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Foreign language provision in English primary schools: making evidence-based pedagogical choices

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Fluency in more than one language is generally accepted as being advantageous in our modern global age. However, in addition to the obvious personal, social, cultural and economic benefits of being bilingual, it has been claimed that bilingualism enhances cognitive development in a range of areas relevant to educational outcomes. Given the poor track record of teaching children foreign languages in England, schools that are not required to follow the National Curriculum are understandably keen to investigate innovative methods for teaching languages, with the aim of not only enhancing language learning but also of stimulating heightened cognitive functioning. Our purpose in writing this paper is to arm education professionals with a critical awareness of the evidence supporting the bilingual advantage and innovative but unproven foreign language taster courses, in order to support them in making evidence-based pedagogical choices. We explain how young children effortlessly learn their first language(s) and argue that it is unrealistic to expect this process to be replicated in the foreign-language-learning classroom. We then review some of the evidence supporting the so-called 'bilingual advantage' and argue that the advantage is found in only specific, as yet undetermined, narrow circumstances and not in the bilingual population as a whole. We scrutinize the suitability of unproven foreign language taster courses for young children and argue that their claims are unlikely to be justified. Finally, we provide some objective criteria to help schools, from early years settings to the end of primary, to judge the efficacy of novel ways of teaching languages before adopting them.

KEYWORDS

language learning, bilingual advantage, foreign language taster courses, 3–11 year olds, language teaching

Introduction

There are undoubtedly benefits from being able to speak foreign languages fluently in our modern global age of multicultural societies. Foreign language learning, however, appears to be in crisis in countries where the majority of the population are English monolinguals, i.e., in Anglophone contexts. This has been attributed to the dominance of English as a global language, giving rise to the lack of a perceived need for native English speakers to learn foreign languages (Lanvers et al., 2021).

In schools in England, a motivational crisis is thought to start particularly from about 11 years of age, once pupils enter Secondary School (Lanvers and Martin, 2021). Many pupils perceive learning a foreign language to be irrelevant, boring, difficult, and that 'English is enough' (Lanvers et al., 2021, p. 4). Such perceptions demotivate pupils and undoubtedly contribute to 14-year-old pupils' low uptake for optional foreign-language study (Lanvers and Martin, 2021).

Despite recent government initiatives, this downward trend of fewer public examinations in foreign languages (ancient or modern) is proving difficult to turn around. The most recent British Council Language Trends survey predicts that the government will be unable to meet its own targets of 75% of 16-year-old pupils sitting foreign language public examinations (GCSE) in 2024 and 90% in 2027 (Collen, 2022). The provisional examination entries for 2022 demonstrate how the 'traditional' modern foreign languages of French and German are becoming less popular, although French has currently stabilised. Spanish and languages being learnt by children from minority ethnic backgrounds (possibly outside the formal school system, e.g., Polish) are increasing in popularity (Collen, 2022).

In 2014 foreign language learning was made compulsory for Years 3–6 [Key Stage 2 (KS2)] in all English local authority maintained primary schools [Department for Education (DfE), 2013]. The purpose of learning foreign languages included 'liberation from insularity', 'opening to other cultures' as well as 'should foster pupils' curiosity and deepen their understanding of the world'. In KS2 pupils were expected to make 'substantial progress in one language', with a focus on practical communication, thus ensuring that foundations were being made for 'further foreign language teaching' [Department for Education (DfE), 2013]. Pupil motivation was expected to improve along with the language proficiency.

However, despite this initiative and some excellent work by many committed and engaged teachers, the British Council Language Trends Survey recently concluded that teaching foreign languages remains a challenging and marginal subject for many primary schools (Collen, 2021). In 2023 this first, 2014, cohort of primary school children will take their Year 11 public foreign language examinations. The number of Year 10 pupils studying languages in 2022, though, indicates that there will be a 1% drop from the previous year (Collen, 2022): a disappointing outcome as this new policy did not seem to improve pupil motivation to study languages.

The lack of national primary school assessments of learning outcomes has contributed to uneven practice and huge inconsistencies in different schools (Tinsley, 2019, p. 18). Nor does the DfE give any indication of the equivalent level in the Common European Framework of Reference (CEFR) that pupils are expected to reach, although 'engage in conversations' and 'speak in sentences' [Department for Education (DfE), 2013] indicates Basic User, Level A1/A2 [Council of Europe (CEFR), 2001]. This suggests that it will be challenging to quantify any improvements in long term language proficiency for this 2014 and subsequent cohorts, despite the necessity to do so. Language Trends Survey 2018 noted a disparity between primary schools' perception of leavers reaching the expected level of competence (51%) and that of secondary schools (12%) (Tinsley and Doležal, 2018, p. 13). Secondary schools have subsequently continued to report a considerably less positive picture of pupil progress than primary schools (Collen, 2022, Figure 7).

A National Recovery Program for Languages Education was called for by the All Party Parliamentary Group for Modern Languages (All Party Parliamentary Group for Modern Languages (APPG), 2019). The Research in Primary Languages (RiPL) also raised, in a white paper, various implementation issues, along with proposals for both long-and short-term solutions (Holmes and Myles, 2019).

Criticisms of the compulsory KS2 foreign language policy implementation have included that it 'remains elusive and continues to be characterized by a lack of cohesion, coordination and forward planning' (Porter et al., 2020, p. 213). Notable problems have been found with planning and progression, teachers' linguistic expertise, and insufficient curriculum time (Porter et al., 2020, p. 213). The crucial collaboration between primary and secondary schools, to ensure a smooth transition to secondary education, is also lacking (Holmes and Myles, 2019). Primary school teachers are often frustrated that secondary schools frequently ignore the progress children have already made in Key Stage 2 and simply start all pupils at 'point 0′ in Year 7 (Tinsley, 2019, p. 8): a possible contributory factor to the motivational crisis occurring once pupils enter secondary school (Porter et al., 2022). Such criticisms remain largely valid (Collen, 2021, 2022) and urgently need to be addressed.

Teachers have reported that their biggest issue is insufficient curriculum time (Collen, 2022). The latest Language Trends survey notes only 10% of Year 3 children, rising to 14% in Year 6, spend the recommended one hour a week learning a foreign language (Collen, 2022): the majority of schools spending about 45 min per week (Collen, 2022). Indeed, RiPL recommends a minimum of one hour per week, amounting to a total of 35 h for each of the four KS2 years (Holmes and Myles, 2019, p. 13). Furthermore, in almost half the schools surveyed, the class teachers still teach foreign languages to their own classes due to inadequate specialist teacher availability (Collen, 2022). The practice of teachers in effect learning the language alongside children had already been criticized as a major KS2 implementation issue (Myles, 2017), the recommended best practice being that pupils be taught by a specialist teacher (i.e., degree-level proficiency in the particular language) for at least one hour per week (Graham et al., 2017).

A growing number of authors also criticize some unproven policies for teaching foreign languages currently being used in primary school classrooms, for example, the younger-the-better concept for language learning generally. This younger-the-better maxim seems to be readily accepted by the general public despite there being no evidence from various world-wide school studies that an early start in the foreign language classroom fosters better outcomes than starting at an older age (Myles, 2017; Mitchell and Myles, 2019; Lightbown and Spada, 2020). Indeed, it has been said that 'Trusting young age of learning with the burden of learning success is clearly not enough' (Muñoz, 2011, p. 130). More research needs to be done in this area to inform the policy makers as the KS2 curriculum was not research-informed.

English schools are, of course, not the only schools to experience challenges in foreign language instruction. At the other end of the scale there is debate in one of the world's most linguistically diverse countries, India, about the best language for medium of instruction. Content delivered in the home language demonstrates better outcomes for primary school children, not least because of better comprehension, resulting in superior learning (Lightfoot et al., 2022). However, this is extremely challenging for a country with over 100 languages (22 of which are official), and the result is that few children are taught in their home language. Children taught in a socially high-value

language, e.g., English, with the aim of increasing their life chances (e.g., because they are from low SES backgrounds, and/or immigrants) instead appear to have been disadvantaged. This unpredicted outcome has been attributed to various factors including lack of learner motivation, outside-school exposure, and inadequate parental support and involvement (Tsimpli et al., 2019; Mukhopadhyay, 2020; Lightfoot et al., 2022). This is mirrored in the UK where parental attitudes/support are considered to be key factors in lower SES families' foreign language achievement (Porter et al., 2020).

Against this backdrop of disappointing outcomes from foreign language teaching in primary schools in England there are controversial claims of a 'bilingual advantage' (Bialystok et al., 2009; Paap et al., 2015). This relates to skills acquired in coordinating jointly-activated languages transferring to other, non-linguistic, mental processes relevant to learning in school. Such bilingual advantage claims are encouraging some early years providers (nurseries and pre-school up to 5 years of age) and primary schools (up to 11 years of age) to investigate unproven ways of teaching foreign languages so their pupils may enjoy other cognitive benefits that may develop from learning foreign languages. These cognitive benefits are in addition to the obvious personal, social, cultural and economic benefits of being fluent in a foreign language (Ayres-Bennett et al., 2022).

In contrast, other schools, remembering previous neuromyths, are wary of introducing pioneering, unproven and possibly speculative ideas before they are replicated by solid scientific research. For example, Lumos Labs closed their LumiKids apps and website in 2018 (Lumosity, 2018, Lumosityhelp) after paying a $2 million fine and receiving a further $50 million suspended judgment. They had deceived consumers with unfounded claims that playing their Lumosity games for 10–15 min, three or four times a week would help children achieve their 'full potential in every aspect of life', including improving school performance [Federal Trade Commission (FTC), 2016, January 5].

In this article, we begin by discussing native-language acquisition in naturalistic, immersive surroundings and then explain how the conditions for learning differ in the artificial environment of limited-input, primary school classrooms. We examine current controversies concerning the possible cognitive bilingual advantage and highlight some of the unproven claims being made on the websites of certain language-teaching resources. Finally, we scrutinize the rationale behind increasingly popular, but unproven, foreign language taster courses and provide some objective criteria to help early years providers and primary schools judge the efficacy of such unproven methods of teaching languages. Overall, our aim is to arm education professionals with a critical awareness of the evidence (or lack thereof) supporting the bilingual advantage and unproven foreign language taster courses, in order to assist them in making evidence-based pedagogical choices.

How children learn their first language(s)

Complex and dynamic neural processes underlie young children's remarkable feat of acquiring language (Sanchez-Alonso and Aslin, 2022). Babies' motor and sensory systems are dynamically intertwined and the necessary multisensory foundations for speech start developing at a very young age, long before they speak (Kuhl et al., 2014; Choi et al., 2021; Kuhl, 2021). Three month olds listening to speech sounds rehearse the necessary motor movements by activating an auditory-motor link (Dehaene-Lambertz et al., 2006). 18 to 20 week olds (Kuhl and Meltzoff, 1982), and even two month olds (Patterson and Werker, 2003), have matched facial features associated with vowel sounds. Information flows between the auditory and motor speech areas as babies listen to their own babbling (Kuhl, 2021).

A key task in acquiring any (spoken) language is to learn which sounds are contrastive in that language, and are, therefore, able to convey meaning. Young babies have been termed 'citizens of the world' (Meltzoff and Kuhl, 2016, p. 3) because they are able to discriminate all the different, fundamental sounds of the world's languages, i.e., about 200 vowels and more than 600 consonants (Ladefoged and Disner, 2012). However, this inherent ability to discriminate between non-native sounds sharply declines from 6 to 12 months of age when their linguistic experience shapes them to become culture-bound native-language specialists (Kuhl et al., 2006). This first year or so of life, when babies are most sensitive to learning the sounds of their native language(s), is recognized as a critical period for the naturalistic acquisition of a language's sounds (Werker and Hensch, 2015, Figure 3; Birdsong, 2018; Kuhl, 2021).

There has been considerable debate about the cognitive mechanisms underpinning language acquisition (Ambridge and Lieven, 2011). Nevertheless, it is likely that language is acquired incrementally through a process affected by previous knowledge and interactions with the environment (Westermann et al., 2011): bi-directional effects, experienced through babies' discovery of their native language(s), help develop their native-language(s) neural scaffolding and circuitry. This enables them to learn more complex native-language(s) patterns of speech which in turn causes further changes in the brain tissue, circuitry and connectivity thus taking them on their native-language(s) development trajectory. As they become increasingly better able to detect and reproduce native-language(s) speech patterns, they find it progressively harder to detect and reproduce non-native speech patterns that are inhibited by the specialized native-language(s) neural architecture (Kuhl, 2021). The timing of early language proficiency milestones, for example, the discrimination between native-language/non-native-language phonemes, correlate to subsequent native-language acquisition trajectories and milestones (Kuhl et al., 2005, 2008; Bosseler et al., 2021; Zhao et al., 2021).

Simultaneous bilinguals, exposed to two languages at birth, demonstrate major language milestones at similar ages to monolinguals, e.g., first sounds, words, and use of grammar/sentences. However, vocabulary learning is spread between the two languages, which can result in smaller vocabularies in each language, slower lexical retrieval (Bialystok et al., 2009) and slower word recognition in decision tasks (Bylund et al., 2019). Parents may even be discouraged to raise their children as bilinguals/multilinguals because of the false premise that having neural connectivity for two or more languages delays general cognitive development and school attainment (Bright and Filippi 2019).

Nevertheless, language growth in each language is affected by the quantity and quality of language exposure (Hoff and Core, 2013) with one language usually being more dominant than the other (Ramírez-Esparza et al., 2017b). Both high-language-input simultaneous bilinguals and low-language-input monolinguals took longer to show neural commitments to their native language(s) than

high-language-input 11-month-old and 14-month-old monolinguals (García-Sierra et al., 2016). This suggests the critical period for learning the sounds of a language is not dependent solely on age but also on the quantity and quality of exposure to the language. Furthermore, the fact that an estimated 25% of children raised bilingually will later speak only one language indicates that factors other than just early age of active exposure are involved (De Houwer, 2020): any learning needs to be sustained (Lightbown and Spada, 2020).

Babies' sensitivity to distributional frequencies of phonetic units drives their language development (Bosseler et al., 2013; Kuhl, 2021). Eight month olds learn to segment words from the speech stream by tracking transitional probabilities across syllable boundaries (Saffran et al., 1996), and they learn word meanings by tracking the distributional frequencies of word-scene pairings (Smith and Yu, 2008). Their ability at 18 months of age in these language areas correlates with their productive vocabulary at 24-months and its growth between 18 and 24 months of age (Ellis et al., 2021).

However, it is social interaction that opens up language-learning neural mechanisms. The additional information gleaned from pointing, eye gaze, and body postures, as well as possible socially-induced motivation, catalyzes babies' language learning (Kuhl, 2007, 2021). This is likely to operate at multiple levels and through many mechanisms. For example, heightened attention, arousal and engagement through eye contact in face-to-face interactions facilitates any learning (Sanchez-Alonso and Aslin, 2022). 10.5-month-old babies who followed the adults' eye gaze, so as to look at a target object for a longer period of time, had a superior vocabulary growth during their second year of life (Brooks and Meltzoff, 2008, 2015; Sanchez-Alonso and Aslin, 2022). The amount of babies' social engagement, measured by eye gaze shifting between the adult speaker and the focus of the adult's attention, was correlated to both phonetic and word learning in a second language (Conboy et al., 2015). This suggests that babies with better social skills have enhanced language learning. 24-month-old children's vocabulary size and language processing skills correlate to the amount of speech addressed to them when aged 19 months; however, they do not correlate to the quantity of overheard adult conversational speech, even when the adult is talking to other children (Weisleder and Fernald, 2013). The importance of high quality social *interaction* is further demonstrated by nine-month-old American children learning Mandarin Chinese phonemes when interacting with native speakers but not from identical audio-visual acoustic information (Kuhl et al., 2003; Kuhl, 2007). Similarly, children aged between 24 and 30 months were able to learn verbs when taught over video chat but not when they were watching a video where they were unable to interact socially (Roseberry et al., 2014).

Caregivers are known to modify the characteristics of their speech to help infants learn new words and their meanings (Yurovsky, 2018). This modified speech is known as infant-directed speech (IDS). It typically has a slower tempo, wider pitch range, higher pitch, longer pauses and exaggerated intonation, for example, expanded vowels (Soderstrom, 2007). Babies generally prefer listening to IDS's greater clarity and exaggerated qualities, rather than listening to adult-directed speech (Kuhl, 2007). Because it attracts their attention, IDS encourages them to listen to language for longer periods of time and so potentially fosters the crucial social interactions between caregivers and infants (Golinkoff et al., 2015). Indeed, caregivers' use of IDS and responsiveness to the infant is considered to enhance infants' ability to extract linguistic regularities from speech. It is therefore unsurprising that there is evidence that children's language learning is heightened by parents who use IDS (Golinkoff et al., 2015). Language outcomes have been predicted by individual differences in the mothers' IDS (Rowe and Snow, 2020). For example, the prevalence of IDS at home has been related to not only initial babbling but also the number of words mastered by 2-year-olds (Ramírez-Esparza et al., 2014, 2017a).

However, it is unclear on how exactly the different properties of IDS influence language development and whether it is IDS itself or the social interaction it fosters through bidirectional conversational turns (Golinkoff et al., 2015). Growth curve analysis in 9–24 month-olds demonstrated a two-way relationship between conversational turn-taking and growth in vocabulary size: they mutually influenced each other (Donnelly and Kidd, 2021). Indeed, the quality of caregiver and 2-year-olds' bidirectional conversational turns during a 15-min semi-naturalistic play session was more predictive of low income, 3 year olds' expressive-language scores than either the number of the caregivers' words or measures of sensitive parenting (Hirsh-Pasek et al., 2015). The fluency and connectedness of exchanges rating of communication quality was a stronger predictor than either the routines and rituals or the symbol-infused joint engagement ratings (Hirsh-Pasek et al., 2015).

These findings suggest the crucial importance of a child's active involvement in rich word-learning situations. Such involvement leads to intricate and complex dyadic interactions that are displayed by child/caregiver joint behavior, for example, caregivers' responsiveness to children's focus of attention (Tamis-LeMonda et al., 2014; Chen et al., 2021). Opportunities for face-to-face interactions, such as those that occur during shared book-reading and guided play, are particularly valuable for language learning. Children are active, engaged, and focused partners in collaborative activities where they are better able to control their learning than in either free play or direct instructional situations. Incorporating learning objectives and child-centered exploration through following the child's lead and asking probing *wh*-questions demand more complex verbal responses than straight forward yes/no questions (Weisberg et al., 2013; Rowe and Leech, 2017; Ferjan Ramírez et al., 2020; Donnelly and Kidd, 2021). Furthermore, IDS is malleable: 14–18 month-old infants followed a superior language development trajectory with improved language outcomes after parents were individually coached in parent–child turn-taking and increased use of IDS (Ferjan Ramírez et al., 2019, 2020).

In summary, we have explained how children are capable of learning more than one language from birth. Whether the child is growing up in a monolingual, bilingual or multilingual environment, they learn language through experiencing high-quantity and high-quality input from speakers who interact with the child. Quality one-to-one social interactions, involving conversational turn-taking, catalyze babies' native-language learning with additional sensorimotor information being gleaned from pointing, eye gaze, and body postures as well as the crucial socially-induced motivation. Phonetic learning, such as being able to recognize native phonetic contrasts during social interactions, predicts the timing of future language milestones.

Although babies are born 'citizens of the world' (Meltzoff and Kuhl, 2016, p. 3), able to learn the sounds of any of the world's language(s) to which they are exposed, by about 12 months of age they are generally committed, phonologically, to their native language.

They are no longer open to all of the world's speech sounds, having lost the ability to discriminate easily between non-native phonemes. This has led to the concept of a Critical Period Hypothesis whereby there are windows of opportunity during development for the naturalistic acquisition of a language. The critical period for phonetic learning is considered to largely occur during the first year of life.

Second language learning in educational settings

An obvious question for researchers and educators is whether we could use our knowledge of how children learn their first language(s) to devise successful programs for teaching a second (foreign) language.

Second language learning is acknowledged to be multifaceted and highly complex. A huge variety of theoretical, sometimes conflicting, approaches from various disciplines have attempted to understand the processes involved, and what it is that learners actually *do* (Myles, 2010). A recent critical overview of studies into teaching foreign languages to pre-primary children (Nikolov and Mihaljević Djigunović, 2023) concluded that 'the overall picture emerging from this review is fragmented' (p. 19); 'this field is still in its infancy' (p. 18) and as it is 'unchartered territory in terms of research, exploratory qualitative inquiries are conducted' (p. 16). How to define success was a recurring issue.

Caution should be exercised when generalizing research findings from immersion studies in various majority/societal language contexts in naturalistic contexts (e.g., immigrants learning English in England) to formal, limited-input minority language instruction in classroom settings (e.g., future immigrants learning English in their country of origin). It cannot be assumed that these different types of learning are identical (Graham et al., 2017, p. 923). Unfortunately, literature has not always clearly differentiated between the two scenarios (Hartshorne et al., 2018; Chen and Hartshorne, 2021).

It is generally accepted that social language/conversational fluency (sometimes referred to as Basic Interpersonal Communication Skills, 'BICS') develops earlier than the academic language used in the classroom (Cognitive Academic Language Proficiency, 'CALP'). Learning the simpler social language used in the playground is supported by the physical context and multimodal communication cues for example facial expressions, manual gestures, and eye gaze (Archer, 1997). This differs considerably from the written language found in text books that needs to engage the higher order cognitive skills associated with academic success (Cummins, 2008). However, such a simple distinction need not be necessarily relevant in formal foreign language learning contexts where the target language is not available outside the classroom.

Based on what we know about children's successful language learning in first and bilingual language contexts, there is a general belief in a younger-the-better maxim for the naturalistic acquisition of a second language (particularly for phonetic learning), before the critical period has been passed. For example, see the effect of parental pressure on school policies (Nikolov and Mihaljević Djigunović, 2023). Indeed, a study carried out in Spain did successfully translate our knowledge on naturalistic language learning into early years settings for second language acquisition. In this study, teams of trained English-L1 tutors, four to each group of 12 pre-school (7–33.5 months) Spanish-speaking children, used IDS to lead the daily adult-scaffolded, hour-long play sessions over a period of 18 weeks. Quality social interaction was provided through weekly-themed games and activities that prompted frequent back-and-forth exchanges, even when the infants were merely babbling. When the individual children's English vocalizations were recorded, using LENA technology (LENA, 2015), the intervention group ($n = 126$) outperformed the business-as-usual control group ($n = 124$) receiving the standard 2 h per week introduction to simple English words and phrases. The older children also took a touch screen comprehension test before and after the intervention, in both English and Spanish. This showed that their English comprehension at the end of the intervention was also superior. The control groups were taught in classrooms of 30–36 children by the usual Spanish-English trained bilingual teacher using nursery rhymes, singing, and story-telling from books (Ferjan Ramírez and Kuhl, 2017). The intervention group's language gains were fully retained 18 weeks after the study ended (Ferjan Ramírez and Kuhl, 2017). However, when the intervention tutors were trained on-line in a lower-cost, more-accessible, replication study, children's post-intervention English scores ($n = 168$) were lower, although still substantial and significant. The reduced tutor-child ratios (3:14 for 9–21 months; 3:20 for 21–33 months), shorter (45-min) daily play sessions and the children's lower overall initial English or Spanish levels may also have caused this inferior result, either individually or in combination (Ferjan Ramírez and Kuhl, 2020).

Although Ferjan Ramirez and collaborators' research shows that young children are able to learn implicitly in school settings, further replication is required to establish the relative importance of key features. For example, the high tutor-child ratios and greater English exposure time enable more quality attention to be given to the individual children. The relative importance of conversation-training and active participation, rather than passive engagement, should also be established.

Ferjan Ramírez and collaborators' carefully-structured guided-play program in a new language, encouraging the child-centered exploration characterizing native-language acquisition, has features suggesting challenges in replicating its success: multiple native-speaking language tutors, considerable English exposure time (3¾-5 h per week), and high tutor-child ratios. Even if schools were to successfully implement a similar program, it does not actually recreate ideal language-learning conditions, for example, no rich out-of-class foreign language exposure in a variety of social contexts and communicative behaviors, as experienced in native-language acquisition (Muñoz, 2010; Chen et al., 2021). We also cannot assume that Ferjan Ramírez and Kuhl's (2017) language-learning activities would be developmentally appropriate and educationally effective for older ages, e.g., Reception, KS1, and KS2 children.

Many factors are responsible for individuals' variability in foreign language attainment (Singleton and Leśniewska, 2021). Dynamic interactions between individuals' linguistic, cognitive, and social skills (Esteve-Gibert and Muñoz, 2020) are constrained by various psychological variables, e.g., motivation, self-regulation, identification, attitude and predisposition (Singleton and Leśniewska, 2021). Long-term achievement is driven by the learner's motivation to consistently practice the language in different social contexts which in turn dramatically affects the crucial high-quantity and high-quality of language input (Flege, 2018, 2019).

An early start to foreign language instruction does not necessarily give an ultimate attainment advantage (Muñoz, 2010, 2014; Muñoz and Singleton, 2011; Pfenninger and Singleton, 2019a; DeKeyser, 2020; Lightbown and Spada, 2020), despite the widespread belief, appeal and acceptance that native-like phonetic attainment is not possible when the first exposure to the language occurs after a certain, critical, age. It is undoubtedly challenging to establish how foreign language learning *ability* changes with age because of the many confounding factors (Muñoz and Singleton, 2011; Hartshorne et al., 2018). Indeed, despite phonology gains, overall there is a sizeable body of evidence that the critical period may not apply and so may be irrelevant in either second or foreign language learning (Muñoz and Singleton, 2011). For example, only biliterate simultaneous-bilingual children, from highly supportive home-learning environments, benefitted from an early start to formal English tuition in one study (Pfenninger and Singleton, 2019b).

A meta-analysis revealed that learning a language at an early age benefits children only in immersion situations rather than in formal instruction contexts associated with little informal learning outside school (Qureshi, 2016). A review and synthesis of 42 empirical studies, again revealed no strong evidence for a younger-the-better advantage for classroom language learning in either long-term or short-term linguistic outcomes (Huang, 2016). No attainment advantage was found for 16–17 year-old Taiwanese children starting English lessons between two and 11 years of age ($N = 97$): out-of-class exposure being more important than formal instruction and more recent exposure outweighing earlier input (Huang et al., 2020).

Young native-language learners learn a language implicitly (i.e., naturally through 'doing') only in rich, immersive word-learning contexts providing unlimited access to quality input generally associated with child/caregiver interactions (Chen et al., 2021). However, as this complex, interactive environment is not typically provided by the KS2 classroom's limited exposure to a foreign language, it is unlikely that young learners will have a learning advantage (Muñoz, 2010; Myles, 2017). In these situations, rather than learning Cummins (2008)' playground language implicitly, school children must make a conscious and attempt to learn (explicit learning) by deliberately accessing fundamental cognitive skills (Muñoz, 2014; DeKeyser, 2020). Indeed, the dynamic cognitive development occurring over the primary school period (broadly middle childhood) suggests that children would initially need to be immersed in a rich and plentiful language environment with lots of opportunities to converse for implicit learning (Holmes and Myles, 2019). This contrasts with the later stages of primary school when they demonstrate greater concentration, sustained attention and motivation: they are transitioning to being able to learn explicitly because of their cognitive development (Holmes and Myles, 2019). Rather than the first language neural circuitry, architecture, and characteristics hindering older learners acquiring un-conforming language patterns (Kuhl, 2010), various studies in instructional settings, e.g., Barcelona Age Factor Project, confirm that older learners, who have had more experience of learning in an explicit, instructed context, learn more efficiently than younger learners (Muñoz, 2010), whose less developed cognitive resources require considerably more language input (Myles, 2017). Languages are arguably mutually supportive under formal instruction (Lightbown and Spada, 2020). Even long term oral performance has been more strongly associated with high quality, cumulative input and contact with native speakers, than with starting age (Muñoz, 2014).

Language learning also takes a considerable length of time. Behavioral and neuroimaging data from 350 Japanese primary-school children indicated that exposure time to a foreign language is a greater determinant of proficiency than age of acquisition: a few thousand hours appearing to be necessary for basic competence (Ojima et al., 2011). Children are thought to require an estimated 10,000 h in naturalistic, rich language learning situations to reach basic proficiency levels in their native language, with true expertise requiring approximately 25,000 h of exposure and practice in non-instructional settings. Successfully learning a second language may be more willingness-to-invest-enough-time than the age-of-acquisition (Clark, 2003). Over their first four years of life, four-year olds may experience an enriched native-language experience, with adult-reformulations, for about 10 h/day amounting to 14,610 h, i.e., approximately 20 times more than adult learners taking formal six hours/week classroom instruction, 30 weeks/year over four years (Clark, 2003, p. 41) and approximately 100 times more than 7–11 year olds taught the KS2 one hour per week, assuming a primary school year is 190 days, or 38 weeks (Long, 2023).

Our poor understanding of the critical period hypothesis, with its focus on purely age-related effects, has arguably impeded the field of language development (Kihlstedt, 2019). The complex role of input has often being ignored or downplayed. Many studies neglect to investigate effects of amount of exposure and optimum starting age in relevant educational contexts (Muñoz, 2014), and research designs crucially fail to control for the amounts of different inputs, e.g., considerable out-of-class versus limited in-class input (Flege, 2018, 2019; DeKeyser, 2020).

The second language critical period hypothesis was based on Lenneberg's personal observations of later-learners usually speaking with foreign accents (Flege, 2019). Subsequent emphasis has since been on phonetic learning and accent; however, vocabulary and grammar-learning are arguably more important in minority language instruction contexts. For these any critical period is likely to end later. Many critical periods, with different sequences and end-points, have been proposed (Singleton and Leśniewska, 2021), for example, 18 years of age for sentence structure (Hartshorne et al., 2018; Chen and Hartshorne, 2021). Indeed the adult brain retains far greater plasticity than hitherto thought (Singleton and Leśniewska, 2021) as shown by immigrants (sequential bilinguals) often speaking with accents in their native language when returning to their homeland and individuals changing their accent when moving from one dialect area to reside in another within the same country (Birdsong, 2014). Such examples not only question the validity of younger-the-better but also suggest inherent problems in using monolingual nativelikeness as a measure of foreign language attainment (Birdsong, 2014). Rather than a scientific hypothesis, Singleton (2005) likens the critical period hypothesis to the mythical hydra: impossible to deal with because of its multiple heads and ability to produce new ones.

To summarize, we have questioned the relevance of the Critical Period hypothesis and the accuracy of the younger-the-better maxim for formal, foreign language instruction in primary schools. It is unrealistic to expect the process of first/bilingual language acquisition to be replicated in the foreign language-learning primary school classroom where there is only limited exposure to the foreign language. Under formal language instruction, learners have to make

a conscious effort to learn and use cognitive abilities established through their first language usage: older learners are more efficient than younger learners in these situations. More research needs to be done to investigate the optimum starting age in educational contexts while controlling for different amounts, quality and types of exposure, for example out-of-class versus limited in-class exposure. We have argued that the brain is more plastic than previously thought. Although how we learn language(s) may change with age, later is not necessarily worse and learning may still be possible outside a critical period. Formal classroom teaching plays only a small part in foreign language acquisition. Motivation, out-of-class exposure, and willingness-to-invest-enough-time are all vitally important: attributes often lacking in many English school children.

The current controversy behind the bilingual advantage

The notion of a 'bilingual advantage' arose from some studies demonstrating bilinguals had superior executive functions in nonverbal cognitive tasks compared with monolinguals, arising from their managing two jointly-activated, conflicting languages (Bialystok et al., 2009; Bialystok, 2017).

Executive functions may be considered as the brain's management system: an umbrella term for top-down cognitive processes. Three core and interrelated skills that we use regularly in everyday life to plan, set goals, and get things done are recognized (Miyake et al., 2000). The first, inhibitory control, enables us to choose how to react rather than simply acting on impulse or habit. The second, working memory, involves not only holding, and working with, information in our mind but also remembering previous information with which we need to deal. The third, cognitive flexibility, allows us to adapt to changed demands or priorities, looking at things in different ways. It enables thinking outside the box to meet new, unanticipated challenges and for seizing unexpected opportunities. These executive functions enable us to reason, stay focused, resist impulsive reactions, think before acting, solve problems, adjust flexibly to changing demands/priorities, and see things from different viewpoints (Diamond, 2013): critical skills for success in all aspects of life, including education (Diamond and Ling, 2016).

Interventions aimed at directly enhancing executive functions, with the ultimate aim of improving educational outcomes, have shown little success (Diamond and Ling, 2016). So, there is understandably widespread appeal that bilinguals may improve their general-purpose executive functions through simply coordinating two jointly-activated languages (i.e., using the required language, suppressing the unwanted language, and switching between the two).

Such controversial claims of these unexpected transferable benefits continue to remain hotly debated, challenged and unconfirmed because the literature on whether bilingualism does indeed boost executive functions is mixed. Earlier studies, conducted between 2004 and 2012, provided the strongest evidence of a bilingual advantage (Van den Noort et al., 2019). In contrast, fewer than 20% of studies between 2011–2015, and only those that typically had the less-robust, small sample sizes ($N < 30$), found a boost in executive functions (Duñabeitia and Carreiras, 2015; Paap et al., 2015, 2019). Lack of replicability of the early positive results, often from studies using a small number of participants, has been a particular issue. The highly cited (1,357 times as at 31/5/23) study (Bialystok and Martin, 2004) was not replicated when a different research group repeated the research with similar aged children (Shokrkon and Nicoladis, 2021). Shokrkon and Nicoladis (2021) suggested that the previous positive results, favoring the bilingual group, may have been caused by the inferior performance of the 2004 monolingual group rather than the superior performance of the 2004 bilingual group. Other researchers failed to reproduce their own previous positive results when larger groups of children were included (Filippi et al., 2012, 2015, 2020). Some recent large-scale studies have found no evidence of a bilingual advantage for 9-to 10-year-old children's inhibitory control, attention and task switching, or cognitive flexibility ($N = 4{,}524$) (Dick et al., 2019) nor 7-to 12-year-olds' attention networks ($N = 360$) (Antón et al., 2014).

Importantly, robust meta-analyses have concluded no strong nor consistent evidence of a bilingual advantage for either adults (Lehtonen et al., 2018) or children (Paap et al., 2019; Gunnerud et al., 2020; Lowe et al., 2021). Gunnerud et al.'s (2020) analysis broadly agreed with Paap's earlier paper 'bilingual advantages in executive functioning either do not exist or are restricted to very specific and undetermined circumstances' (Paap et al., 2015, p. 265): the circumstances being one specific laboratory (at York University, Canada), middle-class SES, early-bilingual children, and switching tasks (Gunnerud et al., 2020). Lowe et al. (2021) suggested children's bilingual advantage in executive functioning is not only small and variable but potentially not attributable to language status.

Various uncontrolled factors call into question the robustness of studies that have demonstrated a bilingual advantage; non-standardized tests; variety of participants' selection procedures; ignoring participants' individual differences (Van den Noort et al., 2019); inconsistencies in reporting, measuring and defining bilingualism; incorrectly matched samples (i.e., not carefully matching the monolingual and bilingual groups so any differences could be caused by a variety of uncontrolled factors) (Antón et al., 2014); a huge variety in individuals' daily language usage patterns exacerbated by differing sociocultural environments (Backer and Bortfeld, 2021); and problems in defining and measuring the different components of executive function (Paap et al., 2019). Antón et al. (2014) concluded that any possible bilingual advantage is extremely elusive, inconsistent, highly variable, does not generalize, related to socio-economic status (SES), and restricted to specific experimental, non-replicable conditions. There have been suggestions that being bilingual may offset some of the adverse effects of an impoverished environment on cognitive development. Indeed, there has recently been success at teasing out the modulatory effects of SES with adolescents and positive effects have been particularly reported in low-SES multilingual populations (Filippi et al., 2022). However, any SES effect may be too closely intertwined and inseparable from the support generally given in home environments. This was demonstrated, albeit in the context of learning a third language (English), in Switzerland, when only bi-literate simultaneous bilinguals receiving substantial parental support gained any benefit from starting at a young age (Pfenninger and Singleton, 2019b).

Driven by a plethora of contradictory results and replication issues, calls have been made to define the precise bilingual characteristics that do result in an advantage (Van Der Linden et al., 2018). Apart from acknowledging that bilingualism is a complex, dynamic experience (Deluca et al., 2020), there is neither a consensus of the conditions in which it may prevail (Gunnerud et al., 2020) nor any decisive single

explanation of the underlying neural control mechanisms when two or more languages are processed (Bialystok, 2017). Studies from a range of countries, cultures and language-learning situations are needed to help fully understand this phenomenon. For example, there is currently a study exploring why the cognitive advantages associated with multilingualism are not always experienced by multilingual children in India (Tsimpli et al., 2019).

Despite it being currently unproven, the general public is continually barraged by media claims of a bilingual advantage. For example, in an article entitled 'The amazing benefits of being bilingual' on the BBC future website this statement is made 'A superior ability to concentrate, solve problems and focus, better mental flexibility and multitasking skills are, of course, valuable in everyday life' (Vince, 2016, para. 43). Particularly concerning is the aggressive marketing of some language resource websites, targeting schools and caregivers, suggesting that *all* children learning foreign languages will gain wide-reaching, general cognitive benefits in *all* circumstances rather than Paap et al.'s (2015, p. 265) 'very specific and undetermined circumstances'. See Table 1 that exemplifies the variety and strength of the claims of cognitive enhancement being made for the products on sale. Some appeal to notions of the brain (such as left-brain versus right-brain learning) that have been identified by other authors to be neuromyths (Dekker et al., 2012). Others far exceed what the current evidence shows, often citing headline catching newspaper articles or online articles written by non-specialists. It is notable that long-established global language training providers, such as Linguaphone (2022) which was established in 1901, Duolingo with its 500 million learners (Duolingo, n.d.), Rosetta Stone 'Trusted for 30 years by top organizations' (Rosetta Stone, 1999–2023) do not market their products by using such controversial bilingual advantage claims: learning another language is sufficiently rewarding in its own right.

In summary, although in certain circumstances bilingualism may heighten executive functions, the empirical base is too weak to use executive-function-enhancement as a rationale for teaching foreign languages: any relationship between success in learning languages and executive function skills is complex and inconsistent (Woll and Wei,

TABLE 1 A selection of claims, from a selection of language resource websites, that exceed what the current evidence shows.

Skills proposed to benefit from early foreign language learning	Claims	Source of the claims
Problem solving, critical thinking, creativity	'Research has shown that children who start learning a second language at an early age are better and faster problem solvers, as they have had the opportunity to develop their ability to think critically (especially High Order Thinking Skills) and are better able to multi-task. They also tend to be more creative (from a cognitive point of view) and have a greater mental flexibility.'	https://www.oxfordclil.es/the-benefits-of-learning-a-second-language-early/
Memory, other school subjects	'Studies support that children learning a new language perform better in standardized tests and memory exercises. Language consists of simple and complex formations of letters and words that enhance the brain's overall cognitive development. This applies to other school subjects as well, resulting in better holistic learning.'	https://www.etoninstitute.com/blog/6-surprising-skills-kids-acquire-when-learning-a-language-and-its-not-fluency. Note that this is *not* the renowned Eton College based in Berkshire, UK
Academic advantages in many areas	'Studies have shown that bilingual children can outperform monolingual children in a number of subject areas. The effects of bilingualism can help improve a child's educational development, cognitive functions, social skills, literacy, and emotional skills that have positive effects for many years to come.'	https://unuhi.com/10-benefits-of-being-bilingual/
Exercising the brain's left hemisphere	'Language skills are located in the brain's left hemisphere, which is also connected to other logical and rational skills. Some other abilities that are controlled by the left lobe are, mathematics, logics, science, critical thinking, problem-solving, analytical skills. The best part about this fact is that by exercising a hemisphere in one part (languages) also improves abilities in other, connected segments. This means that, according to neuroscience theories, a child that's learning and practicing a foreign language is simultaneously boosting its skills in math and science.'	https://www.littlepim.com/blog/10-reasons-for-kids-to-learn-a-foreign-language
Brain plasticity	'Several studies on multilingual children have determined that any experience with a second language, regardless of the level of fluency, has a positive effect on brain plasticity. Incredibly, these effects were seen even in kids who had not yet practiced using the language; just being exposed to multiple languages was enough.'	https://studycat.com/how-language-learning-affects-childs-brain/
Strengthening and developing the brain	'The brain is a muscle, and when we learn another language we strengthen and develop it. Learning a language increases the density of grey matter and strengthens the white matter tissue in the brain. Grey matter is associated with muscle control, memory, emotions and sensory perception. White matter connects the grey matter areas together. Language learning results in these networks becoming better integrated, which makes them more flexible and allows for faster and more efficient learning and results in improved problem solving and multitasking abilities.'	https://www.lespetitstigres.com/post/how-to-teach-your-child-french

All websites were accessed on 2nd September 2022.

2019). However, there are many caregivers and teachers who may believe that using materials purchased from these aggressively-marketed language resource websites would provide the holy grail of across-the-board, transferable, cognitive benefits sought by educationalists. Educational consultants may potentially justify their own innovative schemes by referring to such websites. The 'very specific and (as yet) undetermined circumstances' for which a bilingual advantage may exist for specific tasks (Paap et al., 2015, p. 265) are likely to entail regularly engaging with the language rather than experiencing the artificial environment of a limited-input primary school classroom. Being bilingual, with its associated personal, social, cultural and economic benefits, is undoubtedly useful in its own right. Its usefulness, however, does not need to be boosted by false claims of unproven, widespread cognitive benefits. The ability to converse in more than one language is a sufficient outcome.

Innovative ways for learning a second language in primary schools

In England it is stipulated that, in schools required to follow the National Curriculum's one hour a week foreign language tuition, 7–11 year olds should make 'substantial progress in one language', focusing on practical communication [Department for Education (DfE), 2013] and also be able to 'write phrases from memory and adapt these to create new sentences …' [Department for Education (DfE), 2013]. However, as outlined earlier, despite the evidence suggesting that one, hour-long weekly instruction is the minimum threshold for progress to be made in Years 5 & 6, along with other factors (Graham et al., 2017), the outcomes have been disappointing: secondary schools have not noted an increase in standards and pupils are not more motivated to study an optional foreign language at age of 14. This has resulted in some schools that are not required to follow the National Curriculum investigating innovative but unproven ways of teaching foreign language. Such initiatives are understandably appealing to schools, particularly if they expect an associated bilingual advantage benefit for their pupils.

One unproven, and previously discredited, idea resurrected from the early 1980s is currently being explored by some schools not governed by KS2 regulations, i.e., state schools [Early Years to Year 2 (3–7 years of age)] and independent schools [Early Years to Year 6 (3–11 years of age)]: to introduce young children (3 years of age and upwards) to multiple foreign languages and their sounds rather than teaching one language thoroughly. As this approach is counter to all KS2 recommendations and current best practice, it is imperative for us to review it before it risks being widely adopted in the independent sector.

In the 1980s it was believed that the study of language itself and exposure to an assortment of foreign languages at secondary schools would be greatly beneficial to pupils. Designed by the schools themselves they were known as language awareness and taster courses. Although initially explored enthusiastically by schools, their fragmented, diluted courses were heavily criticized by the HM Inspectorate (HMI, 1990).

Language awareness courses was an umbrella term (HMI, 1990, para. 8) covering loosely, inconsistently (HMI, 1990, para. 2) and inadequately defined courses resulting in a great variation of structure, content and aims (HMI, 1990, para. 64). They often resulted in superficial and disjointed activities (HMI, 1990, para. 12). The purpose of such courses, providing the study of languages *per se,* was to give an awareness of language, its role in human life and to increase pupil's sensitivity to different languages (HMI, 1990, para. 2). The schools' schemes of work had aims that fell into three main categories: cognitive, linguistic and social (HMI, 1990, para. 32). Many language awareness courses included a series of one-off lessons in several foreign languages so as to give a quick overview of a variety of languages' different sounds, scripts and grammars (HMI, 1990, para. 4). Such foreign language sampler lessons were not intended to help pupils to either master the language or choose which to study further (HMI, 1990, para. 4). Superficially, some of the skills acquired could potentially transfer to future foreign language learning; however, there was little evidence of this actually happening (HMI, 1990, para. 13). Despite half the schools providing satisfactory courses, and one school designing a particularly well-defined course (HMI, 1990, para. 66), any positive gains in attitudes, knowledge, and insights were generally considered too insignificant to justify the time spent (HMI, 1990, para. 65). The HMI Survey Report (1990) concluded that there was no evidence that such language awareness courses generally speeded up the rate of either parallel, or subsequent, language learning (HMI, 1990, para. 66) and they did not become official policy. Nevertheless, these courses did contribute to the debate on language teaching methodology and the national curriculum for English subsequently incorporated some of these ideas, explored by schools in the 1980s, under 'learning about language' (HMI, 1990, para. 67).

The foreign language taster courses, designed to help pupils choose which language to study, gave a greater depth of foreign language experience than the language awareness one-off lessons (HMI, 1990, para 3). A huge variety of courses was provided across the various schools, though, differing in intent, structure, and effectiveness. Typically two foreign languages, but sometimes more, were taught over several weeks/months during the lesson time previously timetabled for learning one foreign language (HMI, 1990, para. 3). Some of the better-structured courses [about one third (HMI, 1990, para. 51)] were effective in helping pupils choose which language(s) to study (HMI, 1990, para. 16). Indeed, some lessons could not be distinguished from traditional language lessons (HMI, 1990, para. 52). However, others, and particularly those with taster modules in several foreign languages, gave only thin, fragmented, and watered-down experiences in several languages, replacing a continuous experience in just one foreign language: an inadequate foundation for mastering communicative skills in those languages (HMI, 1990, para. 18) and gravely compromising foreign language competency during the initial two/three years of secondary school (HMI, 1990, Para. 66). Rotating four languages was considered to be completely inadequate (HMI, 1990 Appendix D para. 3).

This previously debunked way of teaching multiple languages superficially is now being sold to schools, from early years' settings onwards, as a win-win situation. Driven by the perception of younger-the-better, it has been argued that young children will develop not only natural, life-long linguistic abilities but also academic advantages through the associated bilingual advantage: a tempting proposition for schools.

Under its resurrected guise, young children (3 years of age and upwards) would be taught a new foreign language every term, totaling up to 15 different languages over 5 years: in stark contrast to the teaching of one foreign language thoroughly, as per the KS2

curriculum for 7 to 11 year olds [Department for Education (DfE), 2013].

This proposal, of giving children a superficial knowledge of multiple foreign languages, is effectively an extension of the inadequate language awareness samplers. It introduces over three times as many taster courses than the four-language taster courses, of which the HMI report was so disparaging (HMI, 1990).

Such a proposal, based on three false premises, should be immediately rejected. Firstly, young school children, with their immature cognitive functions, are slower than older children when consciously and deliberately learning a language in a stark, limited input classroom (Myles, 2017). Secondly, the HMI Report (1990) concluded, albeit for early secondary school children, that a superficial exposure to foreign languages did not generally speed up the rate of either parallel, or subsequent, language learning and severely compromised standards of achievement. Thirdly, any possible bilingual advantage would arise from the conflict resolution of jointly activated languages in 'very specific and undetermined circumstances' (Paap et al., 2015, p. 265), not from the superficial knowledge of several languages used in a classroom for a maximum of one hour, a week. However, because of its understandably great appeal to schools we must scrutinize this proposal further.

Superficial exposure to multiple languages

Our question is whether it is possible to give three-to seven-year-old children a solid foundation for future language learning by teaching them, for one hour a week, a new language every term over a four-year period: 12 languages in total or possibly 15 languages if extended into Year 3 for those schools not having to comply with KS2. Are children in this younger age group, from three years upwards, possibly superior foreign language learners than those 1980s secondary school children: teaching methods and materials having evolved? In particular, would there be any associated bilingual advantage giving rise to cognitive benefits?

For example, Little Pim's *Entertainment Immersion Method*® for 0–6 year olds, targeting both caregivers and nursery schools is 'based on how children naturally acquire language' (Little Pim, 2020a, para.1). It sells resources to teach children 360 words and phrases in 12 foreign languages. Little Pim's method 'immerses children completely in a foreign language" (Little Pim, 2020a, para.11); "UNLIMITED ACCESS TO ALL 12 LANGUAGES AND MORE! Choose any language or multiple languages to teach your little ones! With the unlimited subscription, you'll receive access to **ALL videos**,' (Little Pim, 2020b). Other pages state 'Studies have shown that bilingual and multilingual kids achieve better results academically' (Savage, 2020), suggestive of more languages leading to greater bilingual advantages, and 'improved cognitive performance …the multilingual child has the advantage over his/her peers and in life' (Little Pim, 2016, para.1).

The Little Pim website certainly gives the impression that learning multiple foreign languages is beneficial for young children, contradicting both the 1990 HMI conclusion and current statutory guidance at KS2 [Department for Education (DfE), 2013]. Linguascope also offers a single subscription package giving access to multiple (15) languages; but this is to reduce administrative costs to make their resources more affordable to schools (Linguascope, 2023).

Despite the marketing ploy, the Little Pim *Entertainment Immersion Method* does not immerse children completely in a foreign language. The entertaining, non-interactive videos certainly introduce children to common words and phrases in a foreign language, using every day scenes of family life and words that children would already be familiar with in their native language. A native speaker (audio only) speaks words/phrases in one of the twelve foreign languages: sometimes dubbed over the entertaining cartoon panda (Little Pim) and other times speaking the word (s) shown on the screen. There are different contexts and also the necessary repetition. However, although children are encouraged to repeat the spoken words there is none of the feedback, social interaction, or conversational turn-taking that are requirements for true 'immersion' (Kuhl et al., 2003; Kuhl, 2007; Hirsh-Pasek et al., 2015; Chen et al., 2021) demonstrated by the Madrid study (Ferjan Ramírez and Kuhl, 2017). The cartoon panda does not provide the lip cues (Kuhl and Meltzoff, 1982), nor the facial expressions and manual gesture cues (Archer, 1997) that are available in face-to-face interactions with an adult caregiver. There will be scant opportunity for children to use sensorimotor feedback mechanisms while listening to themselves speak (Choi et al., 2021; Kuhl, 2021).

Little Pim advises 'No prior language knowledge needed; children can learn independently' (Little Pim, 2020c); 'Teaching your toddler Korean is daunting, especially if you are a beginner, but it's possible' (Little Pim, 2020d, para.1); and 'The lessons are also scripted to guide you, as the parent, even if you have no prior knowledge of Korean. You not only guide your child through a new language but also acquire the skills for yourself' (Little Pim, 2020d). This contradicts English primary schools' best practice that pupils be taught by a specialist teacher of degree-level proficiency in the particular language (Graham et al., 2017). School teachers learning the language alongside primary school children was one of the major KS2 implementation criticisms (Myles, 2017). This strongly suggests caregivers learning the foreign language with toddlers is inferior practice.

Children may certainly be able learn some vocabulary from watching videos with captions, as demonstrated by recent research exploring the use of multimedia with primary school learners (Linebarger et al., 2010; Linebarger and Vaala, 2010; Gernsbacher, 2015; Feng, 2019; Reynolds et al., 2022). However, they would still need some live interaction, e.g., video chat with feedback (Roseberry et al., 2014). Also, if the same/identical visual material were to be used across all the different languages (as intimated by Little Pim) children potentially would become bored or even confused. The retrieval of a memory from related memory traces can suffer interference through several mechanisms if the same cue word and context is used in all languages (cue-overload principle): the more recently encoded information potentially impeding the retrieval of similar previous information learned (retroactive interference) (Baddeley et al., 2015, pp. 111–112). Young children suffering a negative experience with early language learning may be demotivated in the future (De Houwer, 2015).

We conclude that using non-interactive videos, largely from just one website, as the primary teaching tool in the classroom is not a cost-effective or easy panacea for learning one new foreign language a term.

In accordance with Ebbinghaus' total time hypothesis (Baddeley et al., 2015, p. 68) we know that the amount of learning depends on

exposure time (Clark, 2003). The weekly one-hour play group for one term potentially provides a scant experience of 0.08% (12/14610 × 100) of the life-time exposure of native-speaking four-year-olds (14,610h) estimated by Clark (2003, p.41). Furthermore, children's language growth in each language, when raised speaking two or more languages, is affected by the quantity and quality of language exposure (Hoff and Core, 2013). Despite this being the challenge for all classroom language learning, with naturalistic conditions never being totally replicated, this scant experience in each language reveals the inadequacy of such superficial exposure to foreign languages.

We also know from Ebbinghaus' exponential forgetting curve that information loss, after learning something, is initially rapid but then levels off: spaced repetition, particularly repeated retrieval, is important for retaining any learned information and for reducing forgetting (Baddeley et al., 2015, pp. 97–98; Murre and Dros, 2015). Retrieving the language in different contexts outside the classroom (i.e., elaborative rehearsal) strengthens memory traces by enabling deeper encoding than is possible through a classroom's simple repetition (i.e., maintenance rehearsal). This deeper encoding is associated with richer, more elaborate and more easily retrievable memory traces (Craik and Tulving, 1975). The informal language immersion out-of-class provides the necessary repeated retrieval that helps with memory consolidation required for naturalistic learning (Qureshi, 2016). Out-of-class English input has been shown to outweigh in-class input for 2–11 year olds (Huang et al., 2020). Opportunities for regular language practice outside school would need to be built into any one-new-language-a-term policy. It is a challenge, though, for all classroom foreign language learning to enable out-of-school exposure to the language.

Finally, we need to explore the extent that these minimal language gains would be retained once a new language was introduced the following term.

Recent input outweighs earlier input (Huang et al., 2020), as alluded to by Ebbinghaus's forgetting curve (Murre and Dros, 2015). When children learn the second language, their memories of the first foreign language will be eroded by the more recent input unless they continue to practise the first, preferably in various social contexts. Expertise is maintained only through constant maintenance and extensive opportunities to interact and communicate with sufficient high-quality and high-quantity input (Clark, 2003; Ferjan Ramírez and Kuhl, 2017). As they are introduced to an escalating number of languages it will become increasingly more difficult to find the time and opportunities to review and practise the earlier languages they had started to learn. The logistics associated with a superficial exposure to a new language every term, to make these children 'citizens of the world', would be prohibitive.

The Spanish-speaking children in Madrid were not exposed to additional English outside school; however, for 18 weeks they had received daily exposure to English in the classroom (Ferjan Ramírez and Kuhl, 2017). This would have provided the necessary spaced repetition and repeated retrieval, from different tutors in different contexts, strengthening memory traces. Furthermore, they had not been subsequently exposed to lessons in other foreign languages.

In conclusion, any school that does not have to comply with the KS2 National Curriculum requirements of mastering practical communication skills and making substantial progress in any one language, should be extremely wary of any language resource website, or consultant, recommending giving tasters, or one-term courses, in multiple languages. After all, the fundamental aim of learning any foreign language is to be able to understand and communicate in that language.

Evaluating unproven teaching protocols that seem too good to be true

In this final section, we urge schools to do as many background checks as possible when considering any unproven ways of teaching foreign languages.

We recommend the following as a minimum, but our suggestions are not extensive because circumstances will vary.

1. Be extremely wary of being persuaded to be the first school to try something innovative when it is sold as being 'ahead of the game'.
2. Approach other schools already using the innovative protocol to establish what quantifiable outcomes can be reasonably expected.
3. Check the credentials and qualifications of the person making the proposal. A quick google search will show whether the proposer is currently (or previously) employed by an accredited university. Search on Google Scholar to find their relevant scientific papers published in peer-reviewed journals. The Education Endowment Foundation (2023) also trials resources/pedagogic approaches for schools and offers an evidence base of likely usefulness.

   An example from the alternative health market serves as a useful illustration. Following a complaint to the Advertising Standards Authority (ASA), the television personality, self-styled holistic nutritionist and dietetic technician Gillian McKeith voluntarily agreed to stop using her PhD qualification obtained from a non-accredited, American college's correspondence course. The ASA considered that 'the claim 'Dr' was likely to mislead' (Goldacre, 2007). McKeith has not published any scientific research papers in peer reviewed academic journals. However, the myth of her scientific credentials was inadvertently being perpetuated on old, but still active, pages on health food web sites that used to sell her withdrawn products, albeit with captions stating that the products are no longer available. For example, 'Dr Gillian McKeith, one of the world's leading molecular nutritionists, worked alongside her team of research scientists to …' (ExpressChemist, n.d.). McKeith withdrew these particular products in 2007 after being censured by the Medicines and Healthcare Products Regulatory Agency (MHRA). This was shortly before the ASA complaint emerged. It is concerning how misinformation can continue to circulate.
4. If the innovative scheme is sold as a 'research project' then it would have been approved by the relevant university's Ethics Committee. External funding will usually be available, too, in which case there should be no costs to the school in the form of expenses or for consultancy fees. Although, of course, the school may wish to continue paying the consultant for other work done unrelated to the project.

5. Schools should consult with, and request approval from, their board of governors. The Primary Languages Policy white paper recommends developing 'effective partnerships between head teachers and governors' (Holmes and Myles, 2019, p. 13, p. 16). The governing body comprises people from diverse backgrounds with a wide breadth of knowledge. Some will be aware of sharp business practices pushing through unproven ideas so as 'to be ahead of the game'. Those who are educationalists will ask for the innovative scheme's quantifiable outcomes. The academics will check the proposer's qualifications and also review any relevant research. For example, they would be able to establish whether the proposal has been validated by the more robust cause-and-effect research designs rather than the weaker observational/correlational studies: correlational studies sometimes show an effect because of a common external factor or a spurious event.

For further guidance, Dorothy Bishop's excellent blog (Bishop, 2012, February 24) raises points relevant to unproven interventions generally.

Discussion

Our purpose in writing this paper is to arm education professionals with a critical awareness of the evidence supporting the bilingual advantage and innovative foreign language taster courses, so as to support them in making evidence-based pedagogical choices.

Children's successful foreign language learning in first and bilingual language acquisition contexts, and the widely held belief of critical periods in language learning (most noticeably in phonetic learning), has led to the younger-the-better rationale for teaching foreign languages in schools. We have explained the challenges in transferring the rich, immersive, native-language learning environment, where young children learn by 'doing' along with access to many hours a day of high quality input from various social interactions, to the primary school classroom providing a weekly one hour exposure to the language. The dynamic cognitive development occurring during primary school education means that over this timeframe alone children's educational needs will change as they become more skilled at learning explicitly. We have questioned whether the younger-the-better maxim is justified in formal foreign language learning situations, where children need to make a conscious attempt to learn by using skills acquired from their native language. Younger children in these situations are slower learners than older children because of their immature cognitive functions. More research needs to be done to investigate the optimum starting age in educational contexts while controlling for different amounts, quality and types of exposure, for example out-of-class versus limited in-class exposure.

Being bilingual, with its associated personal, social, cultural and economic benefits, is undoubtedly useful in its own right. However, controversial claims of associated enhanced cognitive skills providing an academic advantage throughout life are being used by some language resource websites for promoting their products for young children. Despite their claims, any life-long cognitive advantage appears to be restricted to very specific and narrow, as yet undetermined, circumstances probably involving the constant management of two jointly-activated and conflicting languages. They do not appear to apply to the bilingual population as a whole and so are unlikely to apply to individuals learning a second language to only a basic level.

Because of disappointing results from implementing the current KS2 (7–11 year olds) policy of teaching one foreign language for one hour a week, some schools not required to follow KS2 curriculum are naturally interested in innovative ways of teaching foreign languages and are prepared to try unproven methods. We provide some objective criteria to help schools, from early years settings to the end of primary, to judge the efficacy of unproven methods of teaching foreign languages before adopting them.

One unproven idea, first tried in the 1980s with older children, is that of schools giving young children a superficial exposure to multiple foreign languages to help them become natural linguists with native-like speech in numerous foreign languages. This is despite a lack of evidence from either research into a younger-the-better advantage for classroom language learning or from language awareness research that such a program of superficial exposure to multiple languages would support learning, i.e., linguistic and non-linguistic outcomes.

The arguments against providing a shallow exposure of several languages are as valid today as in 1990 when the HMI Language Courses Report concluded that 'short, watered down, fragmented and thin experiences in too many languages' provided 'an utterly inadequate base for mastering practical communication skills in any one language and developing proficiency therein'. Then, as now, a policy of continuous exposure to one foreign language is considered to be superior [HMI, 1990; Department for Education (DfE), 2013].

Author contributions

SW and CM made substantial contributions to the conception of this work. SW drafted the manuscript. CM revised it critically for important intellectual content. Both authors contributed to the article and approved the submitted version.

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Conflict of interest

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

Publisher's note

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