Article

An Investigation of the Cross-Language Transfer of Reading Skills: Evidence from a Study in Nigerian Government Primary Schools

Steve Humble [1], Pauline Dixon [1,*], Louise Gittins [2] and Chris Counihan [3]

[1] School of Education, Communication and Language Sciences, Newcastle University, Newcastle NE1 7RU, UK; steve.humble@ncl.ac.uk
[2] Universal Learning Solutions, Lancaster LA1 4XQ, UK; louise@universallearningsolutions.org
[3] Department of Social Work, Education and Community Wellbeing, Northumbria University, Newcastle NE1 8ST, UK; christopher.counihan@northumbria.ac.uk
* Correspondence: pauline.dixon@ncl.ac.uk

Abstract: This paper investigates the linguistic interdependence of Grade 3 children studying in government primary schools in northern Nigeria who are learning to read in Hausa (L1) and English (L2) simultaneously. There are few studies in the African context that consider linguistic interdependence and the bidirectional influences of literacy skills in multilingual contexts. A total of 2328 Grade 3 children were tested on their Hausa and English letter sound knowledge (phonemes) and reading decoding skills (word) after participating in a two-year English structured reading intervention programme as part of their school day. In Grade 4, these children will become English immersion learners, with English becoming the medium of instruction. Carrying out bivariate correlations, we find a large and strongly positively significant correlation between L1 and L2 test scores. Concerning bidirectionality, a feedback path model illustrates that the L1 word score predicts the L2 word score and vice versa. Multi-level modelling is then used to consider the variation in test scores. Almost two thirds of the variation in the word score is attributable to the pupil level and one third to the school level. The Hausa word score is significantly predicted through Hausa sound and English word score. English word score is significantly predicted through Hausa word and English sound score. The findings have implications for language policy and classroom instruction, showing the importance of cross-language transfer between reading skills. The overall results support bidirectionality and linguistic interdependence.

Keywords: linguistic interdependence; Nigeria; Hausa-English; letter sound knowledge; decoding

1. Introduction

Currently, children in Nigeria become part of an English immersion programme at Grade 4 to provide them with the skills, knowledge, and ability to participate in a globalised world and become global citizens. It is important to note that heritage language is part of culture, history, and identity. The teaching of Hausa (heritage language) alongside English can be regarded as controversial. The Nigerian government are currently contemplating changing their current curriculum so that English is not taught until there are more Hausa literacy skills to build upon. Therefore, the importance of this study is to consider linguistic interdependence and any bidirectional influences of literacy skills when learning to read in Hausa and English. This will have implications for policy, as well as making an important and innovative contribution to understanding and knowledge. Using empirical data that looks at decoding reading skills (word) and letter-sound knowledge (phoneme), this study sets out to investigate the cross-language transfer of reading skills in 488 government schools sited in 11 northern Nigerian states. The implications of the findings could inform the current debate at the country level around teaching languages in the Nigeria curriculum either concurrently or sequentially.

1.1. Cross Linguistic Transfer: L1–L2 and L2–L1

Theories regarding the development of language and literacy skills suggest that children can transfer knowledge across languages. According to the interdependence hypothesis [1]:

> "To the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly". [1]
>
> (p. 29)

The abilities acquired in L1 facilitate learning in L2 and vice versa. According to Cummins [2], the interdependence hypothesis posits that 'on a cognitive level, the languages are not separate but connect with each other by means of a common underlying proficiency' [2] (p. 106). Instruction that develops L2 reading and writing skills not only develops L2 skills but develops linguistic proficiency that significantly contributes to the development of literacy in L1. Cognitive/academic proficiency is common across languages, allowing for the transfer of skills [3,4].

According to de Galbert [5], most studies concerning cross-linguistic transfer (CLT) are from countries involving Asian languages and Indo-European languages. Research shows that there is no negative effect on the home language (L1) when students are taught in the second language (L2) for part or all of the day [6–9]. In Canada, Jared et al., [10] find that, when children are studying within a French immersion curriculum (L2), and hence learning to read concurrently French (L2) and English (L1/home language), there is no detrimental effect on English (L1) reading development. When the child begins reading in French (L2) in the French immersion programme, there is also no confusion with word identification after being taught to read in L1 (English). Verhoeven [11] shows that, in the Netherlands, under certain conditions transfer of literacy related skills can occur both ways, that is from minority to majority and from majority to minority languages (L2–L1 and L1–L2). When there are opportunities for children to read in L2 at school within immersion programmes, Gebauer et al., [12] find in German elementary schools that the skills acquired for successful reading in L2 are transferred to L1.

A longitudinal study carried out in a remote Inuit community in Nunavik, Quebec over a 12-year period [13] shows positive crosslinguistic relationships. Students speak Inuktitut (L1) at home, and this is the language of instruction through kindergarten to Grade 3. From Grade 4 to the end of secondary school, the medium of instruction is either English or French (L2). The study shows that early skills in L1 (Inuktitut) are related to skills in L2 (English or French) in later years. "A strong basis in Inuktitut (L1) is predictive of later strength rather than weakness in a second language" [13] (p. 680). After only three years of the immersion programme (English or French), similar levels of attainment are seen in both L2 and L1. However, according to Usborne et al., [13] the cross transfer between L2 and L1 is not observed in this case owing to the lack of a meaningful L1 component in the school curriculum after Grade 4. This agrees with other studies and Cummins [1], in that, when practices are unstructured or not part of a planned curriculum, this severely limits reading attainment in any language [14]. Teachers switching between English and other indigenous languages [15] often leads to confusion [14].

In the African context, few studies have considered the bi-directional relationship of cross-language transfer, where L2 has an impact on L1. One study that uses longitudinal data from a randomised controlled literacy trial in Kenya finds a bi-directional relationship of children's reading skills in English (L2) and Kiswahili (L1) [16]. The findings support the bidirectionality of language crossover when tailored, systematic instructional processes are used to teach children to read. In another study from Kenya, Wawire and Kim [17] find causal evidence for cross-language transfer of letter knowledge and phonological awareness from their 8-week intervention. A study in Namibia looking at reading ability of children with Herero (L1) and English (L2) finds that phonological skills in English (L2) are a reliable predictor of literacy in Herero (L1) [18].

1.2. Decoding and Phonological Awareness

Within alphabetic languages, phonological awareness has been found to be a critical skill for word reading [19,20]. Letter sound knowledge, or phonics, is a subset of phonological awareness, focusing specifically on the relationship between sounds and their written symbols. Phonological awareness is a broader cognitive skill which includes the ability to hear and manipulate sounds in words without the need for written text. There is a growing body of work that suggests that letter sound knowledge predicts reading ability across alphabetic languages [10,21–23]. Durgunoğlu [24] demonstrates that phonological awareness, syntactic awareness and functional awareness are correlated across languages. In a meta-analysis of 22 studies where L1 and L2 are both taught at school and are alphabetic, there are high correlations between decoding and phonological awareness skills [25]. Decoding is a foundational skill that allows for reading fluency [26,27], being built on the knowledge and awareness of phonology, morphology, and orthography [28].

1.3. School Policy in Nigeria

In Nigeria, around 73% of children aged between 7 and 11 years lack foundational reading skills, highlighting a significant challenge [29]. Estimates suggest that children in rural areas account for 63% of this total, and 84% of this amount are from the lowest income quartile [30]. Ineffective teacher training programmes [31], underfunded school infrastructure [32] and over-populated classrooms [33–35] are cited as contributing to Nigeria's learning crisis [36].

The current version of the National Policy on Education [37] states that all children should learn through the language of their immediate environment (mother tongue, L1) for the first three years of primary education (aged 6–9 years). English (L2) is only taught as a subject. This changes in Grade 4 (aged 9–10), when English (L2) becomes the medium of instruction; this is typically known as immersion education. Children are gradually introduced to oral English in Grade 2 with the expectation of developing sufficient speaking, listening, reading, and writing skills in Grade 3, and transiting these skills in preparation for the English immersion programme from Grade 4.

This is about to change, with the Federal Government recently approving a new policy to extend the exposure of the first language (L1) to Grade 6 [38]. The shift in policy complements the recently federally approved National Reading Framework, which aims to prioritise teaching, learning, and the assessment of early reading skills over a longer period in the child's mother tongue [39]. It mirrors trends found in other African countries, including Cameroon [40], Uganda [41] and Kenya [42], that have advocated a mother-tongue first approach before second language immersion in the higher primary grades.

Over the last ten years in Nigeria, early grade reading interventions have been funded both internationally and nationally. These include the Reading and Numeracy Activity (RANA), initiated as part of the Girls Education Programme Phase 3 (GEP3). This focuses on L1 (Hausa) literacy development in northern Nigeria through a combination of whole language and phonics approaches. The Northern Education Initiative Plus (NEI+) programme adopts a transitional approach, with L1 (Hausa) being the focus in grades 1 and 2, taught using systematic phonics, and L2 (English) literacy being introduced in Grade 3. The Education Sector Support Programme in Nigeria (ESSPIN), Teacher Development Programme (TDP) and Jolly Phonics all focus on English literacy development, with ESSPIN and TDP applying a combination of whole language and phonics approaches. Jolly Phonics adopts a systematic phonics approach. The Better Education Service Delivery for All (BESDA) and Nigerian Partnership for Education Project (NIPEP) expand RANA, NEI+ and Jolly Phonics. Jolly Phonics has been adopted as the Universal Basic Education Commission's flagship programme since 2013, mandating its implementation in all states under the national Teacher Professional Development Fund [43,44].

Nigerian teachers have been found to lack the pedagogical knowledge and skills required to teach early reading skills effectively [31,45,46], with recent evidence from five states in northern Nigeria finding that 91% of Grade 3 children score zero on English (L2)

and Hausa (L1) reading comprehension assessments [47]. Similar trends are observed in other northern states where early grade reading skills are not being mastered in local languages. This severely impedes children's reading attainment in L1 and L2 [48,49].

1.4. The Present Study

This research explores whether there is any bidirectionality of language crossover when a tailored, systematic instructional process is used to teach children to read in L2 pre-immersion. Bivariate correlations, the construction of a feedback path model and multi-level modelling are techniques used to answer the three research questions to consider the overarching research interest around the bidirectionality of language crossover:

- Are there associations between phoneme and decoding scores between and within L1 and L2?
- Is there a bidirectional association between L1 and L2 word/decoding scores as per the interdependence hypothesis?
- How much of the variation in test scores is due to the pupil, school, and state level, and how does this affect predicted associations?

The present study looks at the decoding ability and letter sound knowledge in both L1 (Hausa) and L2 (English) with children studying in government primary schools in 11 northern states in Nigeria (Figure 1). All children are pre-immersion learners learning in their mother tongue, Hausa (L1). English (L2) is taught as a subject. The schools and children in this study have been part of a two-year structured English reading intervention. The programme, Jolly Phonics, focuses on the delivery of synthetic phonics. Within the programme, the 42 sounds of the English language are taught independently, at a pace of one sound per day. This is alongside the skills of letter formation, blending and segmenting, followed by 'tricky words' and 17 digraphs. There are various child-centred and multi-sensory activities for teaching these different skills, including storytelling, songs, and actions for each sound. The teachers attend workshops and training. The training focuses on developing teachers' knowledge and skills specific to delivering the lessons. During the training, teachers are provided with teaching and learning materials, including workbooks for pupils. Following the initial training, the teachers are then provided with ongoing support building upon the workshops through continuous school visits by government officials and in-state project teams, as well as cluster meetings in local government areas. During the school visits, teachers are observed delivering lessons and provided feedback upon which to act.
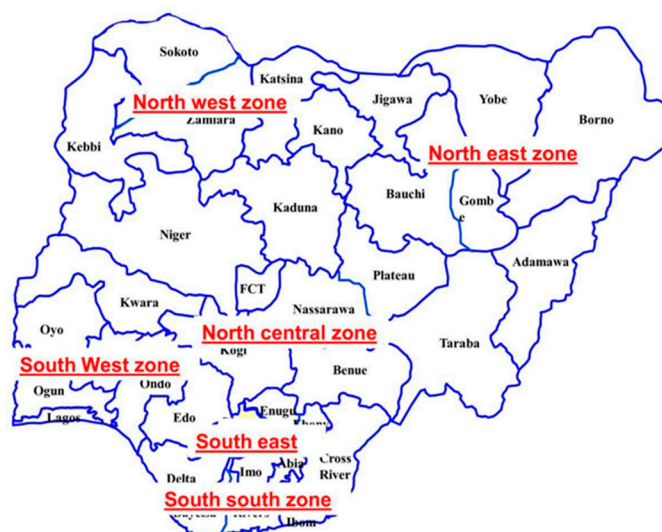
Figure 1. Map of Nigeria showing states. Source: https://maps-nigeria.com/map-of-nigeria-showing-the-36-states (accessed on 1 January 2024).

2. Method

2.1. Participants

Data were gathered between June and August 2021 with 2328 Grade 3 primary school children. These children were attending 488 government primary schools in 11 states. Pupils have a mean age of 9.64 years, with a standard deviation of 1.36 years, and are aged between 5 and 13 years. The gender split for the sample is nearly 50–50, with 49.7% (n = 1157) girls. The children's schools are based in a mixture of rural (41.0%), urban (41.7) and semi-rural (17.3%) areas in these 11 states.

2.2. Procedure

Children were tested on their letter sound knowledge (phoneme) and decoding reading ability (word) in both English (L2) and Hausa (L1). The assessors were told to visit as many schools as possible and to work with the Local Education Authority to randomly select the schools from their school lists. With differing numbers of assessors and numbers of schools visited by the assessors, the sample sizes varied across the 11 states.

The assessors were government officials, project intervention staff and academics that had been trained and had experience of conducting pupil assessments. They were provided with training guidance and videos, and were required to learn the correct answers and practice administering the assessments before going to schools. The videos also refreshed the assessors' knowledge on setting up comfortable and conducive assessment environments, as well as how to randomly sample classes and pupils.

Children were informed by the assessor that their participation was voluntary and they could stop at any time. Head teachers and class teachers were also informed about the concept of the research prior to the data collection. Permission to conduct the assessments was granted by the Nigerian government. Parents/guardians were informed through their school that the purpose of the exercise was to look at the development of language and literacy skills, that participation was voluntary, and that the results of the assessment were to be kept strictly confidential and for research use only. A dedicated smartphone assessment app was used to display the pupil stimulus, with each word or sound appearing one-by-one in large font. The assessor also marked the responses on the app, selecting "correct", "incorrect", or "no answer", meaning that the data were instantly collated and synced to a central database.

2.3. Instruments

No two languages are phonologically identical. Hausa and English have some similar phonemes; Hausa has 47 phonemes and English 42. Both languages have some vowel phonemes in common. To take this into consideration, the children took four different tests, two in Hausa and two in English.

The English letter sound knowledge test assessed the pupil's ability to pronounce the sounds (phonemes) for 41 different graphemes, including 17 diagraphs, based on the accepted English sounds and their most common grapheme representations. The English word reading test (word) was the 2019 version of the UK Government's "Phonics Screening Check". This test assesses the pupil's ability to read 20 invented decodable words, such as "yad", and 20 real decodable words, such as "plug". Decodable means that they do not have any irregularities in their spelling, and so follow the standard sound system.

The Hausa letter sound knowledge test assessed the pupil's ability to pronounce the sounds for 35 different graphemes, including 10 diagraphs. The Hausa word reading test assessed the pupil's ability to read 20 invented and 20 real decodable Hausa words. Both tests were developed by linguistic academics from the Federal University of Gusau, Zamfara State, Nigeria.

3. Results

SPSS statistical software (Version 28) was used to analyse associations among variables. Multilevel modelling was performed to take account of the hierarchical structure of the

data (pupil, school, state) using Stata (Version 17). Stata was used to explore the structural relationships in the Hausa (L1) and English (L2) sounds and words test scores using Structural Equation Modelling (SEM).

Table 1 below sets out the means and standard deviations for test scores in Hausa (L1) and English (L2) for letter sound knowledge (phonemes) and decoding (word reading) for 2328 Grade 3 pupils experiencing 4–5 structured English phonics reading sessions per week. The maximum score for reading is 40 in both Hausa and English. The maximum for sounds is 41 for English and 35 for Hausa. The distribution of all the data test scores is within an acceptable range to satisfy normal univariate distribution. Skewness between −0.5 and +0.5 indicates approximate symmetric distributions and kurtosis values between 0 and −1.5 are considered acceptable [50,51].

Table 1. Means and standard deviations.

	Total Test Scores			
	Hausa Letter Sound Knowledge	**Hausa Word Reading Decoding**	**English Letter Sound Knowledge**	**English Word Reading Decoding**
Total mean score (SD)	22.086 (8.190)	18.796 (12.744)	27.961 (10.003)	19.218 (12.299)
Skewness	−0.265	0.231	−0.431	0.124
Kurtosis	−0.589	−1.319	−0.628	−1.244

3.1. Bivariate Correlations

The bivariate correlations between Hausa and English test scores are shown in Table 2. Carrying out bivariate Pearson correlations to examine the effect size associations between L1 and L2 test scores demonstrates that they are all large (greater than 0.5) and strongly positively significantly correlated [52].

Table 2. Bivariate correlations between Hausa scores and English scores.

	Hausa Scores (L1)		English Scores (L2)	
	Sounds	**Words Decoding**	**Sounds**	**Words Decoding**
Hausa Sounds (L1)	1			
Hausa Words Decoding (L1)	0.751 **	1		
English Sounds (L2)	0.674 **	0.553 **	1	
English Words Decoding (L2)	0.671 **	0.798 **	0.691 **	1

Correlations are significant at the ** $p < 0.01$ level (2-tailed).

3.2. Feedback Path Model

Using the interdependence hypothesis [1] and the results from the associations found so far in this paper, we construct a feedback path model [53] (p. 96). A path model is a statistical technique that specifies a model of the relationship between variables and statistically tests the fit of the model to the data. Path analysis is a specific application of Structural Equation Modelling (SEM). A SEM is based on the analysis of covariance structures. The just identified feedback path model is used to show the effect of the word score for L1 on L2 and vice versa [54,55].

The data demonstrate a good fit to the model and reveal degrees of cross-linguistic relationships among the variables that are consistent with the interdependence framework. Only 34% of the variation in L1 word scores and 28% in L2 word scores remain unexplained by this model. The disturbance in L1 and L2 word scores do not correlate (r = −0.068, $p > 0.05$) (Figure 2).
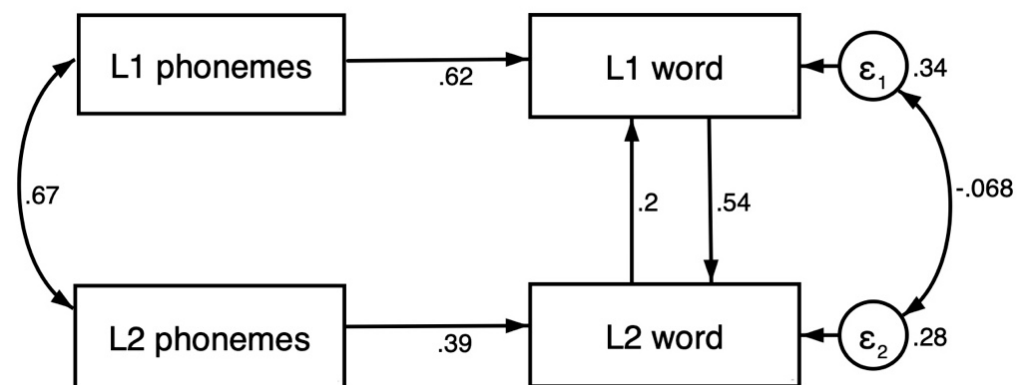
Figure 2. Feedback path model L1 to L2 and L2 to L1.

The exact solution provides a significant bivariate correlation between L1 phonemes and L2 phonemes scores (r = 0.674, *p* < 0.001), suggesting a strong positive association between these scores [52]. The path feedback analysis illustrates that L1 word predicts L2 word (β = 0.545, *p* < 0.001) and L2 word predicts L1 word (β = 0.200, *p* < 0.001), supporting Cummins' interdependence hypothesis (Table 3).

Table 3. Regression standardised structural coefficients.

	Endogenous Variables	
Exogenous Variables	**L1 Word**	**L2 Word**
L1 phonemes	0.617 *** (0.031)	
L1 word		0.545 *** (0.028)
L2 phonemes		0.390 *** (0.021)
L2 word	0.200 *** (0.043)	

*** *p* < 0.001. Number observations 2328.

The discovery of notable links between L1 and L2 abilities in phonemes and word skills can be interpreted as indicative of cross-linguistic transfer. It is important to emphasise, however, that these results demonstrate an association, not the underlying cause. Nevertheless, the presence of an association is often considered a necessary condition for a causal link [56]. When considering the reasons for these observations, they align with the Cummins interdependence framework.

3.3. Multilevel Modelling

Multilevel modelling [57] is a development of regression analysis, taking into account data that are grouped into similar clusters at different levels. In these data, there are three levels with individual pupils grouped into the school attended, and those schools are grouped within states. Note that the pupils in each school are all taught by the same teacher trained in the structured English reading intervention. Multilevel modelling allows us to take account of the hierarchical structure of the data, leading to more accurate predictions and estimates of the differences between pupils, schools, and states.

The multilevel model has three levels: (i) State (11 in total) (ii) School (488 in total) (iii) Pupil (2328 in total). Comparing the base case with the final model shows how much of the variation in the word score achievement across school and state is accounted for. Explanatory independent variables are introduced into the model to try and explain part of the variability in the word score across schools and states. The residual variance is much lower in the final model than in the base model. The residual variance is lower because the state and school variances are partly explained by the introduction of these variables.

In this model, the total variance in the Hausa word (reading) score is equal to 29.212 + 17.056 + 0.063 = 46.331 (Table 4). The multilevel modelling illustrates that 63.1% of the variance is at the pupil level (29.212/46.331). This multilevel modelling result indicates

that the majority of the variation in scores is attributable to the pupil level. Around one third of the variation in the Hausa word (reading) score is due to the school (36.8%), while only 0.1% is due to the state in which the school is situated. The total variance in the English word (reading) score is equal to 28.260 + 13.537 + 0.241 = 42.038. Therefore 67.2% of the variance is at the pupil level, 32.2% at the school level and 0.6% at the state level. The multilevel modelling analysis gives four independent variables that have a positive significant effect. Hausa word (reading) score is significantly predicted through Hausa sound (B = 0.565, *p* < 0.001) and English word (B = 0.540, *p* < 0.001) scores. Similarly, the English word score is significantly predicted through Hausa word (B = 0.555, *p* < 0.001) and English sound (B = 0.407, *p* < 0.001) scores.

Table 4. Multilevel model for English and Hausa test scores.

Dependant Variable	Hausa Word Score		English Word Score	
	Estimate	Standard Error	Estimate	Standard Error
Base Case				
Intercept	17.778 ***	0.694	18.176 ***	0.791
Pupil variance	67.344	2.219	61.314	2.023
School variance	93.238	7.365	89.493	7.047
State variance	1.757	2.565	3.080	3.448
Final Model				
Pupil variance	29.212	0.981	28.260	0.934
Hausa sound score	0.565 ***	0.023		
Hausa word score			0.555 ***	0.014
English word score	0.540 ***	0.016		
English sound score			0.407 ***	0.017
School variance	17.056	1.677	13.537	1.418
State variance	0.063	0.334	0.241	0.557

2328 pupils, 488 schools and 11 states. *** *p* < 0.001.

We use quasi-effect sizes [58,59] to assess the relative strengths of different factors and illustrate how much difference each makes on the expected pupil Hausa and English word scores. The quasi-effect sizes convey the average change in the outcome, expressed as a percentage of the outcome standard deviation, for an average change in the background variable. The effect sizes are multiplied by 100 in Table 5 below for clarity.

Table 5. Quasi-Effect sizes.

Hausa Word Score		English Word Score	
Hausa sound score	51.1	English sound score	46.7
English word score	73.5	Hausa word score	81.1

The formula $100 \times B \times 1.41 \times s/S$, is used to calculate the quasi-effect size, with s as the standard deviation of the background measure (independent variable) and S the standard deviation of the outcome (dependant variable).

Looking at the quasi-effect size, having a higher English word score increases the Hausa word score by 73.5% of the Hausa word score standard deviation. Similarly, having a higher Hausa word score increases your English word score by 81.1% of the English word score standard deviation. The multilevel modelling results illustrate the significant language transfer combinations (L2 to L1 and L1 to L2) and support our hypothesis of a relationship in cross-language learning.

4. Discussion and Implications for Practice and Policy

This paper investigates the linguistic interdependence of Grade 3 children studying in government primary schools in northern Nigeria who are learning to read in Hausa (L1) and English (L2) simultaneously. A total of 2328 Grade 3 children were tested on their

Hausa and English letter sound knowledge and decoding skills after participating in a two-year English structured reading intervention programme as part of their school day. Three research questions were considered to investigate the overarching interest concerning whether there is any bidirectionality of language crossover when a tailored systematic instructional process is used to teach children to read.

The first question considers whether there are any associations between phoneme and decoding scores between and within L1 and L2. Carrying out bivariate correlations we find a large and strongly positively significant correlation between L1 and L2 test scores. As found in a meta-analysis of 22 studies by Melby Lervåg and Lervåg [25], both instructional languages at school (L1 and L2) and the closeness of the writing system between Hausa and English would seem to play a role in the correlations between Hausa and English letter sound knowledge (r = 0.674, $p < 0.01$) and Hausa and English decoding (r = 0.798, $p < 0.01$). The awareness of phonemes is seen as a predictor of reading ability across alphabetic languages [10,21–23]. The bivariate correlations between L1 (Hausa) sounds and L2 (English) decoding (r = 0.674, $p < 0.01$) and L2 (English) sounds and L1 (Hausa) decoding (r = 0.553, $p < 0.01$) would seem to add further support to this literature. Decoding is a foundational skill that allows for reading fluency [26–28]. Looking at L1 sounds to L1 decoding (r = 0.751, $p < 0.01$) and L2 sounds to L2 decoding (r = 0.691, $p < 0.01$) with this set of children, their letter awareness allows for the foundational skill of decoding.

The second question explores the bidirectional associations between L1 and L2 decoding as per the interdependence hypothesis [1,4] using a feedback path model [53,54]. Concerning bidirectionality, the feedback path model illustrates that L1 word predicts L2 word and vice versa. That is, L1 word score is a predictor of L2 word score (β = 0.545, $p < 0.001$) and L2 word score predicts L1 word score (β = 0.200, $p < 0.001$). L1 and L2 letter sound knowledge (phoneme) are a strong predictor of decoding scores.

The final question uses multi-level modelling to consider the variation in test scores and how this affect predicts associations. Almost two thirds of the variation in the word score (L1 63.1% and L2 67.2%) is attributable to the pupil level and one third to the school level (L1 36.8% and L2 32.2%). Hausa word score is significantly predicted through Hausa sound (ES 0.511) and English word score (ES 0.735). English word score is significantly predicted through Hausa word (ES 0.811) and English sound score (ES 0.467). Our findings clearly support Cummins' Interdependence Hypothesis [1,4], with the overall results supporting bidirectionality and linguistic interdependence. This has implications for language policy and classroom instruction, showing the importance of cross-language transfer between reading skills.

The findings show that it is possible for literacy skills in L1 and L2 to be built alongside each other. L1 and L2 literacy skills are bidirectional. The teaching of bilingual education allows for a common underlying proficiency in both languages, as they are not separate but connected to each other. When practices are structured and part of a planned curriculum, there will be a positive effect on both L1 and L2 languages. The transfer of literacy related skills occurs both ways and is hence bidirectional. In the Nigeria context, teaching L1 and L2 for the first three years of primary education where L2 is taught as a subject would seem to be the correct approach alongside structured and planned curriculum. This research finds no negative affect on either language with regard to letter sound knowledge or decoding. Currently, children in Nigeria become part of an English immersion programme at Grade 4 to provide them with the skills, knowledge, and ability to participate in a globalised world and to become global citizens. Language is part of cultural heritage, history, and identity; therefore, to achieve the goal of preparing young people for global participation, as well as expanding and strengthening the language of their heritage, Hausa needs to continue to play a meaningful part in the school curriculum.

Author Contributions: Conceptualization, P.D., L.G. and C.C.; Methodology, S.H. and P.D.; Formal analysis, S.H.; Data curation, L.G.; Writing—original draft, S.H., P.D., L.G. and C.C.; Writing—review & editing, L.G. and C.C. All authors have read and agreed to the published version of the manuscript.

References

1. Cummins, J. The role of primary language development in promoting educational success for language minority students. In *Schooling and Language Minority Students: A Theoretical Framework*; California State Department of Education, Ed.; California State University: Los Angeles, CA, USA; Evaluation, Dissemination and Assessment Center: Sacramento, CA, USA, 1981.
2. Cummins, J. Teaching for Transfer in Multilingual School Contexts. In *Bilingual and Multilingual Education*; Garcia, O., Lin, A.M.Y., May, S., Eds.; Springer: Cham, Switzerland, 2017; pp. 103–117.
3. Cummins, J. Immersion Education for the Millennium: What Have We Learned from 30 Years of Research on Second Language Immersion? In Proceedings of the Second Katoh Gakuen International Symposium on Immersion and Bilingual Education, Katoh Gakuen, Japan; 1998; pp. 34–47. Available online: https://www.researchgate.net/publication/255638397_Immersion_Education_for_the_Millennium_What_We_Have_Learned_from_30_Years_of_Research_on_Second_Language_Immersion (accessed on 1 January 2024).
4. Cummins, J. *Rethinking the Education of Multilingual Learners. A Critical Analysis of Theoretical Concepts*; Multilingual Matters: Bristol, UK, 2021.
5. de Galbert, P.G. Language transfer theory and its policy implications: Exploring interdependence between Luganda, Runyankole-Rukiga, and English in Uganda. *J. Multiling. Multicult. Dev.* **2023**, *44*, 1–19. [CrossRef]
6. Cummins, J.; Swain, M. *Bilingualism in Education: Aspects of Theory, Research and Practice*; Longman: London, UK, 1986.
7. Appel, R.; Muysken, P. *Language Contact and Bilingualism*; Edward Arnold: London, UK; Baltimore, MD, USA, 1987.
8. Krashen, S.; Biber, D. *On Course: Bilingual Education's Success in California*; California Association for Bilingual Education: Sacramento, CA, USA, 1988.
9. Genesee, F. What do we know about bilingual education for majority language students? In *Handbook of Bilingualism and Multiculturalism*; Bhatia, T.K., Ritchie, W., Eds.; Blackwell: Malden, MA, USA, 2004; pp. 547–576.
10. Jared, D.; Cormier, P.; Levy, B.A.; Wade-Woolley, L. Early predictors of biliteracy development in children in French immersion: A 4-year longitudinal study. *J. Educ. Psychol.* **2011**, *103*, 119–139. [CrossRef]
11. Verhoeven, L. Acquisition of biliteracy. *AILA Rev.* **1991**, *8*, 61–74.
12. Gebauer, S.K.; Zaunbauer, A.C.M.; Moller, J. Cross-language transfer in English immersion programs in Germany: Reading comprehension and reading fluency. *Contemp. Educ. Psychol.* **2013**, *38*, 64–74. [CrossRef]
13. Usborne, E.; Caouteet, J.; Qumaaluk, Q.; Taylor, D.M. Bilingual education in an Aboriginal context: Examining the transfer of language skills from Inuktitut to English or French. *Int. J. Biling. Educ.* **2009**, *12*, 667–684. [CrossRef]
14. Trudell, B. *Language and Education in Nigeria: A Review of Policy and Practice*; British Council and UNICEF: Abuja, Nigeria, 2018; Available online: https://www.britishcouncil.org.ng/sites/default/files/j149_language_and_education_nigeria_final_web.pdf (accessed on 28 December 2023).
15. Adebayo, T.A. An evaluation of code-mixing and switching strategies on the efficacy of primary 1 pupils in numeracy in Kwara State. In *The Abuja Regional Hornby School: Language Lessons from Africa*; McIlwraith, H., Ed.; British Council: London, UK, 2016; pp. 25–30.
16. Kim, Y.S.G.; Piper, B. Cross-language transfer of reading skills: An empirical investigation of bidirectionality and the influence of instructional environments. *Read. Writ.* **2019**, *32*, 839–871. [CrossRef]
17. Wawire, B.A.; Kim, Y.S.G. Cross-language transfer of phonological awareness and letter knowledge: Causal evidence and nature of transfer. *Sci. Stud. Read.* **2018**, *22*, 443–461. [CrossRef]
18. Veii, K.; Everatt, J. Predictors of reading among Herero–English bilingual Namibian school children. *Biling. Lang. Cogn.* **2005**, *8*, 239–254. [CrossRef]
19. Adams, M.J. *Beginning to Read: Thinking and Learning about Print*; MIT Press: Cambridge, MA, USA, 1990.
20. National Institute of Child Health and Human Development (NICHD). *Report of the National Reading Panel. Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Is Implications for Reading Instruction*; Reports of the Subgroups; U.S. National Institutes of Health Publication No. 00-4769; U.S. Government Printing Office: Washington, DC, USA, 2000.
21. Gottardo, A. The relationship between language and reading skills in bilingual Spanish-English speakers. *Top. Lang. Disord.* **2002**, *22*, 46–70. [CrossRef]

22. Deacon, S.H.; Wade-Woolley, L.; Kirby, J. Crossover: The role of morphological awareness in French immersion children's reading. *Dev. Psychol.* **2007**, *43*, 723–746. [CrossRef]

23. Gottardo, A.; Mueller, J. Are First- and Second-Language Factors Related in Predicting Second-Language Reading Comprehension? A Study of Spanish-Speaking Children Acquiring English as a Second Language from First to Second Grade. *J. Educ. Pshchol.* **2009**, *101*, 330–344. [CrossRef]

24. Durgunoğlu, A.Y. Cross-linguistic transfer in literacy development and implications for language learners. *Ann. Dyslexia* **2002**, *52*, 189–204. [CrossRef]

25. Melby-Lervåg, M.; Lervåg, A. Reading comprehension and its underlying components in second-language learners: A meta-analysis of studies comparing first- and second-language learners. *Psychol. Bull.* **2014**, *140*, 409–433. [CrossRef]

26. Fuchs, L.S.; Fuchs, D.; Hosp, M.K.; Jenkins, J.R. Reading competence: A theoretical, empirical, and historical analysis. *Sci. Stud. Read.* **2001**, *5*, 239–256. [CrossRef]

27. Kim, Y.S.G. Developmental, component-based model of reading fluency: An investigation of predictors of word-reading fluency, text-reading fluency, and reading comprehension. *Read. Res. Q.* **2015**, *50*, 459–481. [CrossRef]

28. Carlisle, J.F.; Katz, L.A. Effects of word and morpheme familiarity on reading of derived words. *Read. Writ.* **2006**, *19*, 669–694. [CrossRef]

29. UNICEF. Language in Education in Nigeria: Phase 2. 2022. Available online: https://www.unicef.org/nigeria/media/7861/file/Language%20in%20Education%20Report.pdf (accessed on 28 December 2023).

30. UNICEF. Education in Nigeria: Evaluation of the Effectiveness and Impact of SDG4. 2022. Available online: https://nationalplanning.gov.ng/wp-content/uploads/2023/02/SDG-4-Education-in-Nigeria.pdf (accessed on 28 December 2023).

31. Oyetunde, T.; Ojo, G.; Korb, K.; Babudoh, G. Improving literacy instructional practices in primary schools in Nigeria: Strategies that work. *LICEJ* **2016**, *6*, 2323–2328. [CrossRef]

32. Ogunode, N.J.; Mbata, F.O.; Ayoko, V.O. School Administrators in Basic Education in Nigeria. *CAJMTCS* **2023**, *4*, 9–17. Available online: https://cajmtcs.centralasianstudies.org/index.php/CAJMTCS/article/view/464 (accessed on 28 December 2023).

33. Ibrahim, J.; Gwandu, S.A. Language Policy on Education in Nigeria: Challenges of Multilingual Education and Future of English Language. *Am. Res. J. Engl. Lit.* **2016**, *2*, 1–10. [CrossRef]

34. Opanuga, A.A.; Okagbue, H.I.; Oguntunde, P.E.; Bishop, S.A.; Ogundile, O.P. Learning Analytics: Issues on the Pupil-Teacher Ratio in Public Primary Schools in Nigeria. *Int. J. Emerg. Technol. Learn.* **2019**, *14*, 180–199. [CrossRef]

35. Adamu, A.; Tsiga, A.U.; Zuilkowski, S.S. Teaching reading in Northern Nigeria: The challenges of large class size. *Pedagog. Cult. Soc.* **2022**, *30*, 225–242. [CrossRef]

36. Adeniran, A.; Ishaku, J.; Akanni, L.O. Is Nigeria experiencing a learning crisis: Evidence from curriculum-matched learning assessment. *Int. J. Educ. Dev.* **2020**, *77*, 102199. [CrossRef]

37. NERDC. *National Policy on Education: Federal Republic of Nigeria*; NERDC: Lagos, Nigeria, 2013.

38. NERDC. *National Language Policy*; NERDC: Lagos, Nigeria, 2022.

39. NERDC. *National Reading Framework*; NERDC: Lagos, Nigeria, 2023.

40. Laitin, D.D.; Ramachandran, R.; Walter, S.L. The Legacy of Colonial Language Policies and Their Impact on Student Learning: Evidence from an Experimental Program in Cameroon. *Econ. Dev. Cult. Chang.* **2019**, *68*, 239–272. [CrossRef]

41. Kerwin, J.T.; Thornton, R.L. Making the Grade: The Sensitivity of Education Program Effectiveness to Input Choices and Outcome Measures. *Rev. Econ. Stat.* **2021**, *103*, 251–264. [CrossRef]

42. Piper, B.; King, S.; Mugenda, A. *USAID/Kenya Primary Math and Reading (PRIMR) Initiative: Endline Impact Evaluation—Revised Edition*; Prepared under the USAID EdData II Project, Task Order No. AID-623-M-11-00001 (RTI Task 13); RTI International: Research Triangle Park, NC, USA, 2016.

43. Counihan, C.; Humble, S.; Gittins, L.; Dixon, P. The effect of different teacher literacy training programmes on student's word reading abilities in government primary schools in Northern Nigeria. *Sch. Eff. Sch. Improv.* **2021**, *33*, 198–217. [CrossRef]

44. UNICEF. *Girls' Education Project Phase 3 (GEP3) in Northern Nigeria Final Evaluation Report*; United Nations Children's Fund: Abuja, Nigeria, 2022; Available online: https://www.unicef.org/nigeria/media/7846/file/GEP3%20Final%20Evaluation%20Brief.pdf (accessed on 28 December 2023).

45. Barnes, A.E.; Boyle, H. *Baseline Assessment of Pre-Service Teacher Education Programs and Teacher Education Institutions in Bauchi and Sokoto States, Nigeria*; Report No. AID-620-C-15-00002; USAID: Washington, DC, USA, 2018.

46. Barnes, A.E.; Boyle, H.; Zuilkowski, S.S.; Bello, Z.N. Reforming teacher education in Nigeria: Laying a foundation for the future. *Teach. Teach. Educ.* **2019**, *79*, 153–163. [CrossRef]

47. Nigerian Partnership for Education Project (NIPEP). *Final Report on Conduct of Early Grade Reading and Learning Assessment of the NIPEP in Five States*; Federal Ministry of Education, Department of Basic and Secondary Education World Bank: Washington, DC, USA, 2019.

48. Bulat, J.; Brombacher, A.; Slade, T.; Iriondo-Perez, J.; Kelly, M.; Edwards, S. *Projet d'Amélioration de la Qualité de l'Education (PAQUED): 2014. Endline Report of Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA)*; Prepared for USAID under Contract No. AID-623-A-09-00010; Education Development Center and RTI International: Washington, DC, USA, 2014.

49. USAID. *Early Grade Reading Assessment Toolkit: Nigeria Northern Education Initiative, Nigeria*; USAID: Washington, DC, USA, 2016.

50. Burdenski, T. Evaluating univariate, bivariate, and multivariate Normality using graphical and statistical procedures. *MLRV* **2000**, *26*, 15–28.
51. Gravetter, F.; Wallnau, L. *Essentials of Statistics for the Behavioural Sciences*, 8th ed.; Wadsworth: Belmont, CA, USA, 2014.
52. Humble, S. *Quantitative Analysis of Questionnaires: Techniques to Explore Structures and Relationships*; Routledge: London, UK; New York, NY, USA, 2020.
53. Kenny, D.A. *Correlation and Causality*; John Wiley and Sons: New York, NY, USA, 1979.
54. Kline, R.B. *Principles and Practice of Structured Equation Modelling*, 4th ed.; Methodology in the Social Sciences; Guildford Press: Guilford, UK, 2016.
55. Loehlin, J.C.; Beaujen, A.A. *Latent Variable Models*; Routledge: New York, NY, USA, 2017.
56. Bollen, K.A. *Structural Equations with Latent Variables*; Wiley Series in Probability and Mathematical Statistics; Wiley: New York, NY, USA, 1989.
57. Goldstein, H. *Multilevel Statistical Models*, 3rd ed.; Edward Arnold: London, UK, 2003.
58. Schagen, I. Presenting the results of complex models—Normalised coefficients, star wars plots and other ideas. In *But What Does It Mean? The Use of Effect Sizes in Educational Research*; Schagen, I., Elliot, K., Eds.; National Foundation for Educational Research: Slough, UK, 2004; pp. 25–41.
59. Dixon, P.; Schagen, I.; Seedhouse, P. The impact of an intervention on children's reading and spelling ability in low-income schools in India. *Sch. Eff. Sch. Improv.* **2011**, *22*, 461–482. [CrossRef]