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Home language, school language and children's literacy attainments: A systematic review of evidence from low- and middle-income countries

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The general consensus in the field is that when the home language is different from the language of instruction in school then children's literacy attainments could slow down. In this 26-year review of the literature on children's literacy attainments in low- to middle-income countries, 40 correlational, ethnographic and intervention studies provide the data. We test the 'home language advantage' hypothesis where we expect children who speak the same language at home and school to show better literacy learning. We also examine other attributes in the home language and literacy environment (HLLE). Among the multivariate studies, trends differ across countries, age and grade levels, and child measures. Rather than a universal home language advantage, the evidence shows that home language advantage is context-sensitive. The correlational and ethnographic evidence point to a multiple risk factors model of home and school language disconnection; and the ethnographic and intervention studies provide complementary evidence of both feelings of unease, disempowerment and wish to help among family members, and increased confidence following guided support. Possible underlying mechanisms are examined through parallel synthesis of evidence from multiple research methods on three HLLE dimensions—books-at-home, home tutoring and adult literacy practices. The data partially corroborate findings from high-income countries (e.g. home environments impact literacy development, responsive parenting is present across families) but also bring focus on context-specific realities. Neither low-income nor low-print environments are uniform constraints because communities differ and some homes use available resources more efficiently than others.

For many children the language of the home differs from the language of instruction in school. In this paper, we examine the implications of such a disconnection in home–school language for literacy development. In line with the general consensus, we expect children who speak the same language at home and at school to be advantaged educationally and show better literacy learning. Support for a strong version of the 'home language advantage' hypothesis would be a universal trend found in all communities regardless of language and socio-cultural background. Support for a

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weaker version of the hypothesis would be if there are advantages in some but not all contexts. If the strong version is confirmed then it is possible that the mechanism of influence is via common predictors of literacy attainments found across writing systems such as phonological skills and vocabulary knowledge. If the weak version is supported by mixed trends then it is also possible that the mechanisms that underpin the advantage are contextual, including factors in the child's home. To examine the home language advantage hypothesis, we systematically review evidence related to disconnection between home and school languages and three other dimensions of the home environment: books-at-home, home tutoring and adult literacy practices. Even midway into 2018, the landscape of peer-reviewed research literature continues to be limited in two ways: first, it primarily focuses on the home environment prevalent in high-income countries; second, a synthesis of the evidence drawn from quantitative and qualitative frameworks of research is missing. Our review addresses this gap by examining evidence from low- and middle-income countries and the converging evidence derived from the complementary approaches of multiple and mixed methodologies (for an introduction to the science of research synthesis see Oliver, 2015). Specifically, we investigate attributes of the home which lead to positive language and literacy outcomes in preschool and primary school-age children in low- and middle-income countries.

Attributes of the home that predict children's literacy development are usually described as 'home literacy environment' (HLE) (e.g. Burgess *et al.*, 2002; Sénéchal & LeFevre, 2014). In this review, we use the expanded term Home Language and Literacy Environment (e.g. Tabors *et al.*, 2001) and examine both the language attributes and literacy-linked processes at home. This is because many attributes that appear to be relevant for children's literacy learning are linked with spoken language; for example, the quality of talk around printed materials. The Home Language and Literacy Environment (HLLE) can be expected to differ when families are multilingual compared with when they are bilingual or monolingual. Similarly, the HLLE may be viewed as more or less supportive according to the parents' proficiency in the child's school language.

HLLE: Evidence from high-income countries

A robust body of evidence on HLLE and children's educational attainments is available from high-income countries (for an early research synthesis see Hess & Holloway, 1984). Children growing up in language-rich literate backgrounds prior to school entry have larger vocabularies and a greater appreciation of the tasks of reading and writing (Goodman, 1986; Teale & Sulzby, 1986; Snow, 1991; Purcell-Gates, 1996; Hart & Risley, 1999) especially when the school language is the same as the home language (Heath, 1983; Teale & Sulzby, 1986; Tabors *et al.*, 2001). Similarly, child literacy learning appears to be associated with parental education and wealth in the middle and upper range of the socio-economic gradient (e.g. Sénéchal & LeFevre, 2014). There is also variation between homes in the importance placed on literacy-related pursuits and on the nature of 'talk' directed to preschool children (e.g. Serpell *et al.*, 2002; Robins *et al.*, 2014; Puglisi *et al.*, 2017). Such differences are also observed when children are in primary school (Sénéchal *et al.*, 1998; Kim, 2007; Hood *et al.*, 2008; Sylva *et al.*, 2011) and beyond (Purcell-Gates *et al.*, 2011; Sylva *et al.*, 2014).

HLLE is thought to influence literacy development because engagement with 'enrichment experiences' (or lack thereof) affects the development of knowledge, which can support the reading process (Neuman & Celano, 2001; Rowe *et al.*, 2005; Sylva, 2014). Such a view has led to the inference that some homes are culturally deficient in meeting the requirements of children for language and literacy learning (e.g. Hoff, 2006; Chiu & Chow, 2010; Hoff, 2013). There may, however, be other causes of poor child outcomes. Deprivation and poverty are two such factors. Strong support for a deprivation- and poverty-linked hypothesis comes from findings that socio-economic indicators, rather than ethnicity or membership in specific cultural groups, explain individual differences in educational attainments (Bradley *et al.*, 2001; Strand, 2014). Contrary to the assumption that low-income homes nurture low aspirations (e.g. Bruner, 1975), parents in settings of disadvantage may be keen to support their children's learning but not have access to guidance on how to do so (Jordan *et al.*, 2000; Reese & Gallimore, 2000; Sylva *et al.*, 2014). A further factor, and the focus of this review, is when the home language is not the school language.

Several lines of research show that children are at an advantage if the home language is the same as the language in which literacy instruction is first encountered. Put differently, the home language advantage is seen in foundation skills for literacy (e.g. vocabulary: Karlsen *et al.*, 2017; Scheele *et al.*, 2010) and some, but not all, component skills of literacy (e.g. Lervåg & Aukrust, 2010). The skills that are particularly vulnerable when there is a disconnection between the home and school language are related to the higher order skills associated with reading comprehension (meta-analyses: Lesaux *et al.*, 2006; Melby-Lervåg & Lervåg, 2014). Beyond the home, neighbourhood factors such as under-resourced libraries and an inability to attract skilled teachers to local schools further differentiate learning environments (UK: Sammons *et al.*, 2004; USA: Heath, 1983; Goodman, 1986; Snow, 1991; Snow *et al.*, 1998; Neuman & Celano, 2001; Heath, 2012). However, whether there is an interaction between neighbourhood disadvantage and a disconnection in home and school language remains unclear.

Given the sensitivity of home–school language disconnections and the importance of HLLE, interventions have attempted to target parents' knowledge, skills and/or proficiency with literacy-related practices (e.g. in low-income communities: Yoshikawa, 1994; Layzer *et al.*, 2001; McCartney & Dearing, 2002). The outcomes of such interventions are mixed (e.g. Baker *et al.*, 1997; Baker *et al.*, 1998; Jordan *et al.*, 2000), with meta-analytic reviews suggesting that the variability relates both to characteristics of the intervention (duration, mode of delivery, programme quality, parent engagement) and measured outcomes (Layzer *et al.*, 2001; Blok *et al.*, 2005; Kim & Quinn, 2013). A consensus on what works in HLLE interventions to improve children's literacy learning is yet to be reached. Against this background one approach which can provide fresh insights is a systematic review that pulls together research using multiple methodologies.

HLLE: the context in low- and middle-income countries

An inclusive research agenda that includes studies drawn from communities living in low- and middle-income (LMI) countries (sometimes called 'the majority world') has

the potential to provide the diversity of contexts needed to fully understand the mechanisms and pathways of influence of the HLLE on children's outcomes. The following descriptions from communities in East Africa capture the multidimensional complexity of HLLEs found in LMI countries:

> . . . there is often little support for literacy: no television, few books or magazines in the homes, and although written signs may be ubiquitous . . . , there is hardly any extended text to be found. In some areas many parents are non-literate, and those who have learned to read have little opportunity to maintain the habit . . . . it is extremely difficult for parents who do not speak English to support their children's learning; and typically such parents consider that they have neither the right nor the responsibility to do so—literacy is in the teacher's sphere and not the parent's. (Parry *et al.*, 2014, p. 3)

> . . . assistance with homework, reading and revising, mainly focused on the need to know that children had additional work from school which they could attempt and complete with the assistance of household members . . . illiteracy may have incapacitated parents' attempts at promoting literacy activities among their children in grades 1–3. (Abuya *et al.*, 2015, p. 525 & 527)

Another prominent feature of the context in LMI countries is the linguistic diversity. Multiple linguistic communities intermingle and schools may also introduce multiple languages. The following excerpts from South Asia capture this variety:

> Fifty-eight percent of the families reported Hindi [the school language] as their native language. An additional 22% of the sample reported a dialect of Hindi as their native language, e.g. Banjari, Bhojpuri, KhadiBoli, . . . [many] families reported other Indian languages . . . : 8% Urdu, 7% Bengali, 3% Marathi, 2% Nepali . . . . Bengali, Marathi, and Nepali have distinct lexicons in comparison to Hindi, while Urdu and the other dialects share a common lexicon with Hindi. In script, Hindi, its dialects, as well as Marathi, are written in the Devanagari script; Urdu, Bengali, and Nepali, however, use distinctly different writing units. (Vagh, 2009, pp. 27–28)

> The assembly is the first event of the school day . . . . There are a few short prayers in Arabic that they may choose from and a famous children's prayer poem in Urdu . . . the prayers and poems are chanted in Arabic and in Urdu and not literally understood by the majority of the [Hindko speaking] children. (Farah, 1991, p. 65)

Underachievement in literacy is a pressing issue in many LMI countries and this has prompted multiple interventions including programmes that extend outside of the school. One line of response has been to develop interventions that address the HLLE. In many of these interventions, a pedagogical programme is conducted outside of the home, with the home-based component targeting home tutoring, supply of materials, or parent–teacher meetings (e.g. Costa Rica: Rolla San Francisco *et al.*, 2006; India: Lakshminarayana *et al.*, 2013; Liberia: Davidson & Hobbs, 2013; multiple countries: Dowd & Pisani, 2013; Dowd *et al.*, 2017). In studies that target the HLLE through supply or skills training (e.g. library books, skills for shared book reading), results are promising but mixed. The broad-based school–home–community interventions appear to have significant effects on component skills of literacy and this effect is seen across preschool and the early grades (e.g. small to moderate–high effect size, Nag *et al.*, 2016b). But longer term follow-up data are rare; the available

evidence is that initial gains may not be maintained over time (e.g. Malawi: Ozler *et al.*, 2016; but see Turkey: Kağitçibaşi *et al.*, 2009). Given the mixed trends from interventions, a synthesis of quantitative and qualitative research on HLLE has the potential to uncover how intervention ideas are received and used and why some interventions find resonance in the home more than others.

There are at least two strands of cultural analysis that suggest that providing material or increasing parent meetings with teachers may not be the best interventions for improving children's literacy. First, parental involvement in children's school learning is influenced by multiple factors. These include parental beliefs and traditional approaches to child development (e.g. 'Learning by Observing' and 'Pitching In' [LOPI], Rogoff, 2014), and confidence and trust in the local school system and social networks (e.g. Cambodia: Eng *et al.*, 2014; Ethiopia: Jirata & Kjørholt, 2013; Ghana: McCoy *et al.*, 2014; Turkey: Baydar *et al.*, 2013; Uganda: Parry *et al.*, 2014). Added to these are issues of access to useful resources for school education at home and in the neighbourhood (e.g. India: Bhattacharjea *et al.*, 2011; Pakistan: Tayyaba, 2012; Tanzania: Alcock *et al.*, 2010), parental engagement with activities at home such as book reading and responsive talk (e.g. Chile: Strasser & Lissi, 2009; Ecuador: Paxson & Schady, 2007; Mexico: Azuara, 2009, Azuara & Reyes, 2011; multiple countries: Willms & Somers, 2001), and availability of sources of information such as the radio, television and the Internet. Family health and nutrition can also affect the HLLE and children's learning (e.g. Bangladesh: Aboud & Akhter, 2011; Nepal: LeVine *et al.*, 2012; multiple countries: Crookston *et al.*, 2014).

The second obstacle to the take-up of such interventions is that while schools may dictate that homes supplement school instruction they may fail to take into account that such demands are either too high for homes to meet (e.g. India: Sen, 2010; Kenya, Uganda: Abuya *et al.*, 2015), or executed so minimally as to make no discernible difference (e.g. language and print skills in the preschool: Rolla San Francisco *et al.*, 2006). In fact, there is evidence that merely increasing frequency of contact between the parent and the teacher does not improve children's educational attainments [e.g. emergent literacy and grade 1 tests in India: Sen and Blatchford (2001); grade 4 first and second language tests in Sri Lanka: Aturupane *et al.* (2013)]; even when a broader measure of parent involvement is considered (e.g. 'knows child's teacher', 'participates in school-related activities', 'attends parent–teacher meetings'), the association with student attainment is not significant [grade 3 and 4 language tests in 10 of 11 Latin American countries: Willms and Somers (2001)]. It is clear that, if investing in HLLE interventions is to be successful, the skills, proficiencies and resources both at home and in school must be taken into account.

Here we review attributes of the home within the place of dwelling of the child and include the resources that are arguably essential for providing good literacy experiences by those who live with or are connected to the child. We focus on the HLLE attributes (books-at-home, home tutoring and adult literacy practices) when there is a language match and a language disconnection between the home and the school and consider how these relate to children's language and literacy development. We synthesise descriptive, correlational and causal evidence related to the disconnection between home and school languages.

Method

Scope of the review

This systematic review is part of a broader study covering several strands of children's learning including foundation skills, literacy and numeracy, within-child factors and contextual factors (Nag *et al.*, 2014). This review is reported in accordance to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Liberati *et al.*, 2009). The review protocol for the entire study was specified in advance and identical search strategies, screening, data extraction and quality assurance templates were followed throughout (Torgerson, *et al.*, 2013). The review focused on literature from low- and middle-income countries (LMI countries) as listed by the World Bank and OECD and published in peer-reviewed journals. Since avenues for publication in peer-reviewed journals is limited in many LMI countries, we also included unpublished doctoral theses and reports and working papers from non-academic institutions such as NGOs and international agencies. Studies were identified based on explicitly stated searches for the date range 1990 to February 2013. The original review protocol was modified twice to expand the search dates, first to a 25-year period and then to a 26-year period from 1990 to 2016. Searches were conducted therefore in three waves covering 1990 to February 2013, January 2013 to December 2014, and January 2015 to December 2016 (month of search: March 2013; March 2015, April 2017; last search date 21 April 2017).

Concepts used in the search strategy

The search strategy was executed by the Center for Reviews and Dissemination (University of York, UK) using a combination of indexed keyword terms and free text search terms appearing in the title and/or abstracts of database records. Search terms were identified through discussion between the research team, by scanning background literature and 'key articles' already known to the team, and by browsing database thesauri.

Initially, a group of 13 'key articles' were shortlisted to use as a test set in the development of the search strategy. Five databases (ERIC, PsycINFO, SSCI, EconLit and ASSIA) were searched to check if each of the 13 'key articles' were present and what indexing terms had been assigned to the database record. A draft search strategy was then created and run in the ERIC and PsycINFO databases and the results scanned to see how many of the 'key articles' were retrieved. Of the 13 'key articles', nine were present in the ERIC database, three were in PsycINFO and one was in neither. The draft search strategy initially retrieved only four of the nine 'key articles' in ERIC, and two of the three in PsycINFO.

When a 'key article' was not identified by the search strategy or did not use the search terms we had shortlisted, the record was checked for potential search terms, which were then added to the search strategy. This procedure was followed after amendments had been made to the second and third drafts of the search strategy. After each draft, the search strategy was sent to the research team for comments, and

further iterations were made, until a fourth and final search strategy was agreed upon (29 January 2013). The final search strategy was peer-reviewed for accuracy by a second Information Specialist.

An additional test of the search strategy involved sending random sample sets of 100 records identified in ERIC and PsycINFO using the second draft search strategy to members of the research team to check the relevance of records retrieved and to confirm inclusion criteria. Both tests ensured that the final search strategy identified the 'key articles' and also, more importantly, that the searches identified other similar studies.

During development of the search strategy it was found that a very large literature about 'adult literacy' in developing countries was being retrieved. It was therefore necessary to introduce in the search terms a concept for 'children', with additional search terms for school type (e.g. primary, elementary, kindergarten) and school grade (grade 1 to grade 8). The use of these and age-related terms in the title and abstract of database records may have been restrictive but was unavoidable.

Similarly, it is not ideal to limit searches geographically but without including the concept of 'developing countries' in the search strategy, an extensive literature about child literacy in North America, Western Europe and Australia was accessed. The research team agreed that this concept should be included in the search strategy to prevent retrieval of literature not relevant to the review. Early in the process of developing the strategy, it became clear that generic search terms for 'developing countries' were not identifying studies relevant to the review, including 'key articles'. The team decided to include named countries to help capture this literature. Countries with poor literacy and low-income rates were identified from four sources (World Bank, OECD, DfID and UNESCO); including named countries in the search strategy improved the identification of relevant studies. A number of studies, however, neither included terms for 'developing countries' nor a named country in the subject indexing, title or abstract of database records, but did include reference to the child's language (e.g. 'Arabic', 'Kannada', 'Swahili'). Therefore, the main languages spoken in developing countries were included in the search strategy.

The databases covered education, mental health, economics and social care (ERIC, PsycINFO, Social Science Citation Index [SSCI], Conference Proceedings Citation Index–Social Science & Humanities [CPCI-SSH], EconLit, British Education Index [BEI], Australian Education Index [AEI], ASSIA, Dissertation Abstracts, Index to Theses, BLDS, Eldis, OAISTER, Zetoc, RePEc, ScienceDirect and JSTOR). The full electronic search strategy for one database is provided in Table S1 (see Supplementary Information, access details at the end of the paper). In addition, publications were gathered following expert recommendations, from specialist libraries (e.g. World Bank) and tracking citations encountered while reviewing the literature. The searches were not limited by language.

Given that a number of databases were searched, some degree of duplication resulted. In order to manage this issue, the titles and abstracts of bibliographic records were downloaded and imported into EndNote bibliographic management software. After removing duplicate records a total of 14,056 records were collated.

Screening

Papers of interest to the HLLE strand were those tagged during screening with the terms: 'community', 'family' and/or 'home' along with 'literacy measures' and/or 'spoken language measures'. This search yielded 254 studies. In the next stage abstracts were reviewed and studies were coded for 'inclusion'. To qualify for inclusion here, studies should have examined (a) features of the home language and literacy environment beyond family income and parent education level and (b) children aged 3 years and above, either enrolled in school up to grade 8 or of same age and out of school. A total of 213 studies were called for and the procurement rate was 91.13%.

Data extraction

The extraction of information in each paper covered: sample characteristics (age, grade, gender, country, language(s), school type, SES); study design (intervention, ethnography, qualitative, cross-sectional, longitudinal, compare groups, mixed methods); HLLE descriptors and measures as given in each study; language and literacy measures (vocabulary, phonological awareness, emergent literacy, symbol knowledge, reading accuracy, fluency and comprehension, spelling and writing); other measures (e.g. health); the analytic approach (e.g. statistical-multivariate, thematic extraction); key findings; limitations; and conclusions. For intervention studies the template additionally captured cultural sensitivity (in rationale, materials, mode of delivery and skills targeted) and methodology (assignment, attrition, fidelity).

Next, two reviewers independently reviewed extractions from every paper. Each paper was assigned a rating for methodological quality based on the extent to which the paper demonstrated adherence to principles of appropriateness, rigour, validity, reliability, openness, transparency and cogency, and clarity of conceptual framing. When there was disagreement between reviewers, a third investigator arbitrated. The inter-rater reliability of quality ratings for 85% of papers that met inclusion criteria yielded a Kappa estimate of 0.785.

Only those studies with a focus on home language and school language marked moderate to high in methodological quality are included in the current review: 14 studies are rated as 'High', 8 'High–Moderate' and 18 'Moderate'. Twenty-three studies had several methodological shortcomings and 105 did not include a HLLE variable, a home language analysis, or assessment of children's language and literacy skills. These are not included in the synthesis.

Of the selected 40 studies in communities with a home language different from school language (either in the whole sample or a sub-set of the sample), 16 are multivariate studies using well-designed regression analyses to identify key variables that can explain differences in literacy attainments. One study conducts only bivariate analysis. Twelve studies are ethnographies of literacy practices, six use mixed methods and five are intervention studies. The multivariate datasets are from 41 countries examining 58 cohorts (desegregated by country, age or grade). There are five overlapping reports in our set: Ethiopia EGRA dataset (Piper, 2010; McCormac, 2012), the Morocco dataset (Spratt *et al.*, 1991; Wagner, 1993), the Vietnam Reading and

Mathematics Assessment Study dataset (Hungi, 2008 and Ikeda, 2010), the South Africa PIRLS 2006 dataset (van Staden, 2010; van Staden & Howie, 2012), the Turkey TEEP dataset (Kağitçibaşi, 1993, 1997; Kağitçibaşi *et al.*, 2001, 2009) and the SACMEQ II dataset (Yu & Thomas, 2008; Smith & Barrett, 2011).

Across the multiple cohorts, the pairing of home language(s) and school language (s) covers multiple language families: for example, Mayan with Spanish in Guatemala, Tharu and Newari with Nepali in Nepal, Dzonghka, Lhotsham and Sharchop with English in Bhutan, and Hmong and Cham with Vietnamese in Vietnam. In the selected studies, the contexts where children acquire literacy in more than one language, the second language (L2) is typically English and the home language is often also a school language (e.g. Afrikaans in South Africa, Cebuano in the Philippines and Shona in Zimbabwe), although there are also contexts where neither of the school languages are the home language. The ethnographies cover 15 communities from 12 countries. Examples of language pairs in the ethnographies are Hindko–Urdu in Pakistan, Quechua–Spanish in Peru, SiSwati–English in Swaziland. The interventions are in six countries covering seven languages of literacy instruction (e.g. Swahili, Hindi, English, Turkish and Standard Arabic) and multiple home languages (e.g. Urdu, Gujarati, Moroccan Arabic, dialects of Hindi). Included studies were published journal articles (24) and books (2), doctoral theses (13), and reports, working papers or other forms of unpublished manuscripts (6). Two sets of investigators were contacted for additional information. For one study, we received desegregated language data for different languages and this informed the Case Study in Appendix 1 (Ethiopia: Piper, 2010). For the second study, the published paper reported composite scores and we were pointed to the archived data on component skills of language and literacy (Vietnam: Rolleston & Krutikova, 2014). These data informed the Case Study presented in Appendix 2.

Assessment of Risk of Bias was conducted at two levels. Bias within individual studies was first assessed during data extraction against methodological quality criteria listed earlier. The quality rating of all included studies is indicated in Tables 1–6. Second, an independent review was also conducted for the bivariate, multivariate and intervention studies to identify if a sub-set of the sample was dropped and if outcomes or any other changes were made to the original methodology. In three studies, the component skills that were measured were not included in the multivariate analysis in favour of word reading measures (e.g. Piper, 2010; McCormac, 2012) or were dropped with no reported justification (Mount-Cors, 2011). In seven studies, the final analytic sample was drawn from a larger data set, with well-justified criteria for doing so [e.g. Smith & Barrett (2011): to control the heterogeneity of economic profiles across countries]. Finally, bias across studies was assessed for skew in publication outlet (published journal article or book, or unpublished report or doctoral thesis) for each dimension of study and trends in findings. The mix of publications was examined for the major trends. Positive, negative or non-significant effects are distributed across publication outlets with no evidence of a systematic bias. For instance, the positive, negative and non-significant effects of home tutors are found in all publication types.

Across the selected studies the attributes of the home language are captured through parental reports, student reports, home observations and recordings of

Table 1. Evidence map for type of home–school language and its associations with child outcomes [a,b]

Author (date), country	Grade	Home language–School language variable	Child outcomes
Emergent literacy (preschool and grade 1)			
Sen & Blatchford, 2001; *India/Kolkata*	K, G1	Degree to which L2 used for speaking, listening, reading and writing at home	K: Composite score (CAP, L2 LK, letter & word association, word matching, RA, copying a sentence, sequencing story cards) ~ G1: Composite score (RA, RF, RC spelling): ~
Vagh, 2009;[d] *India/Mumbai*	K	(a) Home language lexically different from school language (b) Home language orthography differs from school language orthography	(a) Voc. ~, (b) CAP ~, akshara knowledge (similar to LK) ~
Willenberg, 2004; *South Africa*	K	Parental language index (language in the family of origin and language of education for both parents)	Composite score (language & print skills composite) +, Composite score (PA) ~
Wuermli, 2016 *Bhutan*	K (68%) Rest not in preschools	Home language is the school language	Composite score (Voc., listening comprehension, first sound in word pairs, CAP, LK, writing) +
Component skills of literacy and grade-level language tests (grades 2–6)			
Aturupane *et al.*, 2013; [g, h] *Sri Lanka*	G4	(a) L1 (Tamil/Sinhalese) (b) L2 (English) spoken at home	(a) Grade-level L1 test ~ (b) Grade-level L2 test ~
Hungi, 2008; [g] *Vietnam/61 provinces*	G5	Speaks school language	Grade-level test +
McCormac, 2012; *Ethiopia/Addis Ababa*	G2, G3	Mother tongue is language of instruction	RF ~ RC +
McEwan & Trowbridge, 2007; [g] *Guatemala*	G3, G6	Home language different from school language	Grade-level test G3, G6 –
Mount-Cors, 2011; [e] *Kenya*	G2	(a) L1 (Kiswahili) (b) L2 (English)	(a) L1 Letter RF, Word RF, Oral RF ~ (b) L2 Letter RF, Word RF, Oral RF ~

Table 1. (Continued)

Author (date), country	Grade	Home language–School language variable	Child outcomes
Piper, 2010; [c, g] *Ethiopia/multiple sites*	G2, G3	Home language is school language	RF +
Rolleston & Krutikova, 2014; [c, f, g] *Vietnam/5 provinces*	G5 (end of grade)	Home advantage index (includes speaks school language at home, ethnicity (i.e. home language different from school language), mother and father are literate in school language)	Grade-level test +
Smith & Barrett, 2011; [g] *10 Sub-Saharan African countries*	G6	Exposure to language of instruction outside school	Grade-level test +
van Staden, 2010; van Staden & Howie, 2012;[g] *South Africa*	G5	Multiple home languages (inferred) Language of instruction in school: (a) Afrikaans (b) Nguni (includes isiNdebele, isiXhosa, isiZulu, SiSwati, and Xitsonga) (c) Sotho (includes Sepedi, Sesotho, and Setswana) (d) Tshivenda (e) English	Grade-level test scores (in comparison to schools with instruction in English) (a) ~ (b), (c), (d) –
Wagner, 1993; *Morocco*	G5 (cohort 1)	Home language is school language (Arabic but diglossia present)	Composite score (word-picture matching, sentence maze test, RA, RC) ~
Yu & Thomas, 2008; [g] *14 Southern and Eastern African countries*	G6	Speak English at home	Grade-level test +

Note: K = kindergarten, G = grade. All grade-level tests are tests of the school language. Voc. = vocabulary, CAP = concepts about print, LK = letter knowledge, RA = reading accuracy, RF = reading fluency, RC = reading comprehension, PA = phonological awareness, L1 = local language, L2 = second language (typically English), t1 = first assessment, t2 = follow-up assessment, [a]Association with child outcomes: + = positive association, ~ = association is not statistically significant, – = negative association. [b]Methodological quality: ■ = High, ▣ = Moderate –High, □ = Moderate. [c]For further analysis by linguistic subgroups see Appendix. [d]Home language variables operationalised differently for different child outcomes. [e]The operationalisation of this variable is unclear. [f]Composite index also includes presence of TV, study desk, fan, computer, study chair. [g]These are district, state, country and cross-national surveys.

Table 2. Home language and literacy environment described in ethnographies and other qualitative or mixed method studies of homes and communities[a]

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
Akrofi, 2003; (G1, 5 sets of parents and children, urban, *Ghana)*	When helping children with school assignments, 'language use' includes English which is the second language for both the child and the parents. (p. 9)	MI = L2 'Home literacy was designed to follow school practices as much as possible.' (p. 9)	'Pretend reading' (e.g. church literature) and copying (e.g. from newspapers): 'more authentic than their classroom English reading activities' (p. 9). Storybooks typically not affordable.	Desired but cannot afford paid tutors '. . .parents generally modelled their instructional strategy after the look-listen-say-and-copy classroom strategy.' (p. 9)	Study area after the school: a bench, a chair, or a stool in front of a makeshift blackboard (rather like a big slate), with chalk, blackboard duster, pencils, and erasers.
Azuara, 2009; Azuara & Reyes, 2011; (two G3 children, their families (the Yah Cab & Canche HH) and teachers, indigenous community, *Mexico*)	Yadira: Parents decided to communicate only in Spanish at home, once Yadira started school in order to make sure their daughters had the necessary language skills to succeed academically . . . . By the time Yadira entered second grade, parents were using both languages again and speaking mainly Yucatec Maya in the private sphere. When asked about this change, Victoria simply replied '*no puedo*' (meaning that she gave up). The girls still preferred to use Maya at home, and Victoria	MI = L2, use of home language for 'clarifications and directives'. In preschool, home language of Maya is 'seldom used'. Assignments sent home from school valued: She uses the amount of homework assigned as a means of measuring her daughter's progress.' (p. 187) Parents visit school to enquire about child's progress.	Child play replicates school experiences (e.g. creating attendance lists, copying a sentence several times). Literacy and literacy artefacts in the home language (Mayan) are not widespread or accessible. Yah Cab HH—calendar, old textbooks, notebooks, occasional storybook and old newspapers used for wrapping vegetables. Canche HH—notebooks, notes, reports, calendars, book of fairy tales, newspaper, Bible, prayer cards, and printed song lyrics of bilingual audio CDs.	Literacy events often unsupervised ('no adults . . . mediating') or incidental (child 'on the periphery'). '(Child) assumes a passive role. Her parents read the directions and give her answers to the problems'. (p. 186) School assignments involve practicing isolated Spanish writing skills that do not lead to construction of meaning.	Literacy helps 'fulfil practical needs such as paying bills and filling out forms' (p. 92), for entertainment (e.g. reading the score of a soccer match, playing *lotería* [*bingo*]). Written language used for interpersonal communication is in turn modelled by children. Unlike the Yah Cab HH, the Canche HH use literacy for work (e.g. written records of farming activities, create list of prospective customers, use the computer). Canche children and adults value written language

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
	decided to use her daughters' language of choice. (p. 184)				and associate formal literacy in L2 with social mobility.
Contreras, 2007; [b] (18 G6 students and parents of 6, rural, *Venezuela*)	Storytelling is infused into everyday life. 'Ramiro recalled how at his house a group of nearby *abuelitos* (elderly neighbours) used to gather to tell stories in the evenings.' (p. 143)	'When the teachers asked Lucia to find help at home with her reading difficulties, her teachers ignored the fact that nobody could serve at home as a role model for literacy learning. Lucia's teachers did not understand her home situation because it was unusual.' (p. 147)		'. . . mothers and other women who took care of the neighbours' children helped them to learn to read and write, . . . guided them with the school assignments. . .' (p. 151)	Reading prayers together (*novenas)* as 'forms of community and home-based literacies' (p. 116). . . . writing love letters, maintain his grocery store accounts, write his own land deed . . . home remedy notes.
Dlamini, 2009; (4 children; 3 from low-income households, urban, suburban and rural settings, *Swaziland*)	Stories in SiSwati: 'When I asked where they got the stories from, Lona said from ". . .*babe*" [". . .father"], and Fana said from ". . .*malume* Mandla Mathabela" [". . .uncle Mandla Mathabela"].' (p. 128) Stories by Fana interspersed with words from *tsotsi taal* which is 'a mixture of South Africa's eleven languages' and known to many across the region.	Sebe's '. . . initial enthusiasm for activities in class was gradually replaced by an increasingly characteristic silence, after her teacher continuously ignored her contributions made in SiSwati.' (p. 107) Heli's school attendance was erratic and sometimes stayed away from school for long durations (due to grandfather's beatings; child of a single mother). 'Literacy learning in school	Homes were not print-rich and reading and writing were not prominent aspects of everyday life. Children recited rhymes and sang religious songs (e.g. Sebe). Print-oriented play at home include guessing the name of a newspaper, using twigs to scratch print on the ground, write spelling words on the damp ground, draw in used school workbooks, storytelling and reading/	Parents did not 'see a tutoring role for themselves. . .' (p. 239) Presence of 'school-like home-based literacy events such as spelling callout and say-after-the-teacher reading.' (p. 105). Children's linguistic resources were not validated by parents because of the general tendency for 'adults to condescend to and to dismiss children and	Although Sebe's grandfather was observed reading a religious booklet, ambient literacy was mostly absent at home. Intergenerational storytelling a common practice. Children also demonstrated an awareness of their literacy limitations. For instance, Fana preferred to have someone more knowledgeable do it for

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
	English borrowing—"You are under arrest"—when shouting during play: MUS: YOU ARE UNDER ARREST! (emphatically) VUY: *NGIYACOLISA PHELA BHUTI, AWU NGIYACOLISA*. . .[I'M REALLY SORRY BROTHER, OH I APOLOGISE. . .] MUS: YOU UNDER ARREST, *NONKHE*! [YOU UNDER ARREST, BOTH OF YOU!]. (pp. 151–152) . . .	. . ., did not make connections between what children already knew from home and what they needed to learn in school.' (p. 166)	recognising environmental print.	their activities as unimportant or as 'mere' play.' (p. 126)	him rather than make a tentative effort himself. In contrast Sebe believed in practicing in order to perfect her drawing.
Dyer, 2000; (Parents and leaders of one pastoral community, rural, *India/Kachchh*)	Schools are also seen as places where people go to learn 'how to talk.' (p. 246) Parents and community leaders say that they struggle to communicate with mainstream institutions: 'Even if we do get to the door of the hospital we won't know what to say next.' (pp. 246–247)	Perception of schools: In school children ' "improve" (*sudhare*). . . become "clever" (*hoshiar*)', and learn 'how to talk.' (p. 246) Families becoming sedentary to enrol child in school: 'an extreme form of adaptation for a pastoral family . . . which many prefer to defer for as long as possible.' (p. 248)			Literacy goals are to master 'a series of discrete tasks.' (e.g. read and write 'own' letters, read bus boards, religious texts). (p. 246)

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
Farah, 1991; (preschool to G5, one girls' school, rural, *Pakistan*)	Hindko is the home language and Arabic is the language of the religious text. The school language is Urdu which may or may not be known to a family member. Even though there is no method to Urdu exposure outside school, opportunities are multiple.	MI + L2, L3, use of home language, Hindko, is allowed in class. Instructions are in Hindko and writing in Urdu. Parents perceive teachers as 'city women, not teaching children, . . . enforcing rules such as wearing of uniforms.' (p. 77) Teachers regard parents as uneducated, not committed to their children's schooling, lack 'good manners'.	'Written material in Urdu to which the children have been exposed are: writing seen on television, shop signs and graffiti . . . older siblings' school books, and for some magazines and newspapers . . .' (p. 66) Early exposure to materials also from trailing along with older sisters to school (schools allowed accompanying children to sit in class).	'. . . start learning to read/ decode the Quran in Arabic at a very early age, almost always before they enter school. Their exposure to oral or written Urdu is not systematic however.' (p. 66)	Reading the Quran as a family practice. Literacy valued because it allows to 'read and write letters', 'understand things better.' (p. 78) Exposure to oral language through TV, radio and letters read out loud to the family by a neighbour or sibling.
Ishihara-Brito, 2013; 17 families, (26 informants) whose eldest child is in G1-G3 & 26 families (37 informants) whose child is in G4–G6; rural and urban; indigenous and non-indigenous families, *Guatemala*)	Parents expect schools to focus on language skills (in Achi, "*utzilaj k'utb'altzij*" ["very good teaching of words."] (p. 190) Teachers without the ability to 'communicate and teach' in the local indigenous language are perceived as unskilled. (p. 190)	Schooling considered of poor quality when teachers did not send assignments home, were tardy or mistreating students and, for some parents, when teachers were unable to teach in the local indigenous language. Parents participated on school committees, especially at community-managed schools, did manual labour on the		School progress monitored by reviewing notebooks and ensuring assignments sent dome are done. Support provided by telling child to school complete assignments, by explaining how to do the assigned work, or allocating time at home for school work.	Education valued for children's personal growth (moral guidance) and future (well-paid jobs). Parents held low expectations for learning (expectation was limited to basic literacy and communication in L1 and MI and ability to sign one's name). Accountability for failure and success attributed to the child.

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
		school infrastructure, and helped prepare meals at school. Parents with little or no formal education more satisfied with their child's education . . . . No parents gave teachers credit when a child did well.			
Kvalsvig *et al.*, 1991; (57 children and their families, townships and rural, *South Africa/ Umlazi, Mamelodi, Nqabeni and Nebo*)	Children have multiple speech partners but who dominates the language exchange differs by the age of the child and who is in the dyad. There is 'an age scale' in language exchanges: language within adult–child interactions is dominated by the adult as also in older child–younger child interactions. The youngest children (0–2, 3–5) are 'more frequently the recipients of 5 year-old speech.' (p. 68)	MI = L1, L2 The concept of 'school' was often presented negatively to the child as 'a place where failure was common and the anger of teachers was to be feared.' (p. 73) School was regarded as 'hard' but learning to write as 'good'.	'. . . absence of reading matter in the homes . . .' (p. 72)	Older children as 'important teaching agents.' (p. 72) '. . . no mention of the *purpose* of learning to read or write except the implied one of preparing the child for school, . . . topics were restricted to the more mechanical aspects of handling materials and copying letters, numbers, shapes and words.' (p. 73) Children are provided scaffolding in teaching sessions about one-third of the time and older children provided 'precise information on how improved	

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
				performance can be achieved' more often than adults. (p. 75)	
Komba, 2013; [b] (24 G7 children, 25 families, 3 schools, 10 educational officers, 3 head teachers, 3 teachers, semi-urban and rural, *Tanzania*)	No discussion of language use at home.	'Families are not concerned about their children's education'—head teacher. (p. 78) Teachers noted that children's out-of-school time was not monitored and children spent most of their time watching videos and that 'families never care.' (p. 76)	Few parents had books at home.	Families' participation in education at home was related to children's commitment to school. Some families 'rarely discussed their children's schooling, inspected exercise books, received and read reports, or encouraged and acted upon student progress, as indicated in children's school reports.' (pp. 75–76)	Few parents had education related facilities at home (e.g. tables and chairs). Seventeen families had never been to school and the remaining 8 had members who were primary school graduates.
McCormac, 2012; (27 parents and teachers from 2 schools, urban, *Ethiopia/Addis Ababa*)	Non-native speakers of Amharic are instructed by school to communicate in Amharic at home. School organises for L2 speakers of Amharic to regularly interact with Amharic speakers.	MI = L2 (some areas) 'Absences from school' owing to household tasks. Parents critical of teachers ('lack of training') but some praise (for tutorial service).	Available school textbooks were either damaged or in short supply.	Mothers are 'more involved in a child's education' than the fathers.	Few supplementary materials.
Mkhize, 2013; (4 focal students in G4, poor rural communities,	Homes support bilingualism and biliteracy in complex and flexible ways. Presence of a Zulu–English	Home language permitted in school. Cross-linguistic skills not adequately supported by teachers and limited use	Newspapers (Zulu & English), magazines (bilingual), TV guides, story books (owned and borrowed from school).	Engagement with reading materials was moderated by families' literacy level. For example, for the two	Listening to bilingual radio programmes, watching bilingual TV programmes with subtitles, reading TV guides, reading the

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
South Africa/ Northern KwaZulu-Natal)	bilingual TV and radio programme (e.g. 'Sesame Street' available in the official South African languages). Bilingual TV programmes encouraged family members to participate actively in constructing meaning. Switching between the two languages was commonplace. Noma was orally proficient in Zulu as she was exposed to Zulu at home and in the community. Dudu's grandmother liked narrating traditional Zulu folktales. Muzi's mother: 'I don't want them to end up speaking only English. Knowing Zulu is important because the language has a lot to teach children, especially the culture.'(p. 179)	of bilingual strategies. Reading at school focused on fluency and public performance and writing focused on grammar and vocabulary—echo/choral/ loud reading, drilling, memorisation, spelling, loud in unison, copying.		families owning a variety of reading materials, meaning-making was important; three families provided children opportunities for creative writing; one family relied on school materials and engagement was limited to helping with school assignments.	newspaper in Zulu and English. Adults and children independently and jointly engaged in these activities.

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
Mount-Cors, 2011; (Low-literate mothers of G2 children from three schools; semi-urban & rural, *Kenya*)	Mothers acknowledge the difficulties arising due to the school language being different from the home language. English is indigenised to the African context in language structure and vocabulary. 'We speak our own English.' (p. 191, Teacher in Malindi District) 'All the subjects used here are taught in English, so if the child does not know English, really, will they succeed?' (p. 193, Shurafa, a native Kiswahili speaker)	MI = L2, L3 for some, HL allowed in school but not preferred. 'hunger, fee arrears, dirty uniforms due to lack of water, sickness of the child, and absence of mother owing to the search for income-generating labour lead to the child missing school.' (p. 170)		Mothers cannot help with homework . . . talk about asking a teacher or family member (often a child's older sibling) to tell her how her child is doing or to help. (p. 190)	Mothers also described an inability to read prescriptions and notes written by health workers. (p. 219)
Ngwaru, 2008; (6 families and their children in G1–G7, rural, *Zimbabwe*)	Home language is Chishona, English is favoured in school and parents do not have much experience with English.	G1–G3: MI = L1 (Chishona), but teachers prefer lessons in English; G4 onwards English. Lessons 'hardly mentioned' details from children's home life even when lesson topics allow for making these connections (e.g. occupations, foods).		'Parents perceived they had no role to play in the child's education, and teachers also believed that the parents had no part to play.'	

Table 2. (Continued)

Study (sample, *country*)	Language(s) and the home	Characterisation of the home			
		Home–school connections	Books-at-home	Home tutoring	Adult literacy practices
de la Piedra, 2006, 2010; (small village community with one school for K to G5, rural, *Peru*)	Quechua was the most widely used language in the community but literacy was mainly associated with Spanish. Quechua literacy was practiced by community members in church. Adult and children participated in church services and most of the ceremony was conducted in Quechua. Quechua was also used during collective bible readings and in explanations provided by the preacher. 'I like to read in Quechua rather than in Spanish, I understand better.' (p. 107, Martina, mother of three children)	MI = L2 (Spanish), 'schools have traditionally ignored or prohibited the use of Quechua language for educational purposes.' (p. 99) 'At the community school, instruction was almost exclusively in Spanish, with the exception of two teachers who attended an in-service training program . . .' (p. 103) Many *comuneros* noted acquiring literacy skills outside the school through meaningful, authentic activities related to their roles as communal or religious leaders.	Bible, written materials are related to the church.	Copywriting is common (e.g. from the bible, popular songs).	Writing related to church matters (e.g. minutes, letters). Collective reading is common ('as a means of knowing' p. 104, de la Piedra, 2006).

Note: K = Kindergarten, G = Grade, MI = Medium of instruction, L1 = child's home language, L2 = child's second language, L3 = child's third language, HH = Household. [a]Methodological quality: ■ = High, ▣ = Moderate–High, □ = Moderate. [b]The home language and language of literacy learning inferred.

Table 3. Evidence map for home-based interventions[a,b]

Authors, date, country, *language*[c], sample size	Profile of the home	Programme	Experimental Conditions (session details)	Outcomes[d,e,f]		Cultural sensitivity[g]
				Child language and literacy skills	Home language and literacy environment	
Randomised controlled trial						
Banerji *et al.* (2013) India/Purnia district, Bihar and Ajmer district, Rajasthan, *Hindi* Mothers of children aged 5–8 8,857 mothers and 14,575 children	Rural Mean education level: Mothers Grade 1, Fathers Grade 1. Presence of a family member who could read: one in four households. Homes may or may not have electricity. School language of the region may or may not be the home language/ dialect.	(i) Adult Literacy classes for mothers (ML): targeting basic literacy and math (ii) Training for mothers to use Child Home Activities and Materials Packet (CHAMP): worksheets for child, instruction on how to review school notebooks, discuss child learning with her child's school teacher, and encourage the child to do schoolwork at home (iii) Combined intervention (ML & CHAMP)	(a) ML (b) CHAMP (c) Combined (d) Business as usual controls (1 year; ML: daily 2 hour sessions; CHAMP: once a week session at home; Combined: daily sessions and once a week session at home)	Literacy composite (identify pictures, read letters, words, connected text): ML ~ CHAMP ~ Combined +, effect size[d] 0.04	Mother's literacy and math composite: ML + effect size[d] 0.097, CHAMP + effect size[d] 0.045 & Combined + effect size[d] 0.13 Ownership of books at home: ML (schoolbooks) +, CHAMP (pencils, school books, other books, and newspapers/ magazines) + Combined (school books, other books, slates) + Child time spent on homework: ML ~, CHAMP ~, Combined + (an increase by 0.3 hours per week)[d] Mother participation index (including school visits and helping with homework): ML + 0.071, CHAMP: + 0.13, Combined + 0.11 Mothers' perceptions of parental involvement in education: ML, CHAMP ~, Combined +	Moderate

Table 3. (Continued)

Authors, date, country, *language*[c], sample size	Profile of the home	Programme	Experimental Conditions (session details)	Outcomes[d,e,f]		Cultural sensitivity[g]
				Child language and literacy skills	Home language and literacy environment	
					Match between mother's guess and child's reading score: ML ~, CHAMP, Combined significant mismatch Child's school attendance: ~	
Oketch *et al.* (2014) Kenya/Kinango and Kwale and Uganda/ Amolotar and Dokolo, *Lango and Swahili* 13,944 children from Grades 1–3 and 229 schools 106 parents	The Kenyan districts (Kwale & Kinango) are the worst-performing in the end of primary examinations. Kinango has the highest levels of poverty and parent participation in children's education is poor. The Ugandan districts (Amolatar & Dokolo) experienced civil war for about 20 years. Exceptionally low literacy attainments in both districts.	(i) East Africa Quality Education and Learning (EAQEL) Core Model: teachers trained on five-step approach covering conceptual understanding of stories, decoding of letter–sound relationships and written production (ii) Core model plus: As above and parents encouraged to borrow books from mini-libraries and to read and tell stories to children	(a) Core model (b) Core model plus (c) Business as usual controls (16 months; frequency not clear)	Uganda: Written literacy + Oral literacy + (Core model plus had higher impact than core model but statistical significance cannot be estimated) Kenya: Written literacy: Core Model Plus + (among low performing students) Oral literacy ~	Not examined	Moderate to High
Quasi-experimental design						
Kağitçibaşi, 1993; Kağitçibaşi, 1997; Kağitçibaşi *et al.*, 2001; Kağitçibaşi *et al.*, 2009; Turkey, *Turkish* 255 mother–child dyads; 3 and 5 year olds in the 7-year	Most mothers in training programme from rural backgrounds; two-thirds mothers worked as unskilled factory workers; average maternal education was 5.4 years.	Intervention comprises a cognitive and a parenting component provided via home visits and group meetings. Cognitive component: taught mothers to support their child's pre-literacy and pre-numeracy skills using	(a) Mother enrichment programme (with or without participation in centre-based care) (b) business as usual controls (with or without participation in centre-based care) (Cognitive component: 60 sets of weekly	Post-programme: School grades: +[f] Stanford Binet IQ scores: +[f] Standardised test of academic achievement: +[f] Vocabulary subtests of the Weschler Intelligence Test: +[f] 7-year follow-up:	Post-programme: Mothers attentiveness and direct interaction with child: +[f] Involvement with cognitively oriented activities and school responsibilities: +[f] Parental educational expectation for child: +[f]	High

Table 3. (Continued)

Authors, date, country, *language*[c], sample size	Profile of the home	Programme	Experimental Conditions (session details)	Outcomes[d,e,f]		Cultural sensitivity[g]
				Child language and literacy skills	Home language and literacy environment	
follow-up cohort (n = 217) and 19-year follow-up cohort (n = 131)		worksheets and story books (adaptation of HIPPY, Lombard, 1981). Parenting component: targets communication and parenting skills, and mother empowerment. Topics include health and nutrition, children's developmental needs, play activities for young children, child discipline and parent–child interaction.	activities. Parenting component: 30 bi-weekly group discussion sessions)	Child school attainment: +[f] School grades: +[f] Standardised vocabulary test: +[f] 19-year follow-up: Achievement/cognitive domain: ~ Cognitive/achievement domain developmental trajectory: +[f] Effect of mother training for the custodial care group but not for the educational care group and home group	Positive discipline and praise: +[f] 7-year follow-up: Parent and adolescent child attitudes towards education: +[f] Parental educational expectation for child: +[f] Fewer child problem behaviours (less sassy or talking back, less delinquency): +[f] Positive parent–child relationship (parent–child communication, adolescent's perception of mother, less spanking): +[f] 19-year follow-up: Occupational status: ~ Social/family adjustment domain: ~	
Rochidi, 2009; Morocco, *Standard Arabic* 45 5–6 year olds not yet enrolled into school	Rural Mothers with 6+ years of formal schooling Typically no books at home. Moroccan Arabic at home. All mothers report being literate in standard Arabic.	(i) shared book reading: using 8 Standard Arabic books (A) (ii) 8 'manipulated' books with more words shared by home and standard language (B)	(a) shared book reading using AB sequence (b) shared book reading using BA sequence (c) Business as usual controls (3 weeks, daily sessions, duration left flexible)	Pooled AB/BA data: Concepts about Print +[f] Emergent literacy +[f] Vocabulary +[f] Phonological isolation +[f] Phonological discrimination ~ Blending and syllable rhyming: floor level performance	AB–BA comparison using frequency data: Sessions with books that had shared words from home and standard language had more book manipulation by child, and more WH questions about sounds, print and vocabulary, and	High

Table 3. (Continued)

Authors, date, country, *language*[c], sample size	Profile of the home	Programme	Experimental Conditions (session details)	Outcomes[d,e,f]		Cultural sensitivity[g]
				Child language and literacy skills	Home language and literacy environment	
					more questioning, repeating, modelling, feedback and praise by parent.	
Shah-Wundenberg *et al.* (2012) India/Ahmedabad, *English* 241 children of Grade 1 (6–7 years old) and their parents	Urban children in budget private schools. Average parent education level is high school. Gujarati at home. Parents report 'sufficient command' of school language but 'lack confidence' to use it.	(i) Paired reading (PR): focuses on assisted reading by parent with child (ii) Hearing reading (HR): parents listening to child read and providing feedback and assistance	(a) Paired reading (PR) (b) Hearing reading (HR) (c) Business as usual controls for PR (d) Business as usual controls for HR (8 weeks; 15–20 minute sessions thrice a week)	Single word reading + (PR, HR), effect size = 0.27[d] Reading accuracy for connected text+ (PR, HR), effect size = 0.62[d] Combined experimental group vs. control: Single word reading +, effect size 0.70[d]	Increase in confidence to help in English, checking of homework, in use of bilingual dictionaries and asking clarifications from neighbours and other family members in preparation for helping child. Among parents with low English proficiency, increase in focus on pictures to explain, prompting for child to persist and complete. (vignette p. 21) Greater use of code-switching and home language to explain texts, greater use of synonyms to communicate comprehension, 'understood story in a sequential manner.' (p. 19)	High

Table 3. (Continued)

Authors, date, country, *language*[c], sample size	Profile of the home	Programme	Experimental Conditions (session details)	Outcomes[d,e,f]		Cultural sensitivity[g]
				Child language and literacy skills	Home language and literacy environment	
			Qualitative report			
Parry *et al.* (2014) Uganda/Lwannunda, *Luganda* 9 women and 1 man for a brief period	Rural and pastoral. Each participant adult had between two and six children at home; several children are AIDS orphans. Child average age was 8 years. Children < 6 years were at home and all older children were in primary school. Low-literate mothers, low proficiency in English, high enthusiasm for education, few books at home or in the local public library, but the Kitengesa Community Library, a school library, provides classes for adults and special reading sessions for children	Family Literacy Project (FLP) with a focus on helping children in school and promoting bilingual literacy. Activities include drawing a map of the locality, looking at pictures, making patterns with small bits of paper, drawing pictures and arranging them, telling and reading stories and making translated books, writing plays and enacting with puppets.	Small and whole group activities, pair-wise activities, parent–child activities, and role plays (12 weekly sessions)	Not examined	Mother's confidence + Mother's reading to child + Mother's own reading + Mother's and child's interest in the books + Mother's perception of home tutoring: (a) 'translating if possible, it might be of both sides either children or parents' (p. 13), (b) 'being a role model of borrowing the books and reading with them.' (p. 13)	Moderate-High

Note: [a]Impact of intervention: + = positive impact, ~ = no impact, – = negative impact. [b]Methodological quality: ■ = High, ▣ = Moderate–High, □ = Moderate. [c]Language of intervention. Effect size: [d]reported, [e]re-calculated, [f]raw data not available for re-calculation. [g]Cultural sensitivity: for criteria to assess cultural sensitivity see methods section.

Table 4. Evidence map of nature of associations between specific books at home variables and language and literacy outcomes[a,b,c,d]

Author (date), country/further identifier	Grade	Home language advantage?[e]	Book ownership and Supply	Child outcomes		Book exposure and use	Child outcomes	
				Language	Literacy		Language	Literacy
Emergent literacy (preschool and grade 1)								
Sen & Blatchford, 2001; *India/Kolkata*	K & G1	No	Composite score[e]: type of reading materials, frequency of the child's reading experiences		K: CAP, LK, word reading, matching, copying: ~ G1: RA, RF, spelling: ~ RC: ~			
Vagh, 2009 *India/Mumbai*	K	No	Composite score[e]: no. of children's books owned, frequency of book reading, frequency of borrowing books from the library	Voc. ~	Print knowledge: CAP, grapheme and word concept ~ Akshara knowledge: identification, writing ~			
Willenberg, 2004; *South Africa*	K	Selectively for some child outcomes	(a) no. of books owned, (b) key literacy artefacts, (c) frequency of library attendance	PA (a) ~ (b) ~ (c) ~	Language and print skill composite: (a) + (b) ~ (c) ~	(a) child age at first reading, (b) family book reading index	PA: (a) ~ (b) ~	Language and print skill composite: (a) +, (b) ~
						Composite score[e]: no. of children's books at home, frequency of book reading, duration of family book reading, frequency of library attendance	PA ~ Voc. & narrative skills +	Print skills (LK, CAP, environmental print recognition, writing/spelling) +

Table 4. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[c]	Book ownership and Supply	Child outcomes		Book exposure and use	Child outcomes	
				Language	Literacy		Language	Literacy
Wuermli, 2016 Bhutan	K, children not in preschool	Yes	Composite measure (Physical learning environment: includes storybooks, textbooks, drawing books, comics, and different toys)		Composite (Voc., Listening comprehension, PA, CAP, LK, writing) ~	Composite measure (Activities: includes teaching letters)		Composite (Voc., Listening comprehension, PA, CAP, LK, writing) ~
Component skills of literacy and grade-level language tests (grades 2–6)								
Aturupane *et al.*, 2013 *Sri Lanka*	G4	No	(a) number of books other than text books, (b) owns English/first language exercise book, (c) library membership		Grade-level test: (a) L1 + L2 + (b) L1 + L2 + (c) L1 ~ L2 ~			
Hungi, 2008; [c] *Vietnam/61 provinces*	G5	Yes	(a) books at home, (b) textbook ownership		Grade-level test: (a) + (b) +			
McCormac, 2012 *Ethiopia/ Addis Ababa*	G2, G3	Selective for some child outcomes	(a) language textbook; (b) other reading materials at home		RF: (a) ~ (b) + RC: (a) + (b) ~			
McEwan & Trowbridge, 2007 *Guatemala*	G3	Yes	Presence of books in the HH		Grade-level test ~			
Mount-Cors, 2011; *Kenya*	G2	No	Reading material in the home		L1 & L2: Letter RF, Word RF, Oral RF ~			
Piper, 2010; *Ethiopia/ multiple sites*	G2, G3	Yes (but mixed trend by region—see Figure 2)	(a) textbook (b) other books		RF: (a) + (b) +			

Table 4. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[e]	Book ownership and Supply	Child outcomes		Book exposure and use	Child outcomes	
				Language	Literacy		Language	Literacy
Rolleston & Krutikova, 2014 *Vietnam/5 provinces*	G5	Yes				Reads books outside of school		Grade-level test +
Smith & Barrett, 2011; *10 Sub-Saharan African countries*	G6	Yes	No. of books at home	Grade-level test +				
Wagner, 1993; *Morocco*	Cohort 1: G5	No	No. of types of reading materials in Arabic and French		Reading composite (RA, RC) : +			
Yu & Thomas, 2008; *14 Southern and Eastern African countries*	G6	Yes	(a) no. of books at home (b) borrow from school library		Grade-level test: (a) + (b) +	Asked to read at home		Grade-level test +
van Staden, 2010; van Staden and Howie (2012) *South Africa*	G5	Selective for some home language groups				Parent created: (a) reading time (b) reading opportunity		Grade-level test (by language of instruction in school): Afrikaans (a) ~ (b) + Nguni (a) ~ (b) ~ Sotho (a) ~ (b) + Tshivenda (a) ~ (b) English (a) ~ (b) +

Table 4. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[e]	Book ownership and Supply	Child outcomes		Book exposure and use	Child outcomes	
				Language	Literacy		Language	Literacy
Studies using other ways of assessing home language issues								
Chinyama *et al.*, 2012 *Zimbabwe*	G3	Inferred from comparison of L1 & L2 performance on equivalent literacy tasks	(a) books, (b) textbooks, (c) religious books, (d) newspapers, (e) comics at home		CAP: (a) ~ (b) + (c) ~ (d) ~ (e) ~ LK: (a) ~ (b) ~ (c) ~ (d) + (e) ~ L1 RA, L2 RA, RF: (a) ~ (b) ~ (c) ~ (d) + (e) ~ L1 RC, L2 RC: (a) ~ (b) ~ (c) ~ (d) ~ (e) +	% of people at home reading to child		CAP + Decoding (L1 RA, L2 RA, L2 RF) + RC (L1, L2) ~
Huang, 2009; *Philippines*	G4,G5[c]	Inferred from comparison of L1 & L2 performance on equivalent literacy tasks	School library		Grade-level test: L1 ~, L2 ~			
Ikeda, 2010; [c] *Vietnam/ schools in isolated areas*	G5	Inferred from comparison of home background indices	(a) books at home (b) can borrow books from school		Grade-level test: (a) + (b) +			
Park, 2008; *25 countries include 6 developing countries: Argentina, Columbia, Iran,*	G4	Yes (Inferred from use of home language details as a control variable)	No. of books at home		Grade-level test: all countries +			

Table 4. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[e]	Book ownership and Supply	Child outcomes		Book exposure and use	Child outcomes	
				Language	Literacy		Language	Literacy
Macedonia, Moldova & Turkey								
Pinto, 2010; *Nepal*	G2	Inferred from comparison of L1 & L2 attributes at home	(a) no. of books, (b) parent has seen picture books in Tharu and/or (c) in Nepali (UA)		CAP: (a), (c) ~ (b) + LK: (a), (b), (c) ~ RA: (a), (b), (c) ~ RF: (a), (b), (c) ~	Reading to the child (UA)		CAP ~ LK ~ RA ~ RF ~
Spratt *et al.*, 1991 *Morocco*	Cohort 1 (3–5 yrs of schooling), cohort 2 (>5 yrs of schooling and dropouts)	Inferred from comparison of L1 & L2 attributes at home	Composite score[e]: presence of books in the home, renting/ exchanging books with friends, child engaged in reading and writing other than homework		Home literacy (reading missives, newspaper, electricity bill, medicine box): Cohort 1 & 2 + School literacy (RA, RC): Cohort 1 + , Cohort 2 ~			

Note: Voc. = vocabulary, CAP = concepts about print, LK = letter knowledge, RA = reading accuracy, RF = reading fluency, RC = reading comprehension, PA = phonological awareness, L1 = local language, L2 = second language (typically English), t1 = first assessment, t2 = follow-up assessment, UA = univariate analysis. [a]Sample sizes: < 150: Willenberg, 2004; 150–250; Chinyama *et al.*, 2012; Pinto, 2010; Wagner (cohort 1 = 350); 1000–1500: McCormac (n = 1304), > 1500: Piper (13,079). [b]Association with child outcomes: + = positive association, ~ = association is not statistically significant, – = negative association [c]Methodological quality: ■ = High, ▣ = Moderate–High, □ = Moderate. [d]Measures not entered in the multivariate models are not included in the table. [e]No study reports an interaction effect between home language and this HLLE dimension.

Table 5. Evidence map for home tutoring and their associations with child outcomes [a,b]

Author (date), country/further identifier	Grade	Home language advantage?[c]	Tutoring	Child outcomes
		Emergent literacy (preschool and grade 1)		
Sen & Blatchford, 2001; *India/Kolkata*	K & G1	No	Frequency of child's writing experiences for two types of material: (a) writing letters (b) writing words	K (Reading composite of CAP, LK, letter–word association, word matching, word reading, copying a sentence & sequencing story cards): (a) ~ (b) + G1: (a) RA ~, RF ~, RC ~, spelling ~, word reading ~ (b) RA ~, RF ~, RC ~, spelling ~, word reading ~
Vagh, 2009; *India/Mumbai*	K	No	Parents and other family members teaching the alphasyllabary and providing help with homework	LK ~, Voc. ~, CAP interacts with child interest
Willenberg, 2004; *South Africa*	K	Selectively for some child outcomes	(a) fostering of literacy by children (b) fostering of literacy by adults	(a) & (b): PA ~, Language & print skills composite (LK, CAP, environmental print, vocab, word definitions, fictional narrative, writing & spelling) ~
Wuermli, 2016 *Bhutan*	K, children not in preschool	Yes	Composite measure (Activities: includes teaching letters)	Composite (Voc., Listening comprehension, PA, CAP, LK, writing) ~
		Component skills of literacy and grade-level language tests (grades 2–6)		
Aturupane *et al.*, 2013; *Sri Lanka*	G4	No	(a) Hours spent in paid tutorials (b) Hours spent studying at home (c) Father helps with homework	Grade-level test: (a) L1 + , L2 + (b) L1~, L2~

Table 5. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[c]	Tutoring	Child outcomes
			(d) Mother helps with homework	(c) L1 ~ L2 – (d) L1~, L2~
McCormac, 2012; *Ethiopia/Addis Ababa*	G2, G3	Selective for some child outcomes	(a) father literate and helps with homework (b) mother literate and helps with homework (c) siblings help with homework	(a) RF + RC + (b) RF ~ RC ~ (c) RF - RC –
Mount-Cors, 2011; *Kenya*	G2	No	Parental help with homework: (a) father, (b) mother, (c) sister	L1 & L2: Letter RF, Word RF, Oral RF: (a) -, (b) +, (c) +
Piper, 2010; *Ethiopia/multiple sites*	G2, G3	Yes (but mixed trend by region —see Figure 2)	(a) father helps with homework (b) sibling helps with homework (c) family helps with homework (father, mother, sibling combined effect)	(a) RF + (b) RF + (c) RF +
Rolleston & Krutikova, 2014; *Vietnam/5 provinces*	G5	Yes	(a) Hours spent on homework (b) Hours of extra classes in Vietnamese (per week) (c) Extra classes in other subjects	Grade-level test: (a) + (b), (c) ~
Smith & Barrett, 2011; *10 Sub-Saharan African countries*	G6	Yes	Adult involvement in school work outside of school	Grade-level test: + for 1 country, ~ for 5, – for 4
Yu & Thomas, 2008 *14 Southern and Eastern African countries*	G6	Yes	(a) frequency of looking at homework (b) questioned in reading at home (c) take extra tuition in reading	Grade-level test: (a) + (b), (c) ~

Table 5. (Continued)

Author (date), country/further identifier	Grade	Home language advantage?[c]	Tutoring	Child outcomes
Studies using other ways of assessing home language issues				
Ikeda, 2010 *Vietnam/schools in isolated areas*	G5	Inferred from comparison of home background indices	(a) Help with homework (b) Take extra tuition (c) Home pays attention to work at school	Grade-level test: (a) –, (b) ~, (c) ~
Huang, 2009; Philippines	G4, G5[d]	Inferred from comparison of L1 & L2 performance on equivalent literacy tasks	Out of school time spent on homework	G4 & G5: L1~ L2~
Pinto, 2010 *Nepal*	G2	Inferred from comparison of L1 & L2 attributes at home	Help with homework (UA)	CAP +, LK ~, RA ~, RF ~

Note: K = kindergarten, G = grade, homework, CAP = concepts about print, LK = letter knowledge, RA = reading accuracy, RF = reading fluency, RC = reading comprehension, PA = phonological awareness, L1 = local language, L2 = second language (typically English), t1 = first assessment, t2 = follow-up assessment. [a]Association with child outcomes: + = positive association, ~ = association is not statistically significant, – = negative association. [b]Methodological quality: ■ = High, ▣ = Moderate–High, □ = Moderate. [c]No study reports an interaction effect between home language and this HLLE dimension, d 81% of the sample is in G4 & G5, the rest are in G1–G3 and G6.

Table 6. Evidence map for adult literacy practices and their associations with child outcomes[a,b]

Author (date), country/ further identifier	Grade	Home language advantage?[c]	Adult literacy practices	Child outcomes
		Emergent literacy (preschool and grade 1)		
Vagh, 2009 *India/ Mumbai*	K	No	Adult literacy practices	Voc. +, CAP +, akshara knowledge ~
Willenberg, 2004; *South Africa*	K	Selectively for some child outcomes	Type, frequency & engagement in literacy activities: (a) mother, (b) father	(a) & (b) language & print skills composite ~, PA ~
		Component skills of literacy and grade-level language tests		
Aturupane *et al.*, 2013 *Sri Lanka*	G4	No	(a) highest education expectation parent has for child (b) parents' opinion of the value of education (c) educational trips to cultural, historic or geographical sites	Grade-level test: (a) L1~, L2~ (b) L1 + , L2 + (c) L1~, L2~
Hungi, 2008 *Vietnam/61 provinces*	G5	Yes	Composite includes private study corner, learning materials at home and parent education	Grade-level test: +
McEwan & Trowbridge, 2007; *Guatemala*	G3	Yes	Television viewing	Grade-level test: +
Mount-Cors, 2011 *Kenya*	G2	No	TV at home	Letter RF: L1 ~, L2 ~ Word RF: L1 ~, L2 + Oral RF: L1 ~, L2+

Table 6. (Continued)

Author (date), country/ further identifier	Grade	Home language advantage?[c]	Adult literacy practices	Child outcomes
Rolleston & Krutikova, 2014; *Vietnam/5 provinces*	G5 (end of grade)	Yes	Child uses a computer outside school	Grade-level test: ~
			Home advantage index	Grade-level test: +
Smith & Barrett, 2011; *10 Sub-Saharan African countries*	G6	Yes	Presence of a table	Grade-level test: + for 5 countries, ~ for 5
Wagner, 1993; *Morocco*	G1 (t1), G3 (t2), G5 (t3)	No	(a) parent vs. teacher involvement in child's education (b) parent's involvement in the child's studies (c) progressiveness of parent's views about 'ideal family' (d) religious observance in the family	Arabic reading achievement: (a) G1 + , G3 + , G5 ~ (b) G1~, G3 + , G5 + (c) G1 + , G3 + , G5 + (d) G1~, G3 + , G5 ~
Studies using other ways of assessing home language issues				
LeVine *et al.*, 2012 Nepal	K, G1, G2	Inferred from comparison of L1 & L2 performance on equivalent literacy tasks	Maternal skills and knowledge for literacy (assessed)	Language and literacy composite +
Huang, 2009; Philippines	G4, G5[d]	Inferred from comparison of L1 & L2 performance on equivalent literacy tasks	(a) mother expectation of child's educational attainment (b) hours watching TV	Grade-level test: (a) L1 + , L2 + (b) L1 ~, L2 ~

Table 6. (Continued)

Author (date), country/ further identifier	Grade	Home language advantage?[c]	Adult literacy practices	Child outcomes
Park, 2008; *25 countries include 6 developing countries: Argentina, Columbia, Iran, Macedonia, Moldova & Turkey*	G4	Yes (Inferred from use of home language details as a control variable)	Parent attitude towards reading	Grade-level test: All countries +
Pinto, 2010; *Nepal*	G2	Inferred from comparison of L1 & L2 attributes at home	(a) family members who read child's school books (to help children or to improve own education) (UA) (b) teaching sole responsibility of teachers (UA) (c) parent report not knowing how to help children learn to read (UA)	(a) CAP +, LK ~, RA ~, RF ~ (b) CAP –, LK ~, RA~, RF~ (c) CAP –, LK –, RA –, RF –

Note: Voc. = vocabulary, CAP = concepts about print, LK = letter knowledge, RA = reading accuracy, RF = reading fluency, RC = reading comprehension, PA = phonological awareness, L1 = local language, L2 = second language (typically English), t1 = first assessment, t2 = follow-up assessment, UA = univariate analysis. [a]Association with child outcomes: + = positive association, ~ = association is not statistically significant, – = negative association. [b]Methodological quality: ■ = High, ▣ = Moderate–High, □ = Moderate. [c]No study reports an interaction effect between home language and this HLLE dimension.

literacy-related activities, field notes, document analysis, transcripts from focus groups and one-on-one interviews with parents (typically mothers) and significant stake-holders (e.g. teachers, community leaders).

Even when the stated home language measure is the same across studies, the metric is not; a score therefore has a different meaning in different studies. For example, home language and school language are operationalised as a categorical variable (home language is school language: yes or no), a simple count (frequency with which school language is used for speaking, listening, reading and writing at home) and a three-point scale (e.g. speak or use the school language at home: never, sometimes, always). One study clusters the home languages of children in the sample by linguistic distance from the school language ['lexically different', 'orthgraphically different' (Vagh, 2009)] and another study develops a Parental Language Index based on the language of the family of origin of each parent and language of education of each parent (Willenberg, 2004). One study assesses whether any part of the literacy instruction in school is delivered in the child's home language (McEwan & Trowbridge, 2007). A small number of studies quantify language usage outside home by computing the average number of students in school or a geographical area who speak/use the school language outside school (Hungi, 2008; Rolleston & Krutikova, 2014).

Similar heterogeneity is seen in the intervention studies. There is heterogeneity in who participates (mother, either parent), their educational level (never enrolled in school, completed primary school, graduates), the child-level outcomes (e.g. vocabulary, print knowledge), programme details (duration, frequency) and mode of training (e.g. information sessions, role play). Such variety in the data does not allow for the use of aggregative methods (e.g. a meta-analysis with home–school language as a moderator variable) but are ideal for a configurative review, 'identifying patterns provided by heterogeneity' (Gough *et al.*, 2012, p. 28).

The synthesis structure

The next step was to draw up a framework for the synthesis of the data extracted in this review. We chose to derive the framework from the literature on developing countries because this could potentially capture local realities better than frameworks developed in contextually dissimilar high-income countries. Five in-depth analyses conducted by independent research groups were chosen. Two were multi-country studies: LeVine *et al.* (2012) (Mexico, Nepal, Venezuela, Zambia); Arya *et al.* (2014) (52 countries including 11 developing countries: Azerbaijan, Botswana, Chinese Taipei, Colombia, Georgia, Honduras, Indonesia, Iran, Morocco, South Africa, Venezuela). Three others were single-country studies: Azuara (2009) (Mexico); Wagner (1993) (Morocco); Rolleston & Krutikova (2014) (Vietnam). These studies covered several languages and writing systems (orthographies), and children from birth to middle school. Using thematic extraction of the measures and descriptions from these high quality multi-method and multi-context studies we derived three HLLE dimensions—(i) books-at-home, (ii) home tutoring, (iii) adult literacy practices. These dimensions provide the broad synthesis structure for analysis of HLLEs when homes differ on whether there are disconnections in the home–school languages. The inductive approach was also well suited for further synthesis of the data since, at least at

two levels, the construct of HLLE remains poorly understood: what are the HLLE characteristics in developing countries when the home and school languages are different and when there is socio-economic disadvantage? Thematic extraction of descriptions of measures and description of homes provided the key attributes for each dimension, as follows:

- Books-at-home: book ownership and supply, book engagement and use
- Home tutoring: tutoring frequency and duration, focus and methods of tutoring
- Adult literacy practices: ambient events and artefacts, literacy values and expectations.

In parallel, a matrix for mapping to child outcomes was developed. Table 1 provides the evidence map for comparison of attainments when there is disconnection between home and school languages. Tables 2 and 3 give the evidence maps for the ethnographies and interventions. Evidence maps are further provided from correlational studies that examined associations between children's language and literacy attainments and attributes related to books-at-home, home tutoring and adult literacy practices (see Tables 4–6; individual studies examining multiple HLLE dimensions appear more than once). While the previous evidence maps (Tables 1–3) inform the testing of the home language advantage hypothesis, Tables 4–6 help characterise homes when the home language and school language are different.

We refer to three types of child outcomes: 'Emergent literacy skills' are measures that tap into beginning reading and writing skills and developmental precursors of literacy (e.g. vocabulary, listening comprehension, letter knowledge, phonological awareness, concepts about print) and present results from correlational studies, ethnographies and intervention studies. 'Component skills of reading' are defined as tasks for primary school children that measure reading accuracy, reading fluency, reading comprehension, spelling and narrative writing, and associated skills. 'Grade-level language tests' are assessments of children's learning in relation to language curriculum content and expectations, e.g. reading comprehension for texts of a certain level of difficulty, narrative writing.

Results

Home language, school language

Correlational studies. Fifteen multivariate studies assess effects of language at home (Table 1). In all studies, the effects are captured in models where multiple socio-demographic covariates have been controlled (e.g. socio-economic status, mother's education, ethnicity).

Emergent literacy skills—The number of studies on foundation learning (preschool and grade 1) is small and the findings are mixed. The association of home language attributes was positive for select component skills of emergent literacy in two studies (Bhutan; South Africa) but not significant in another two (India/Kolkata; India/Mumbai).

Component skills of reading and grade-level language tests—The body of evidence for grade-level language tests between grades 2 and 6 is substantial with a strong trend towards home language advantage (26 of 29 country effects, some countries sampled in more than one study). However, at the level of component skills such as decoding and comprehension, the home language advantage disappears (Kenya, Morocco) except for individual sub-samples in two studies (reading comprehension: Ethiopia/Addis Ababa, and reading fluency: Ethiopia/multiple sites).

Ethnographic studies. The varied language resources and linguistic environments at home are illustrated in Table 2 (column 2). Home language contexts vary from near absence of the school language to limited proficiency among family members to contexts where family members are skilled users of the language (e.g. Guatemala, India, Swaziland). Parents expect new and better language development when their children go to school and they may show an urgency for transition into the higher prestige languages of the school (e.g. to go 'straight to English', Dlamini, 2009). One expectation from school often is that children improve in their language skills [learn 'how to talk', Dyer (2000); want 'very good teaching of words', Ishihara-Brito (2013)]. Some narratives also capture how some homes adjust their use of speech to accommodate the school language and the ways in which the school language may either come to dominate or fade away over time (e.g. Ghana, Mexico, Venezuela). Code-switching between the home language and the school language is common in some contexts (e.g. South Africa), and exposure to multiple languages is often driven by exposure to the media (e.g. Pakistan). Finally, the narratives often capture a strong oral tradition of storytelling in many homes (e.g. South Africa, Venezuela).

The multifaceted nature of the connections between the home and the school is illustrated by the nature and scope of parent–teacher interactions (Table 2, column 3). These interactions may be related to not just home–school language disconnections but also socio-demographic distance between teachers and parents such as urban–rural residence, socio-economic status and proficiency in the school language. Finally, beliefs held by teachers and parents about education may differ. Communities can idealise the school as the institution that helps break the cycle of poverty (India/Kachchh) and families can be remarkably keen to keep children in school even when the preoccupation is for subsistence (Kenya). There are occasional reports of praise from parents for extra tutoring support in individual schools (Ethiopia/Addis Ababa) but a more consistent, though modest, body of evidence points to unease in the parent–teacher relationship. Teachers may hold deeply entrenched beliefs that certain homes—picked for their rural, ethnic, low-income, home language or occupational status—lack a learning environment (e.g. Mexico, Pakistan, Peru). When teachers actively ignore home culture (e.g. Swaziland) this can alienate parents; the situation is particularly disempowering for parents when, despite policy mandates, the language of instruction is not the home language (e.g. Kenya, Peru). In addition, everyday challenges such as excessive household chores, vulnerability to disease and injury from physical abuse at home (Ethiopia/Addis Ababa, Kenya, Swaziland) can make a child's connection with school tenuous (e.g. poor attendance leading to loss of instruction time).

Intervention studies. The interventions in the review target the gap between the home language and school language and/or solely address the school language or a second language (e.g. L2, typically English). Three interventions target parental ability to make links between home and school languages (see Table 3, column 3). The interventions focus on guided reading by parents with their children using books with controlled vocabularies (Morocco), L2 books (India/Ahmedabad) or self-produced bilingual books (Uganda/Lwannunda). The studies show three consistent changes in the HLLE following the intervention: parents increased their use of the school language, both parent and child increased code-switching between their home language and school language (or L2) during literacy-linked activities, and parental confidence increased for school-related participation. Parents took to being role-models for reading at home, asking about read texts and praising reading behaviours. One study additionally reported an increased use of bilingual dictionaries and seeking out others at home and in the neighbourhood to solve day-to-day L2-related queries. In the self-produced bilingual books programme, a further outcome was the children's pride in the books produced by their mothers and wanting to show these in school. Taken together, the impact on HLLE may be summarised as change towards 'a socially interactive atmosphere that fostered engagement and enjoyment' for literacy-linked activities (Shah-Wundenberg *et al.*, 2012, p. 23).

The three remaining interventions targeted the school language by sending home worksheets and instructions on how to review school work (India/multiple sites); encouraging parents to borrow library books to read and tell stories at home (Kenya, Uganda/multiple sites) and focusing on parenting skills; for example, around play activities (Turkey). Of these, two interventions were broad-based and included adult literacy programmes for the mother (India/multiple sites, Turkey). Positive changes in HLLE following intervention were for 'attentiveness' towards the child and increased 'participation' in school-related activities in one study each. The impact on child language and literacy outcomes was selective. Effect sizes on child outcomes are available for one study in each intervention type and are relatively stronger when the focus is on addressing the home–school language gap (0.27–0.70, India/Ahmedabad) compared to addressing the school language alone (0.04–0.13, India/multiple sites). Missing effect size information in several studies, however, preclude a direct comparison of the efficacy of the different interventions.

No study in our database compared the impact of a HLLE intervention by the home language status of participating children.

Taken together, the results from the multivariate analyses are mixed with both confirmatory and diverging evidence for the home language advantage hypothesis. The heterogeneity of the data in the review relate to what appear to be differences at the country-level but similar heterogeneity may also be seen within countries (see Appendix 1 for a re-analysis of the Piper, 2010 Ethiopia data). The interventions provide preliminary evidence that improvement in certain skills and proficiencies in the home lead to an improvement in children's literacy attainments, and the further evidence from ethnographies suggests that risk factors may accumulate for the child [for another view of multiple risk factors, see Appendix 2 for a secondary data analysis of the Rolleston and Krutikova (2014) Vietnam data).

Other dimensions of home language and literacy environment

We turn next to examine other HLLE dimensions that provide complementary information. For each dimension, the data are from the correlational studies that have included a home language variable (listed in Table 1) and studies that use an alternate design (e.g. comparison of children's performance on equivalent tasks in the home language, school language, or an L2 such as English, or analysis of language attributes of literacy artefacts at home). As earlier, the synthesis also draws upon the ethnographies and the intervention data.

Key attributes of each HLLE dimension are described as follows: 'Books-at-home' refers to either book ownership and supply or book engagement and use. A book is defined as any printed material (including picture books, comics, calendars and newspapers). 'Home tutoring' refers to tutoring frequency and duration, and the focus and methods of tutoring. 'Adult literacy practices' includes parents' proficiency, skills and attitudes in relation to children's literacy learning. The key attributes are related to ambient events and artefacts, and literacy values and expectations. Studies were then included if one or more aspects of each HLLE dimension was analysed in the context of literacy learning.

Correlational studies. Twenty-one multivariate analyses and one bivariate analysis report associations between books-at-home measures and child outcomes (Table 4). One bivariate and 13 multivariate studies show the effects of home tutoring (Table 5) and 13 studies look at relationships of adult literacy practices with child outcomes (Table 6). The evidence maps cover emergent literacy skills in preschool and grade 1 and either component skills or grade-level tests in grades 2–6.

Emergent literacy skills

Books-at-home: In the preschool years and grade 1, the number of print artefacts at home and the frequency of reading to the child are typically not correlates of either single or composite emergent literacy measures, perhaps because often there are few books at home, or parents are not proficient in the school language or with reading. Books-at-home measures (singly or in composites) show a mixed pattern of association with vocabulary and no association with phonological awareness. It may be the case that in low-income settings individual measures of books-at-home are not sensitive enough to capture differences in the literacy environment across homes, whereas a more robust estimate based on aggregated measures better captures the differences. Such a composite measure is not a concurrent or longitudinal correlate in multilingual settings (India/Kolkata; India/Mumbai) and ceases to remain a correlate in a third setting once family demographic variables have been accounted for (South Africa).

A clear pattern of the relationship between this dimension of HLLE and child outcomes is difficult to discern but two trends need examination. First, lower parental proficiency in the school language may affect children's outcomes in multilingual settings. Second, the language of print resources in multilingual settings may be a proxy for parent education and of useful book engagement. They could

also represent availability of children's literature in a home language and access to varied printed sources. For example, parent reports of print materials in the home language (rather than the school language) are associated with greater concepts about print in children (Nepal).

Home tutoring: Measures of parent tutoring do not predict individual differences in concepts about print or oral language skills among preschool children (India/Mumbai, South Africa). In one context writing word lists has positive results but not letter teaching (India/Kolkata) and in another context the effect of teaching is negative for children who demonstrate interest in language and literacy skills (India/Mumbai). Who tutors the child—a parent, a sibling or another family member—does not change child outcomes (India/Mumbai, South Africa). However, it is unclear whether this is because of similarly ineffective methods of tutoring across family members.

Adult literacy practices: A small but consistent body of research suggests better educated parents or those who adopt more literary practices have a positive impact on all aspects of early emergent literacy across the kindergarten year (Mumbai/India). However, the effects are mixed on later emerging print-related skills of letter/akshara knowledge and decoding (positive: India/Mumbai, not significant: South Africa).

Measures of adult modelling reading behaviours (e.g. frequency and emotional response to reading) show significant associations with language and literacy skills (India/Mumbai). The mechanism of influence is perhaps the exposure that children get when they see the uses of printed material in daily life. However, the level of engagement in reading and writing activities at home may also be an index of parental proficiency with language and reading (India/Mumbai). One study reports that parents' own skills and knowledge have a significant effect on child outcomes (Nepal).

Component skills of literacy and grade-level attainments

Books-at-home: Six studies assessed concurrent associations between measures of books-at-home and the component skills of reading accuracy, reading fluency and reading comprehension across grades 2 and 6. Trends are mixed for all three component reading skills. Differences in the pattern of association across book types may be due to the fact that the availability of books varies within a particular context. It may also be that there is an inherent instructional value in a particular resource. There are too few studies to clarify this.

Unlike the majority of studies above, all studies using grade-level language tests are large-scale regional or national databases with mixed SES groups and hence have good statistical power. Measures of book ownership and engagement predict individual differences in grade-level language tests (25 of 34 and 8 of 14 cohorts, respectively). These effects are found across grades, across languages and orthographies (e.g. Amharic, Oromo, Sinhala, Spanish, Vietnamese), and in home, school and/or second languages. A thematic analysis shows that consistent predictors across multiple cohorts are the number of books at home, borrowing books from school libraries, and reading books at home (or reading outside the school setting). Library

membership and size of school library are not predictors perhaps because they do not translate into book borrowing and book use.

Home tutoring: The association between home tutoring and reading accuracy in the primary grades is hard to decipher because the only two studies to examine this have floor effects on the reading test (India/Kolkata, Nepal). For reading fluency, reading comprehension and grade-level language tests, the trends are mixed and potential mechanisms of influence are unclear. Providing more study hours at home also shows mixed effects (positive in Vietnam but not Sri Lanka) with further analysis in one study refuting the hypothesis that too much time spent on homework is detrimental (Philippines). Literacy outcomes are mixed with sibling-tutors (e.g. Ethiopia/Addis Ababa vs. Ethiopia/multiple sites). Furthermore, investment in paid tutoring has no effects on grade-level attainments once school- and teacher-level effects are taken into account (Vietnam/schools in isolated areas, but see Sri Lanka).

A notable finding is the negative relationship between home tutoring and child outcomes (Asia, Sub-Sahara, Latin America); studies are mainly on achievement in grades 3 to 4. When fathers or siblings are tutors, the phenomenon of negative association with children's reading scores appears to be country-specific, but with mothers, the effects are uniformly non-significant rather than negative. Together these trends suggest that there is a complex relationship between home tutoring and child outcomes and a need to consider the focus and methods of tutoring, who is the home tutor, their skill-level and proficiency in the school language.

Adult literacy practices: Several studies measure parental attitudes towards literacy but this construct has been operationalised differently by different researchers. Nonetheless, the evidence of a positive association between parental attitudes about reading and children's attainments is small but consistent (G1: Morocco, G4: multiple countries). Significant effects are related to the value of literacy and education, and its functions (e.g. for information, for leisure). There is a positive effect of parent expectation on the home language but not L2 attainments (G4: Sri Lanka). Similar to emergent literacy, composite measures of adult modelling of reading behaviours show significant associations with language and literacy skills (G3: Zambia; G4: six developing countries). The evidence about the relative role of different literacy artefacts on child outcomes is mixed. Studies differ in the artefacts they measure including assets such as chalk, school bags, pencils, erasers, calculators, computers and Internet connections, radio and TV. Individual differences in grade-level tests show positive associations with ownership of literacy artefacts in some contexts (Guatemala, Vietnam) but not others (Kenya, Philippines). Similarly, the presence of a study table at home shows mixed effects (positive in five countries but not significant in another five; Sub-Saharan Africa).

Ethnographic studies

Books-at-home: Nine ethnographies and two mixed method studies show that in low-income households, children's books are either missing or not easy to access (Table 2, column 4). Literacy artefacts even if few are varied; they include calendars,

medical prescriptions and bills. Unsurprisingly, storybook reading is conspicuously absent or very low in occurrence, whereas reading of religious texts is a common cultural practice, reading for leisure is not. Among reasons noted for the low- or non-availability of children's books are expense (Ghana, Swaziland) and absence of reading material published in the home languages (Peru, Mexico). Instead, school primers or textbooks become the sole print material at home in many settings.

Home tutoring: Thirteen ethnographies show that adult support around school assignments set in the school language vary in frequency, duration, focus and methods (Table 2, column 5). Assignments sent home from school, 'homework', are valued (Mexico), and quickly become a focal point of home tutoring, to be done well to earn praise (South Africa). Homework, however, can leave parents feeling overwhelmed (Venezuela, Swaziland) or mimicking less-than-optimal tutoring practices prevalent in local schools (Ghana). Methods of tutoring include 'look-listen-say-and-copy' (Azuara, 2009; p. 9), 'spelling callout' and 'say-after-the-teacher reading' (Dlamini, 2009, p. 10).

Older siblings show 'intense involvement' (Kvalsvig *et al.*, 1991, p. 79) introducing children to school routines and helping with homework. The role of the sibling and older children at home or in the neighbourhood is noted to be a natural consequence of no other family member being proficient in the school language. Several ethnographies interpret the sibling role as influencing attitudes to reading because they teach in a more playful way than parents. There is also evidence of parents aspiring to invest in paid tutors to further support their children. Consistently, however, the absence of material resources and parent expertise makes home tutoring a challenge.

Adult literacy practices: The daily use of literacy is around communicative events (paying bills, reading and writing missives, dealing with medical prescriptions), livelihood (maintaining a feeding chart for the pigs, maintaining a record of farming practices) and leisure (playing bingo, reading the soccer score) (see Table 2, column 6). Literacy events are often closely tied to religious practices where choral reading is led by a relatively more fluent reader. Children are often 'on the periphery of a literacy event' (Azuara, 2009, p. 133) but the influence of literacy events can be seen in children's play scenarios (pretend reading, copy writing from the newspaper, trading with strips of paper for money). There is variation in literacy events across homes even when families are similarly constrained by either severe limitations in financial resources or little access to a literate person.

Intervention studies

Books-at-home: Programme details in Table 3 show the level of focus five interventions have on the attribute of book ownership and supply, and book engagement and use. A home-based intervention of dialogic reading (arguably, a proxy of book exposure) had a significant impact on word learning and print awareness (Morocco). A basic school literacy programme that added a book borrowing and reading-at-home component for parents found positive effects on oral language skills of children in

grades 1–3 (Kenya, Uganda/multiple sites). Three interventions targeting other HLLE dimensions also affected books-at-home attributes: training for home tutoring (India/multiple sites; India/Ahmedabad) and adult literacy practices (India/multiple sites) led to an increase in book ownership, and training mothers to develop bilingual books had an impact on 'confidence' with book use and book engagement (Uganda/Lwannunda). No study examined whether these immediate gains on the books-at-home dimension maintained over time or were causes for change in children's literacy outcomes.

Both the correlational studies and the ethnographies report that many parents may have particularly low proficiency in the school language. The intervention studies include activities that ask them to use the home language to talk about the pictures in books (India/Ahmedabad), think of a title for a book read aloud to them or together with others (Uganda/Lwannunda), use books with a shared vocabulary of the home and school languages (Morroco), think about how reading aloud would be different when done in the school language compared with the home language (Uganda/Lwannunda) and use libraries to ensure book supply to the house (Kenya, Uganda/multiple sites).

Home tutoring: Six studies examine interventions with low-literate mothers (India/Ahmedabad, India/multiple sites, Kenya and Uganda/multiple sites, Turkey and Uganda/Lwannunda). Intervention effects are positive on parent's sense of empowerment, preparation for a tutoring session and knowledge of specific topics. One study shows that these effects are moderated by intensity of participation and another study indicates that the benefits of participation can persist even after 7 and 19 years, but there are several skills that are slow to change: methods for cognitive and language stimulation and skills for positive parenting, estimating children's learning gains and making considered judgements about what to monitor or tutor.

The impact on children's performance is far from clear. There are positive effects on both oral language and print level skills in the early grades but the finding is not consistent. No study specifically examined the nature of tutoring-talk and its link to child outcomes, making it hard to pinpoint the exact pathways of influence when home tutoring has a positive impact. A trend in the data is that when parents receive new skills through coaching and demonstration there can be changes across multiple dimensions of the home language and literacy environment.

Adult literacy practices: Three interventions with mothers suggest that skills training for adult literacy practices are perhaps the pathway to improved learning outcomes in children (India/Ahmadabad, India/multiple sites, Turkey). There is, however, little effect on parent's educational aspirations for their children, their perception of their child's reading level, the nature of verbal stimulation and parent–child talk around literacy artefacts. These trends are contrary to the description in a qualitative study (Uganda/Lwannunda). Finally, evidence from one study suggests that an increase in parental aspirations for their children following intervention was accompanied by a decrease in their ability to judge their child's actual level of attainment (India/multiple sites).

Summary of confirmatory, divergent and complementary evidence

Starting with the correlational studies, six multivariate studies provided confirmatory evidence for a home language advantage (sample sizes range from 3284 to 73,376; in 26 countries; one cohort in the preschool years and 39 between grades 2 and 6 with the majority of the positive evidence clustering around the grade 5 and 6 band). Divergent evidence was found in five studies (sample size 149–2400; in four countries; three cohorts in preschool and grade 1, and four cohorts between grades 2 and 6 with no clear clustering around any specific grade band). Sometimes mixed results were found within a single study (sample size 101–4657, with one cohort in preschool and grade 1, and three cohorts in the grade 2–5 range), the positive effects of home language advantage were seen on only some component skills (in a younger group on emergent literacy and an older group on reading comprehension) and in the remaining study the mixed results were for individual home language groups within a multilingual sample.

One reason for the mixed results may be the languages or the orthographies covered within each set. The home–school language pairs in the studies providing negative evidence for a home language advantage, however, do not suggest a particularly greater linguistic distance although there is one instance of diglossia (Arabic) and another of not one but several home languages in each school (multilingual India). The task demand in two studies providing negative evidence is of simultaneous exposure to two different writing systems (the alphasyllabary at home and an alphabetic system in school), and among the studies confirming a home language advantage the writing system is mainly alphabetic, although in one study the home language did not have a writing system. A third issue to consider is bias because of omitted variables (cf. Aturupane *et al.*, 2013). Two critical socio-demographic variables that are known to influence children's literacy learning are maternal and/or parent education and socio-economic status. All studies in the set (with the exception of three) that examined both these variables suggest that there is no systematic difference in predictors that have been studied in the statistical models that provide the confirmatory and the ones that provide the negative evidence related to the home language advantage (see Table S2). Finally, other dimensions of HLLE may configure differently in contexts with a home language advantage. Studies confirming a home language advantage tended to show attributes of books-at-home, home tutoring and adult literacy practices as individual predictors of children's language and literacy attainments, although no clear pattern differentiates these results from the studies that provide negative evidence. For instance, HLLE measures are operationalised in a variety of ways in studies providing positive and negative evidence (e.g. both sets of studies have books-at-home operationalised as a continuous variable and a categorical variable, or focus on both children's books, textbooks and miscellaneous materials such as newspapers).

In short, the mixed findings suggest that the evidence is not robust enough to support the strong version of the home language advantage hypothesis. Rather, the correlational evidence points to a multifactorial model of the relationship between HLLE and child outcomes. One implication of this finding is that within-child factors such as the oral language foundation for literacy learning are not the only mechanisms to

consider when a child is slow to gain mastery in literacy tasks. Contextual factors including home language matter.

The ethnographic studies provide the description of what these contextual features might be, and along with the intervention studies provide complementary evidence of the pressures and solutions drawn upon when the proficiency of family members is low for the school language. The ethnographies show unease among family members about the school, a feeling of disempowerment and a wish to support the child's learning. The intervention studies show that when skills and proficiencies are supported, there is an increase in confidence to use the school language, to participate in the child's school work, to seek out solutions to support the child's learning and to use resources that are available and accessible.

Both correlational studies and the ethnographies converge on the prominent role of older siblings in home tutoring and uncover contradictory outcomes: while siblings are effective mediators of literacy-related socialisation they may not always have the knowledge and proficiency themselves to offer effective tutoring. However, in low-literacy contexts siblings may be the most proficient member at home to use and engage with the school language.

Discussion

We set out to examine whether children who speak the same language at home and at school will demonstrate greater mastery in literacy tasks than those who speak a different home language. In testing this home language advantage hypothesis, our interest was in two inter-related questions: will there be a home language advantage in literacy learning, and what are the attributes of homes when the home language is not the school language? The findings are mixed and in line with a context-sensitive version of the home language advantage hypothesis.

The review provides data derived from methodologically diverse approaches within the understudied context of low- and middle-income countries. We build an evidence base that may be of interest to both researchers and interventionists who design interventions for school and community settings. For instance, the multivariate studies suggest that absolute levels of book ownership is low in low-income homes, the ethnographies show that interactions around print is low generally, but more so when family members are not fluent in the school language, and the intervention studies show that programmes that specifically target the home and school language disconnection have the most success in supporting children's literacy attainments.

The material reviewed comes from methodologically robust studies identified through an extensive search of multiple databases. Several studies have accounted for the dynamics between the home, geography (rural–urban), income (SES), classroom and school-level factors (Table S2, see Supporting Information—for access details see end of paper). This is important because research on a complex socio-cultural construct like HLLE must be alert to missing variables. However, only a fraction of the studies examine the joint contribution of multiple attributes, how they inter-relate and differentially influence children's learning outcomes. There is also a remarkable absence of attention to the 'why' and 'how' attributes

such as the manner and language of engagement during book reading. Also less studied are the dynamics between parent and child. Homes can be responsive to children's achievements by investing more in enrichment activities when children show success or in remedial support when they fall behind (Wagner, 1993; Ishihara-Brito, 2013; Parry *et al.*, 2014). Reciprocally, child characteristics can have cascading effects on HLLE attributes. Single study evidence shows that preschoolers' interest for engaging in literacy activities at home influences the effects of home tutoring (Vagh, 2009) and that older children can be competent judges of their own reading attainments and of the attributes of 'good' readers (Wagner, 1993). Given these (and other) interactions, the widespread use of multivariate analyses (e.g. multilevel, structural equation modelling) is appropriate. These analytic strategies and the wide range of attributes measured and/or described in multiple socio-cultural contexts, increase the robustness of our conclusion that the evidence supports a 'weak' version of the home language advantage hypothesis.

Methodological considerations

Despite the broad range and scope of the evidence base, we cover, and the use of a mixed methods approach to evidence building, and steps undertaken to select studies with moderate to high methodological rigour, there are two limitations on outcome measures that need attention—construct validity of HLLE measures and statistical issues related to distributions and power. First, a weakness is the use of measures that are prone to reporter bias and the issue of shared method variance in some studies. The validity of self-report and survey measures may be influenced by the respondent's characteristics—educational level, whether it is the child or the parent, and how accurately they may be recalling aspects of the home. Furthermore, some measures appear to be a proxy for context-sensitive processes: home language captures book reading and home tutoring proficiency in the school language, book ownership captures purchasing power; book supply reflects school functioning; child health measures capture home support for regular school attendance; family size and educational level suggest a number of potential tutors at home. School- and classroom-level variables—school timings, preschool participation, attendance rate, parent meetings and correction of children's homework—are arguably proxy HLLE measures because these behaviours actively depend on home support.

Second, low variability of scores is a feature of several studies. At the child level, tests for the early grades and in the second language are particularly prone to poor distributions and floor effects limiting their usefulness in statistical analysis (e.g. Pinto, 2010; Piper, 2010). There is therefore a need for more sensitive measures or to control for these sources of sub-optimal variability in low- to middle-income country contexts. Among HLLE measures, homogeneity is either because of cultural sameness (more fathers know the school language, mothers do not do certain activities) or similar constraints (all mothers are not literate, all families are not instructed by school on what to do, no resources to buy literacy artefacts, no lighting source after sunset for homework). The language groups under study also determine which HLLE measure will achieve good distributions. Thus, a book ownership measure captures better distributions with certain language groups (e.g.

with a strong publishing tradition) but may lack sensitivity within certain language groups (e.g. when variation is restricted due to low availability). Interactions with socio-economic status may also change the pattern of results (e.g. even if the child belongs to a majority language group, low socio-economic status would mean limited access to books or tutors). A statistical solution to achieve more stable estimates is to aggregate discrete but related HLLE information into a dimensional and more generic composite measure.

Reinforcing what is known about home language and literacy environments

Findings from this review highlight the fact that HLLE is a multifaceted and culturally embedded construct (cf. Heath, 1983; Teale & Sulzby, 1986). Several findings reported in high-income countries are partially corroborated: HLLEs make a difference to the developmental profile of the child (e.g. Canada: Sénéchal & LeFevre, 2002; USA: Storch & Whitehurst, 2001), and the associations between different home attributes and child outcomes differ across component skills of language and literacy (e.g. Canada: Sénéchal & LeFevre, 2014; UK: Sylva *et al.*, 2011). Responsive parenting is present across families, with a tendency for parents to increase home tutoring for lower performing children (e.g. Korea: Kim, 2009; Finland: Silinskas *et al.*, 2010; Canada: Sénéchal & LeFevre, 2014). In addition, the review provides robust evidence for the association between HLLE disadvantage and both low-income and social circumstances (Yoshikawa, 1994; Layzer *et al.*, 2001; McCartney & Dearing, 2002; Kim & Quinn, 2013). Methodologically, similar to high-income countries, HLLE 'quality' is understudied (Phillips & Lonigan, 2009; Sénéchal & LeFevre, 2014) as is the influence on the home of broader contextual factors such as unequal neighbourhood resources and indifferent schools (e.g. Purcell-Gates, 1996; Neuman & Celano, 2001; Reese & Gallimore, 2000).

A key theoretical contribution of this review is a reconceptualising of 'home literacy environment'. First, we have made a case for broadening the construct to home language and literacy environment, and have shown how language-related processes are integral to literacy practices and artefacts at home, and to children's literacy outcomes. Second, our iteratively developed framework for analysing the dimensions of HLLE goes beyond the current focus on book reading at home and home tutoring (e.g. Sénéchal & LeFevre, 2002, 2014). A unique contribution of our synthesis is to highlight the role of home–school linkages and the inference that in several countries, effects of a disadvantage because of a home language–school language disconnection does not appear to be offset by school-level inputs. Indeed, schools often ignore home language as a learning resource (Nag *et al.*, 2016a). Third, we find several family members active in literacy socialisation and tutoring of children but the older sibling may often be the most proficient in the school language when there are home–school disconnections. Together these findings challenge the notion of the parent as the key influencer of HLLE, and a related formulaic approach apparent in intervention research in high-income countries of exclusively targeting mothers.

In addition, the review highlights the need for locally situated measures. For example, a measure popular in high-income countries is parental awareness of children's book titles (e.g. Sénéchal *et al.*, 1996). This measure is conspicuous in its absence in

our review perhaps because several assumptions related to the measure are untenable: homes will have access to children's literature, the titles of interest will be similar across family members, a limited titles list will be sensitive for heterogeneous groups such as in multilingual communities, and the school language will be the language of books in all homes. A further contribution of the review is to clarify attributes of HLLE when there is extreme socio-economic deprivation. Neither low-income nor low-print environments are uniform constraints because communities differ (e.g. parental attitudes towards homework, attitudes towards school) and some homes use available resources more efficiently than others. While in some contexts the child will experience a disadvantage when there is a disconnection between home and school language in other contexts there can be home attributes to mitigate the impact. Last, this research synthesis examining both naturalistic variability in HLLE and response to HLLE intervention provides pointers for future investigation beyond the home: at the level of the community factors (e.g. is the language a majority or minority language, what is the language, purpose, quantity and quality of ambient print resources and non-print media) and the school (e.g. is the language privileged, what percentage of children have family members proficient in the school language).

A significant limitation of our study is the poor coverage of local knowledge. Despite setting up a search strategy with no constraints on language only six records were in a language other than English (five Spanish, one Hindi). In addition, although our methods for searching and screening were rigorous, time and resources did not allow for a comprehensive enough combination of hand searches, electronic database searches, 'snowballing' of references, citation tracking, personal knowledge and serendipitous discovery of sources. An exhaustive review of the evidence would require the use of a more thorough search. Capturing the grey literature and dissertations from universities in the LMI countries was a particular challenge. It is therefore clear that for an update of this review in the future we recommend systematic search of the following: theses from key universities in LMI countries, reports from key international aid agencies, NGOs and civic bodies, and a call for suggestions from teachers, field workers and NGO workers.

Our findings have implications for educational interventions in low- and middle-income countries and for the emerging discipline of 'implementation science' (e.g. Bauer *et al.*, 2015). These may include the identification of key resources within the home and school environments that could help bridge gaps in children's language experiences. Although the review focuses on contexts in which the home language and the school language are different, much remains to be clarified and it is likely that a threshold of coordinated home–school linkages, print variety, tutoring proficiency and/or ambient literacy practices is needed to influence children's literacy attainments when there is a home–school language gap.

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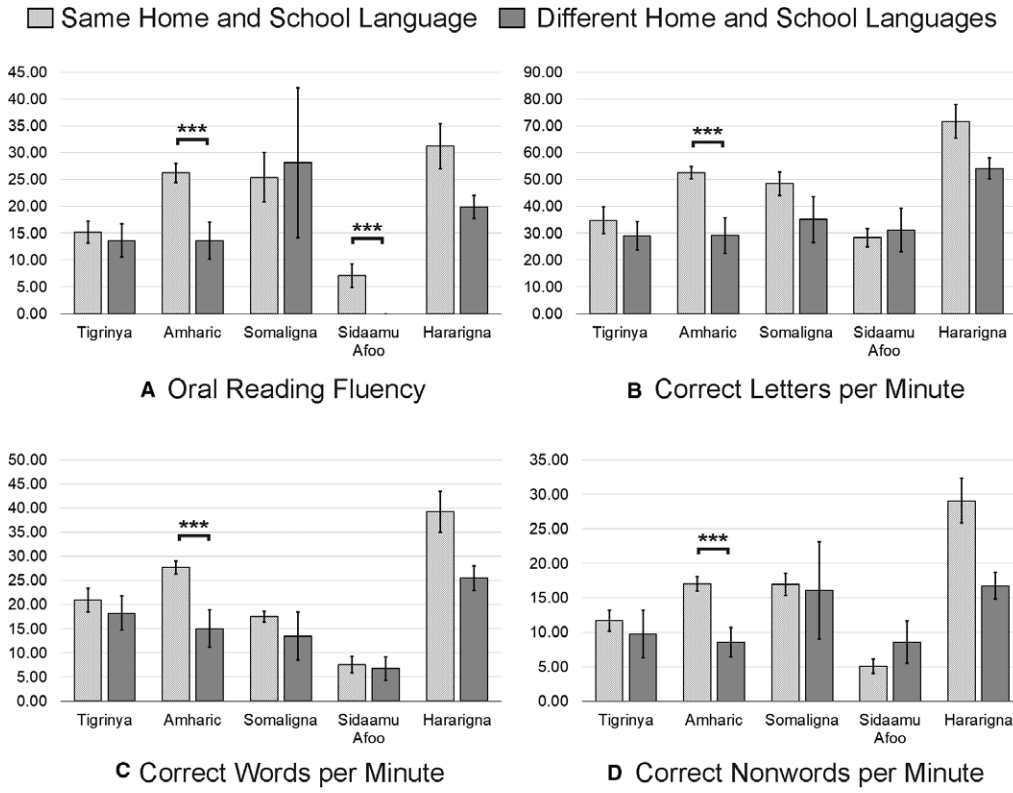
Appendix 1

Home language advantage is not seen across all contexts or component skills of literacy: A case study of grade 2 student performance on four tasks from the 2010 Ethiopia Early Grade Reading Assessment (EGRA) (data source: Piper, 2010).



Note: Bar charts indicate mean scores with standard error bars for five language groups in Ethiopia. Patterned bars indicate groups with the same home and school language and solid bars indicate groups with different home and school languages. Significant group differences are indicated with ***$p < 0.001$, **$p < 0.01$, and *$p < 0.05$. *t*-tests were not performed for the Hararigna language group due to small group sizes. Scores of a sixth language group (Afan Oromo) were dropped due to ambiguous coding of membership in the same or different home–school language groups.

For literacy attainments in Amharic, the home language advantage was on letter knowledge, oral reading fluency and accurate reading of words and nonwords but for Sidaamu Afoo literacy, the home language advantage was only on oral reading fluency and for literacy in the Tigrinya and Somaligna languages, there were no group differences across all four component skills. The results for the cohort receiving literacy instruction in Hararigna were not statistically evaluated, but trends suggest a home language advantage.

Appendix 2

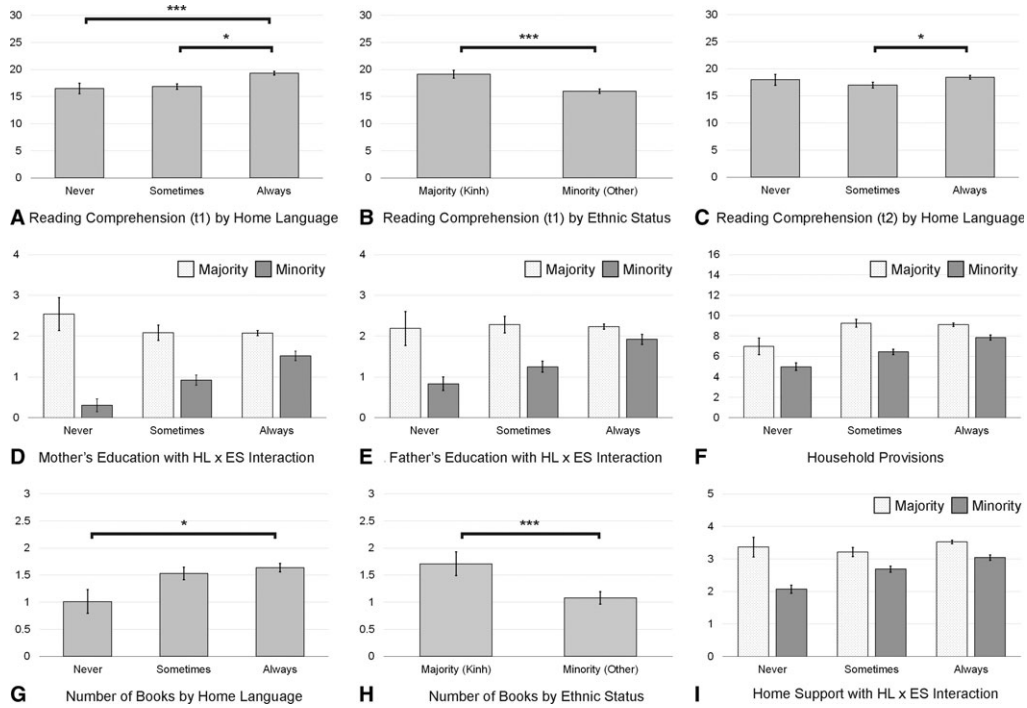
Multiple risk factors may co-occur with home–school disconnections in language: Random intercept models of grade 5 performance on a 2011–2012 Vietnamese reading comprehension test (data source: Young Lives data archive, accessed on 21 March 2017).

The primary language of instruction in schools in Vietnam is Vietnamese, regardless of children's home language (UNICEF, 2015). In the data set, children reported if Vietnamese was 'always', 'sometimes', or 'never' spoken at home. Ethnic group membership was recoded to indicate membership in the majority (Kinh, 88% of the sample) and minority (12% of the sample) groups. A set of random intercept models were created to compare Vietnamese reading comprehension, socio-demographic indicators, and HLLE indicators across home language (HL) and ethnic status (ES), accounting for clustering of children within schools. Results were summarised in the figure attached. A home language advantage in Vietnamese reading comprehension (panels a–c) was found among frequent home speakers of Vietnamese at the beginning of the year (Time 1) and at the end of the year (Time 2). Children from the Kinh majority ethnic group attained higher reading comprehension scores than ethnic minority children at Time 1, but not at Time 2. No HL and ES interactions were found in reading comprehension outcomes.

In contrast, significant HL and ES interactions were found in socio-demographic indicators (panels d–f). Although mother's and father's education levels were relatively similar within the majority ethnic group, mothers and fathers in households where Vietnamese was spoken less frequently were reported to be less educated. A similar trend was also found in the household provisions that families have; however, Kihn families who never spoke Vietnamese at home also had a lower average number of household provisions than Kihn families who spoke Vietnamese more frequently.

In terms of HLLE factors (panels g–i), children in the majority group had more books at home than children in the minority group, regardless of home language status. Children whose families always spoke Vietnamese, regardless of ethnic group, had a similar advantage over children whose families never spoke Vietnamese at home. A significant HL and ES interaction was found in the level of home support reported by teachers, in which ethnic minority children received less home support when Vietnamese was spoken less frequently at home. Although no systematic differences were found in hours spent in additional Vietnamese lessons according to model results, Chi-square tests of independence revealed that ethnic minority children were less likely to attend extra classes, attend full-day schooling, or read books outside of school when Vietnamese was spoken less frequently at home. A larger percentage of children within the ethnic minority group (31%) reported that their schools had no libraries or bookstores compared to Kihn children (11%), and majority of ethnic minority children did not use a computer outside of school (92%).

In summary, the overall pattern is that a home language advantage is found in children's reading comprehension and number of books at home, and that home–school language disconnection is associated with multiple socio-demographic and HLLE risk factors, particularly among ethnic minority children in Vietnam. This includes lower parental education, having fewer household provisions, receiving less home support, and having less access to full-time schooling, extra tuition, and books.



Note: $N = 3284$. Mean scores and standard errors are given by home language (HL) and ethnic status (ES). In (a), (b), (c), (g), and (h), significant group differences are indicated with $^{***}p < 0.001$, $^{**}p < 0.01$, and $^{*}p < 0.05$

SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article:

Table S1. Search Strategy (dated 29-01-2013, example with ERIC and ProQuest)
Table S2. Table of multivariate analyses reported in the correlational studies listed by the child outcomes, HLLE dimension, additional variables, other co-variates and the statistical analysis used for each fitted model