should be considered. All data are cross-sectional, and the results need to be interpreted cautiously as no causality can be inferred. All the variables with the exception of children's linguistic abilities were assessed via parental questionnaires, which may be prone to social-desirability bias, misinterpretation or misreporting of the information (Ziegler & Buehner, 2009). However, previous studies on HLE showed that questionnaires often provide reliable data which is in accordance with other measures (Burgess, 2002). In addition, a children's book title checklist that included fake titles was used, which should be less prone to social-desirability answering (Grolig et al., 2017). Despite the fact that the sample included a diversity of migration backgrounds, different cultural backgrounds could lead to divergent results. A more sociological approach may help to understand how cultural backgrounds are related to different home learning environments and activities as well as TE.

Another issue for consideration is the moderate to strong correlations between the facets of the HLE, which partly indicate multicollinearity. For example, the number of books may exert an indirect effect on children's linguistic abilities via shared reading. These results highlight the potential need to restructure the concept of the HLE, grouping together facets that had been considered independent or highlighting the interdependence between them (Wirth et al., 2023). Further, we explicitly excluded e-books from the analyses, as research indicates different pathways for an analogue and a digital HLE (Lehrl et al., 2021). Future research needs to analyse the role of e-book reading and the digital HLE for children's literacy development. In an exploratory approach, we used path analyses to include all variables in a model simultaneously. In such a model, migration background was still significantly associated with all mediators, but did not predict child outcomes directly. Concerning the mediators, the number of books was the only significant predictor of linguistic abilities ($p < .05$),

with the knowledge of children's books showing a tendency to predict these abilities ($p < .10$).

Our measure of the knowledge of children's books (KCB) focused on German book titles only and this result must be cautiously interpreted as non-German-speaking parents might read these and other books to their children in their mother tongue and may thus have a greater knowledge on other books that are more common in their country of origin. Nevertheless, our findings emphasize the fact that children with a migration background in Germany are generally less frequently read to compared to children without a migration background, which may be reflected in their lesser KCB.

The measure of TE focussed on the amount of time watching television and on background television, but not on other digital media. Consequently, a more comprehensive assessment of quantity of screen time could have led to different results. Moreover, potential changes in both HLE and TE could not be analysed. In fact, Ennemoser and Schneider (2007) suggest that television exposure depends on the seasons with greater TE in winter compared to summer and the assessments took place in summer, which may have impacted on the results. In addition, we did not assess in which language children watched television. Children with a migration background might benefit from watching television in German, as it increases their exposure to the German language. For example, Kahn-Horwitz and Saba (2018) argue that watching television in another language may improve children's reading skills due to the use of subtitles. However, it remains unclear whether this finding can be applied to preschool age, because most preschool children do not have strong reading skills and as, in Germany, television is broadcasted without subtitles. Moreover, a high TE, which is more typical for families with a migration background in Germany (Leyendecker et al., 2014), is more likely to result in reduced parent-child interactions (Madigan et al., 2020) and thus may be detrimental for the acquisition of linguistic abilities.

On the other hand, the Corona pandemic as context of this study should be considered. As the kindergartens were closed for some months and social contacts were limited, TE and parent-child-interactions at home may have increased during the months prior to the assessments (Lehrl et al., 2021). Consequently, the results presented should be interpreted cautiously, although they are in line with previous studies (Eisenwort et al., 2018; Ennemoser & Schneider, 2007).

The quantity but not the quality of TE was examined in the study. Children's engagement with digital media is more complex than measuring TE. For example, the purpose of watching a particular television program may be important, considering the potential educational value of television (Anderson et al., 2001; Mares & Pan, 2013). In addition, moderating factors such as joint media usage may lead to different findings (Dore et al., 2020a).

Strengths

Despite these limitations, this study has also several strengths. This study has practical implications for policy and families, especially for families with a migration background. Based on these findings, interventions can be developed to foster par-

ent awareness towards the importance of the HLE and the potential negative consequences of a high TE (e.g. Niklas et al., 2020). For instance, such interventions may target parents' attitudes towards shared reading with and screen time of young children. Another possibility would be to provide parents with appropriate reading material such as children's books for free, which has proven to enhance both, the HLE and children's literacy-related skills, at least in early years (De Bondt et al., 2020). Clearly, the implementation of programmes that promote parental involvement enrich the HLE with regard to children's linguistic development (e.g., Baralt et al., 2022; Niklas & Schneider, 2017). The Chancenreich program in Germany shows positive longitudinal effects of the family support program on parental involvement and vocabulary acquisition of preschool children (Cohen et al., 2020). Consequently, these programs which offer parenting-skill and parent-child-interaction courses might be a great support for families with a migration background. Promoting specific programs for families with a migration background which emphasize the potentially detrimental effects of TE and positive effects of a high-quality HLE may lead to a better understanding of children's development and thus help parents to provide their children a better home learning environment.

Further, the family environment was assessed, considering not only the SES but also migration background, which is not very common in research on HLE (Niklas et al., 2013; Novita & Kluczniok, 2022). In addition, in this study, migration background was operationalised via family language, which is not common in the HLE research, but nevertheless resulted in findings consistent with other studies (Niklas et al., 2020; Rose et al., 2018; Whitehurst & Lonigan, 1998). Consequently, not only ethnicity is related to other study variables, but also family language (Novita et al., 2022).

For the analysis, a comprehensive index of family SES was controlled in order to avoid a confounding relationship between migration background and children's linguistic abilities. The results indicate that migration background plays an indirect role only in children's linguistic abilities via HLE and TE (see also Eisenwort et al., 2018; Niklas et al., 2013a, b). The findings suggest that a high quality HLE, in which children are frequently read to, may influence children's linguistic abilities more directly, while migration background seems to play a secondary role.

This paper sheds light into the controversial findings about TE, migration background, and children's linguistic abilities. Although no causal statements can be inferred, the results show that TE was negatively related to linguistic abilities and positively related to migration background. The mediating role of TE offers the opportunity to raise awareness among families with and without migration background of potentially detrimental effects of excessive TE at an early age.

Based on the finding that all four facets of the HLE and TE acted as mediators between migration background and children's literacy abilities, researchers may decide which aspect to assess depending on their own research focus.

Conclusions

This study shows that various facets of the HLE provided by families and the TE of children play an important role in their linguistic development. The four facets of the HLE and TE mediated the relationship between migration background and children's early linguistic abilities, when the family SES, children's sex and age were controlled for. In the sample, families with a migration background provided a less favourable HLE than families with German as the main language spoken at home. Further, TE was greater for children with a migration background.

Compared to family background variables such as SES and migration background that are more static and difficult to modify, the quality of the HLE and the TE can be changed more easily in order to support children in the development of their linguistic abilities. An understanding of the vital benefits of parent-child interactions and the detrimental role TE may play is important for developing interventions, and to raise awareness among families with a migration background. Although the cross-sectional analyses need to be interpreted with caution, these findings contribute to a better understanding of the association between family background variables, the HLE, TE, and children's linguistic outcomes.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11145-023-10458-8>.

Funding Open Access funding enabled and organized by Projekt DEAL.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology, 100*(2), 235–251. <https://doi.org/10.1037/0022-0663.100.2.235>.
- Anderson, D. R., Huston, A. C., Schmitt, K. L., Linebarger, D. L., & Wright, J. C. (2001). Early Childhood Television viewing and adolescent behavior: The Recontact Study. *Monographs of the Society for Research in Child Development, 66*(1), 1–164. <https://doi.org/10.1111/1540-5834.00120>.
- Autor:innengruppe Bildungsberichterstattung (2022). Bildung in Deutschland 2022. Ein indikatorengestützter Bericht mit einer Analyse zum Bildungspersonal [Education in Germany 2022. An indicator-based report with an analysis on the education workforce]. *Wbw*. <https://doi.org/10.3278/6001820hw>.
- Baker, L., Scher, D., & Mackler, K. (1997). Home and family influences on motivations for reading. *Educational Psychologist, 32*(2), 69–82. https://doi.org/10.1207/s15326985ep3202_2.

- Baralt, M., Griffith, S. F., Hanson, L., André, K., Blair, N., N., & Bagner, D. M. (2022). How family needs informed an early literacy family reading program in multilingual and multicultural Miami-Dade County. *Journal of Early Childhood Literacy*, *0*(0), 1–33. <https://doi.org/10.1177/14687984221093242>.
- Barnett, M. A., Paschall, K. W., Mastergeorge, A. M., Cutshaw, C. A., & Warren, S. M. (2020). Influences of parent engagement in early childhood education centers and the home on kindergarten school readiness. *Early Childhood Research Quarterly*, *53*, 260–273. <https://doi.org/10.1016/j.ecresq.2020.05.005>.
- Bonifacci, P., Trambagioli, N., Bernabini, L., & Tobia, V. (2022). Home activities and cognitive skills in relation to early literacy and numeracy: Testing a multifactorial model in preschoolers. *European Journal of Psychology of Education*, *37*, 681–705. <https://doi.org/10.1007/s10212-021-00528-2>.
- Boonk, L., Gijssels, H. J., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, *24*, 10–30. <https://doi.org/10.1016/j.edurev.2018.02.001>.
- Bronfenbrenner, U. (1979). Contexts of child rearing: Problems and prospects. *American Psychologist*, *34*(10), 844–850. <https://doi.org/10.1037/0003-066X.34.10.844>.
- Burgess, S. R. (2002). The influence of speech perception, oral language ability, the home literacy environment, and pre-reading knowledge on the growth of phonological sensitivity: A one-year longitudinal investigation. *Reading and Writing*, *15*, 709–737. <https://doi.org/10.1023/A:1020954606695>.
- Burgess, S. R., Hecht, S. A., & Lonigan, C. J. (2002). Relations of the home literacy environment (HLE) to the development of reading-related abilities: A one-year longitudinal study. *Reading Research Quarterly*, *37*(4), 408–426. <https://doi.org/10.1598/RRQ.37.4.4>.
- Bus, A. G., van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint Book Reading makes for Success in Learning to read: A Meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, *65*(1), 1–21. <https://doi.org/10.2307/1170476>.
- Carr, R. C., Bratsch-Hines, M., Varghese, C., & Vernon-Feagans, L. (2020). Latent class growth trajectories of letter name knowledge during pre-kindergarten and kindergarten. *Journal of applied developmental psychology*, *69*, 1–12. <https://doi.org/10.1016/j.appdev.2020.101141>.
- Cohen, F., Schünke, J., Vogel, E., & Anders, Y. (2020). Longitudinal Effects of the Family Support Program Chancenreich on parental involvement and the Language Skills of Preschool Children. *Frontiers in psychology*, *11*, 1282. <https://doi.org/10.3389/fpsyg.2020.01282>.
- De Bondt, M., Willenberg, I. A., & Bus, A. G. (2020). Do Book Giveaway Programs promote the home literacy environment and children's literacy-related behavior and skills? *Review of Educational Research*, *90*(3), 349–375. <https://doi.org/10.3102/0034654320922140>.
- Diergarten, A., & Nieding, G. (2012). Einfluss des Fernsehens auf die Entwicklung der Sprachfähigkeit [Impact of television on the development of language skills]. *Sprache · Stimme · Gehör*, *36*(1), 25–29. <https://doi.org/10.1055/s-0031-1301282>.
- Dore, R. A., Logan, J., Lin, T. J., Purtell, K. M., & Justice, L. M. (2020a). Associations between Children's Media Use and Language and literacy skills. *Frontiers in Psychology*, *11*(2224), <https://doi.org/10.3389/fpsyg.2020.01734>.
- Dore, R. A., Logan, J., Lin, T. J., Purtell, K. M., & Justice, L. M. (2020b). Characteristics of children's media use and gains in Language and literacy skills. *Frontiers in Psychology*, *11*(1724), <https://doi.org/10.3389/fpsyg.2020.02224>.
- Dubowy, M., Ebert, S., von Maurice, J., & Weinert, S. (2008). Sprachlich-kognitive Kompetenzen beim Eintritt in den kindergarten [Linguistic-cognitive competencies at kindergarten entry]. *Zeitschrift Für Entwicklungspsychologie und pädagogische Psychologie*, *40*(3), 124–134. <https://doi.org/10.1026/0049-8637.40.3.124>.
- Egan, S. M., Moloney, M., Pope, J., Breatnach, D., & Hoyne, C. (2022). From stories at bedtime to a love of reading: Parental practices and beliefs about reading with infants. *Journal of Early Childhood Literacy*, *0*(0), <https://doi.org/10.1177/14687984221123710>.
- Ehri, L. C. (2020). The science of learning to read words: A case for systematic phonics instruction. *Reading Research Quarterly*, *55*, 45–60. <https://doi.org/10.1002/rrq.334>.
- Eisenwort, B., Aslan, H., Yesilyurt, S. N., Till, B., & Klier, C. M. (2018). Sprachentwicklung bei Kindern mit Migrationshintergrund und elterliches Vorlesen [Language development in children with a migration background and parental reading aloud]. *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie*, *46*(2), 99–106. <https://doi.org/10.1024/1422-4917/a000500>.
- Endlich, D., Berger, N., Küspert, P., Lenhard, W., Marx, P., Weber, J., & Schneider, W. (2017). *WVT: Würzburg preschool test: Assessment of literacy and mathematical (precursor) abilities and linguistic competencies in the last year of kindergarten (german version)*. Hogrefe.

- Ennemoser, M., & Schneider, W. (2007). Relations of television viewing and reading: Findings from a 4-year longitudinal study. *Journal of Educational Psychology, 99*(2), 349–368. <https://doi.org/10.1037/0022-0663.99.2.349>.
- Ennemoser, M., Marx, P., Weber, J., & Schneider, W. (2012). Spezifische Vorläuferfertigkeiten der Leseschwindigkeit, des Leseverständnisses und des Rechtschreibens [Specific precursor skills of reading speed, reading comprehension, and spelling]. *Zeitschrift für Entwicklungspsychologie und pädagogische Psychologie, 44*(2), 53–67. <https://doi.org/10.1026/0049-8637/a000057>.
- Farangi, M. R., & Mehrpour, S. (2022). Iranian Preschoolers Vocabulary Development: Background television and Socio-economic status. *Journal of Early Childhood Literacy, 0*(0), <https://doi.org/10.1177/146879842111073653>.
- Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (2020). *Gelebte Vielfalt: Familien mit Migrationshintergrund in Deutschland [Living Diversity: Families with a migration background in Germany]*. Retrieved October, 3, 2022, from <https://www.bmfsfj.de/resource/blob/116880/83c02ec19dbea15014d7868048f697f2/gelebte-vielfalt-familien-mit-migrationshintergrund-in-deutschland-data.pdf>
- Federal Statistical Office (2022). *Bevölkerung und Erwerbstätigkeit. Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2020 [Population and employment. Population with a migration background- Results of the Microcensus 2020]*. Retrieved March, 15, 2023, from https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Publikationen/Downloads-Migration/migrationshintergrund-endergebnisse-2010220207004.pdf?__blob=publicationFile
- Federal Office of Statistics (2019). *Mediennutzung von Kindern [Children's use of media]*. Retrieved October 17, 2020, from <https://de.statista.com/statistik/daten/studie/30691/umfrage/nutzungsdauer-von-medien-durch-kinder/>
- Grolig, L., Cohrdes, C., & Schroeder, S. (2017). The title Recognition Test for Kindergarteners (TRT-VS): Assessment of Preconventional readers' print exposure and its relations to Precursors of Reading. *Diagnostica, 63*(4), 309–319. <https://doi.org/10.1026/0012-1924/a000186>.
- Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. *Methodology in the social sciences*. The Guilford Press.
- Heppt, B., Haag, N., Böhme, K., & Stanat, P. (2014). The role of Academic-Language features for reading comprehension of Language-Minority students and students from Low- SES families. *Reading Research Quarterly, 50*(1), 61–82. <https://doi.org/10.1002/rrq.83>.
- Heppt, B., Olczyk, M., & Volodina, A. (2022). Number of books at home as an indicator of socioeconomic status: Examining its extensions and their incremental validity for academic achievement. *Social Psychology of Education, 25*, 903–928. <https://doi.org/10.1007/s11218-022-09704-8>.
- Hjetland, H. N., Brinchmann, E. I., Scherer, R., Hulme, C., & Melby-Lervåg, M. (2020). Preschool pathways to reading comprehension: A systematic meta-analytic review. *Educational Research Review, 30*(100323), <https://doi.org/10.1016/j.edurev.2020.100323>.
- Hussmann, A., Wendt, H., Bos, W., Bremerich-Vos, A., Kasper, D., Lankes, E. M., McElvany, N., Stubbe, T. C., & Valtin, R. (Eds.). (2017). *IGLU 2016: Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich [IGLU 2016: Reading competencies of primary School children in Germany in International Comparison]*. Waxmann.
- IBM Corp. (2016). *IBM SPSS Statistics for Windows, Version 24.0*. IBM Corp.
- Inoue, T., Manolitsis, G., Jong, P., Landerl, K., Parrila, R., & Georgiou, G. (2020). Home literacy environment and early literacy development across Languages varying in Orthographic consistency. *Frontiers in Psychology, 11*, 1–11. <https://doi.org/10.3389/fpsyg.2020.01923>.
- Joshi, M. R. (2005). Vocabulary: A critical component of comprehension. *Reading and Writing Quarterly, 21*(3), 209–219. <https://doi.org/10.1080/10573560590949278>.
- Kahn-Horwitz, J., & Saba, M. (2018). Weak english foreign language readers: The cross-linguistic impact of morphological awareness. *Reading and Writing, 31*, 1843–1868. <https://doi.org/10.1007/s11145-017-9810-9>.
- Kannass, K. N., Colombo, J., & Wyss, N. (2010). Now, pay attention! The effects of instruction on children's attention. *Journal of Cognition and Development, 11*(4), 509–532. <https://doi.org/10.1080/15248372.2010.516418>.
- Kiese-Himmel, C. (2005). *AWST-R – active vocabulary test for 3- to 5-year-old children*. Hogrefe.
- Kirkorian, H. L., Pempek, T. A., Murphy, L. A., Schmidt, M. E., & Anderson, D. R. (2009). The impact of background television on parent-child Interaction. *Child Development, 80*(5), 1350–1359.

- Kohl, K., Willard, J. A., Agache, A., Bihler, L. M., & Leyendecker, B. (2019). Classroom Quality, Classroom Composition, and Age at Entry: Experiences in early Childhood Education and Care and single and dual Language Learners' german vocabulary. *AERA Open*, 5(1), 1–16. <https://doi.org/10.1177/2332858419832513>.
- Kostyrka-Allchome, K., Cooper, N. R., & Simpson, A. (2017). The relationship between television exposure and children's cognition and behaviour: A systematic review. *Developmental Review*, 44, 19–58. <https://doi.org/10.1016/j.dr.2016.12.002>.
- Kotrla Topić, M., Šakić Velić, M., & Merkaš, M. (2020). Tablet and Smartphone or a Book: The struggle between digital media and literacy environment in Homes of Croatian Preschool Children and its Effects on Letter Recognition. *Cyberpsychology Behavior and Social Networking*, 23(6), 412–417. <https://doi.org/10.1089/cyber.2019.0482>.
- Lambrecht, J., Bogda, K., Koch, H., Nottbusch, G., & Spörer, N. (2019). Comparing the effect of home and institutional learning environment on children's vocabulary in primary school. *Journal for educational research online*, 11(2), 86–115. <https://doi.org/10.25656/01:18028>.
- Lavigne, H. J., Hanson, K. G., & Anderson, D. R. (2015). The influence of television coviewing on parent language directed at toddlers. *Journal of Applied Developmental Psychology*, 36, 1–10. <https://doi.org/10.1016/j.appdev.2014.11.004>.
- Lehrl, S., Linberg, A., Niklas, F. & Kuger, S. (2021). The Home Learning Environment in the Digital Age—Associations Between Self-Reported “Analog” and “Digital” Home Learning Environment and Children's Socio-Emotional and Academic Outcomes. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.592513>.
- Lenhard, A., Lenhard, W., Segerer, R., & Suggate, S. (2015). *PPVT-Peabody Picture Vocabulary Test* (4th ed., German version). Pearson.
- Lenhart, J., Suggate, S. P., & Lenhart, W. (2022). Shared-Reading onset and emergent literacy development. *Early Education and Development*, 33(4), 589–607. <https://doi.org/10.1080/10409289.2021.1915651>.
- Leyendecker, B., Citlak, B., Schräpler, J. P., & Schölmerich, A. (2014). Diversität elterlicher Einstellungen und vorschulischer lernerfahrungen: Ein Vergleich deutscher und zugewanderter Familien aus der Türkei, Russland und Polen. *Zeitschrift für Familienforschung*, 26(1), 70–93. <https://doi.org/10.3224/zff.v26i1.15916>.
- Liebeskind, K. G., Piotrowski, J. T., Lapierre, M. A., & Linebarger, D. L. (2014). The home literacy environment: Exploring how media and parent–child interactions are associated with children's language production. *Journal of Early Childhood Literacy*, 14(4), 482–509. <https://doi.org/10.1177/1468798413512850>.
- Lin, L. Y., Cherng, R. J., Chen, Y. J., Chen, Y. J., & Yang, H. M. (2015). Effects of television exposure on developmental skills among young children. *Infant behavior and development*, 38, 20–26. <https://doi.org/10.1016/j.infbeh.2014.12.005>.
- Madigan, S., McArthur, B. A., Anhorn, C., Eirich, R., & Christakis, D. A. (2020). Associations between screen Use and Child Language Skills: A systematic review and Meta-analysis. *JAMA Pediatrics*, 174(7), 665–675. <https://doi.org/10.1001/jamapediatrics.2020.0327>.
- Mares, M. L., & Pan, Z. (2013). Effects of *Sesame Street*: A meta-analysis of children's learning in 15 countries. *Journal of Applied Developmental Psychology*, 34(3), 140–151. <https://doi.org/10.1016/j.appdev.2013.01.001>.
- McElvany, N., Becker, M., & Lüdtke, O. (2009). Die Bedeutung familiärer Merkmale für Lesekompetenz, Wortschatz, Lesemotivation und Leseverhalten [The importance of family characteristics for reading competence, vocabulary, reading motivation, and reading behavior]. *Zeitschrift für Entwicklungspsychologie und pädagogische Psychologie*, 41(3), 121–131. <https://doi.org/10.1026/0049-8637.41.3.121>.
- Melby-Lervåg, M. (2012). The relative predictive contribution and causal role of phoneme awareness, rhyme awareness, and verbal short-term memory in reading skills: A review. *Scandinavian Journal of Educational Research*, 56(1), 101–118. <https://doi.org/10.1080/00313831.2011.621215>.
- Milton, J. (2009). *Measuring second language vocabulary acquisition*. *Second language acquisition*. Multilingual Matters.
- Mol, S. E., Bus, A. G., De Jong, M. T., & Smeets, D. J. H. (2008). Added Value of Dialogic parent–child Book Readings: A Meta-analysis. *Early Education and Development*, 19(1), 7–26. <https://doi.org/10.1080/10409280701838603>.

- Niklas, F., Schmiedeler, S., Pröstler, N., & Schneider, W. (2011). Die Bedeutung des Migrationshintergrunds, des Kindergartenbesuchs sowie der Zusammensetzung der Kindergartengruppe für sprachliche Leistungen von Vorschulkindern. *Zeitschrift Für Pädagogische Psychologie*, 25(2), 115–130. <https://doi.org/10.1024/1010-0652/a000032>.
- Niklas, F., Möllers, K., & Schneider, W. (2013). Die frühe familiäre Lernumwelt als Mediator zwischen strukturellen Herkunftsmerkmalen und der basalen Lesefähigkeit am Ende der ersten Klasse. *Psychologie in Erziehung Und Unterricht*, 60(2), 94–111. <https://doi.org/10.2378/peu2013.art08d>.
- Niklas, F., & Schneider, W. (2013). Home literacy environment and the beginning of reading and spelling. *Contemporary Educational Psychology*, 38(1), 40–50. <https://doi.org/10.1016/j.cedpsych.2012.10.001>.
- Niklas, F. (2015). Die familiäre Lernumwelt und ihre Bedeutung für die kindliche Kompetenzentwicklung. *Psychologie in Erziehung Und Unterricht*, 62(2), 82–97. <https://doi.org/10.2378/peu2015.art11d>.
- Niklas, F., Cohrsen, C., & Tayler, C. (2016). The Sooner, the Better: Early Reading to Children. *SAGE Open*, 6(4), 1–11. <https://doi.org/10.1177/2158244016672715>.
- Niklas, F., & Schneider, W. (2017). Home learning environment and development of child competencies from kindergarten until the end of elementary school. *Contemporary Educational Psychology*, 49, 263–274. <https://doi.org/10.1016/j.cedpsych.2017.03.006>.
- Niklas, F., Annac, E. & Wirth, A. (2020). App-based learning for kindergarten children at home (Learning4Kids): Study protocol for cohort 1 and the kindergarten assessments. *BMC Pediatrics*, 20, 554. <https://doi.org/10.1186/s12887-020-02432-y>.
- Niklas, F., Wirth, A., Guffler, S., Drescher, N., & Ehmig, S. C. (2020). The Home Literacy Environment as a Mediator Between Parental Attitudes Toward Shared Reading and Children's Linguistic Competencies. *Frontiers in Psychology*, 11, 1–10. <https://doi.org/10.3389/fpsyg.2020.01628>.
- Novita, S., Lockl, K., & Gnamb, T. (2022). Reading comprehension of monolingual and bilingual children in primary school: The role of linguistic abilities and phonological processing skills. *European Journal of Psychology of Education*, 37, 993–1013. <https://doi.org/10.1007/s10212-021-00587-5>.
- Novita, S., & Kluczniok, K. (2022). Receptive vocabulary of preschool children with migration backgrounds: The effect of home literacy activities. *Early Child Development and Care*, 192(11), 1728–1743. <https://doi.org/10.1080/03004430.2021.1932861>.
- OECD (Organisation for Economic Cooperation and Development) (2020). *Education at a Glance 2020: OECD Indicators*. OECD Publishing. <https://doi.org/10.1787/69096873-en>
- Radesky, J. S., & Christakis, D. A. (2016). Increased screen time: Implications for early Childhood Development and Behavior. *Pediatric Clinics of North America*, 63(5), 827–839. <https://doi.org/10.1016/j.pcl.2016.06.006>.
- Raikes, H., Pan, B. A., Luze, G., Tamis-LeMonda, C. S., Brooks-Gunn, J., Constantine, J., Banks Tarullo, L., Raikes, H. A., & Rodriguez, E. T. (2006). Mother-child bookreading in low-income families: Correlates and outcomes during the first three years of life. *Child Development*, 77(4), 924–953. <https://doi.org/10.1111/j.1467-8624.2006.00911.x>.
- Reutzel, P., Mohr, K. A., & Jones, C. D. (2019). Exploring the relationship between letter recognition and handwriting in early literacy development. *Journal of Early Childhood Literacy*, 19(3), 349–374. <https://doi.org/10.1177/1468798417728099>.
- Rose, E., Lehl, S., Ebert, S., & Weinert, S. (2018). Long-term relations between children's language, the home literacy environment, and socioemotional development from ages 3 to 8. *Early Education and Development*, 29(3), 342–356. <https://doi.org/10.1080/10409289.2017.1409096>.
- Saracho, O. N. (2017). Parents' shared storybook reading – learning to read. *Early Child Development and Care*, 187(3–4), 554–567. <https://doi.org/10.1080/03004430.2016.1261514>.
- Schatschneider, C., Fletcher, J. M., Francis, D. J., Carlson, C. D., & Foorman, B. R. (2004). Kindergarten prediction of reading skills: A longitudinal comparative analysis. *Journal of Educational Psychology*, 96(2), 265–282. <https://doi.org/10.1037/0022-0663.96.2.265>.
- Schmiedeler, S., Niklas, F., & Schneider, W. (2014). Symptoms of attention-deficit hyperactivity disorder (ADHD) and home learning environment (HLE): findings from a longitudinal study. *Eur J Psychol Educ*, 29, 467–482. <https://doi.org/10.1007/s10212-013-0208-z>.
- Schmidt, T. (2016). Compensatory early childhood education for educationally disadvantaged children in Germany and beyond. *Early Child Development and Care*, 186(1), 140–152. <https://doi.org/10.1080/03004430.2015.1064913>.
- Sénéchal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73(2), 445–460. <https://doi.org/10.1111/1467-8624.00417>.

- Sénéchal, M., LeFevre, J. A., Hudson, E., & Lawson, E. P. (1996). Knowledge of story-books as a predictor of young children's vocabulary. *Journal of Educational Psychology*, 88(3), 520–536. <https://doi.org/10.1037/0022-0663.88.3.520>.
- Sénéchal, M., LeFevre, J. A., Thomas, E. M., & Daley, K. E. (1998). Differential Effects of Home literacy experiences on the development of oral and Written Language. *Reading Research Quarterly*, 33(1), 96–116. <https://doi.org/10.1598/RRQ.33.1.5>.
- Seymour, P. H., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in european orthographies. *British journal of psychology*, 94(2), 143–174. <https://doi.org/10.1348/000712603321661859>.
- Sulzby, E. (1985). Children's Emergent Reading of Favourite Storybooks: A develop mental study. *Reading Research Quarterly*, 20(4), 458–481. <https://doi.org/10.1598/RRQ.20.4.4>.
- Suortti, O., & Lipponen, L. (2016). Phonological awareness and emerging reading skills of two-to five-year-old children. *Early Child Development and Care*, 186(11), 1703–1721. <https://doi.org/10.1080/03004430.2015.1126832>.
- Tamis-LeMonda, C. S., Luo, R., McFadden, K. E., Bandel, E. T., & Valloton, C. (2019). Early home learning environment predicts children's 5th grade academic skills. *Applied Developmental Science*, 23(2), 153–169. <https://doi.org/10.1080/10888691.2017.1345634>.
- Tiedemann, J., & Billmann-Mahecha, E. (2007). Leseverständnis, Familiensprache und Freizeitsprache [Reading comprehension, family language and leisure language]. *Zeitschrift für pädagogische Psychologie*, 21(1), 41–49. <https://doi.org/10.1024/1010-0652.21.1.4>.
- Trivette, C. M., Simkus, A., Dunst, C. J., & Hamby, D. W. (2012). Repeated Book reding and preschoolers' early literacy development. *Orelena Hawks Puckett Institute Center for Early Literacy Learning*, 5(5), 1–13.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard Univ. Press. <https://doi.org/10.2307/j.ctvjf9vz4>
- Wegener, B. (1988). *Kritik des Prestiges*. Westdeutscher Verlag. [Prestige criticism].
- Weis, M., Müller, K., Mang, J., Heine, J. K., Mahler, N., & Reiss, K. (2019). Soziale Herkunft, Zuwanderungshintergrund und Lesekompetenz. In K. Reiss, M. Weis, E. Klieme, & O. Köller (Eds.), *PISA 2018. Grundbildung im internationalen Vergleich* (pp 129–160). [PISA 2018. Basic education in international comparison]. Waxmann.
- Wesseling, P. B. C., Christmann, C. A., & Lachmann, T. (2017). Shared Book Reading promotes not only Language Development, but also Grapheme Awareness in German Kindergarten Children. *Frontiers in Psychology*, 8(364), 1–13. <https://doi.org/10.3389/fpsyg.2017.00364>.
- Wirth, A., Stadler, M., Birtwistle, E., & Niklas, F. (2023). New directions in the conceptualization and operationalization of the home learning environment. *Journal of Educational Psychology*, 115(1), 160–172. <https://doi.org/10.1037/edu0000749>.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development*, 69(3), 848–872. <https://doi.org/10.1111/j.1467-8624.1998.tb06247.x>.
- Wirth, A., Ehmig, S. C., Heymann, L., & Niklas, F. (2020). Das Vorleseverhalten von Eltern mit Kindern in den ersten drei Lebensjahren in Zusammenhang mit familiärer Lernumwelt und Sprachentwicklung. *Frühe Bildung*, 9(1), 26–32. <https://doi.org/10.1026/2191-9186/a000464>.
- Ziegler, M., & Buehner, M. (2009). Modeling socially desirable responding and its effects. *Educational and Psychological Measurement*, 69(4), 548–565. <https://doi.org/10.1177/0013164408324469>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Authors and Affiliations

María Valcárcel Jiménez¹ · Astrid Wirth¹ · Efsun Birtwistle^{1,2} · Frank Niklas¹

✉ María Valcárcel Jiménez
mariav96@zedat.fu-berlin.de

✉ Frank Niklas
Niklas@psy.lmu.de

Astrid Wirth
astrid.wirth@psy.lmu.de

Efsun Birtwistle
Efsun.Birtwistle@nottingham.ac.uk

¹ Department of Psychology, Ludwig-Maximilians-Universität München, Munich, Germany

² School of Psychology, University of Nottingham, Nottingham, United Kingdom