

**Reading in two languages: Parents' strategy and language use across book
formats during bilingual shared reading**

Erin Quirk (<https://orcid.org/0000-0002-2467-2894>)^a,

Melanie Brouillard (<https://orcid.org/0000-0002-7129-3221>)^a,

Krista Byers-Heinlein (<https://orcid.org/0000-0002-7040-2510>)^a

^a*Concordia University*

Corresponding author:

Erin Quirk

Concordia Infant Research Laboratory

Psychology Department

7141 Sherbrooke St. West

PY-033, Montreal, QC H4B 1R6,

CANADA, Email: erinnora.quirk@concordia.ca

Phone: 514-848-2424 ext. 5831

Reading in two languages: An analysis of the quantity and quality of bilingual parent-child shared reading

This study asked how bilingual parents read to their children in two languages. Data were collected in Montreal, Quebec, where French and English are spoken widely. Parents read children three books in different formats: books in their dominant language, books in their non-dominant language, and bilingual books. Parents' quality and quantity of reading in any language was stable across formats, but non-dominant language use was highest with books written in that language. Overall, parents relied most on the dominant language during story discussion but provided children with high-quality reading interactions in both languages, regardless of their proficiency in the languages.

Word count: 100

Keywords: shared reading, literacy, bilingual development, bilingual books

Introduction

Shared reading—when an adult reads to a child—boosts children's language and literacy development. Specifically, children who are read to often and in ways that increase their engagement show superior gains in word learning (Ard & Beverly, 2004; Sénéchal & LeFevre, 2002). For preschool-aged children, parents are an important source of such reading interactions, and in monolingual contexts, parents vary in how frequently they read to children (Sénéchal et al., 1996) and employ strategies to increase child engagement when reading (Dexter & Sacks, 2014). Shared reading practices may be even more variable in bilingual families, given that time and resources are divided between two languages, and parents may have different skill levels in each language. Indeed, parents report reading less often to children and owning fewer children's books in the family's weaker language (Gonzalez-Barrero et al., 2021). This imbalance could have implications for bilingual children's development given that time reading with parents in each language has been related to children's outcomes in that language (Patterson, 2002).

In addition to how frequently parents read with children in their languages, the *nature* of

shared reading may differ across families' two languages. However, with so few studies that directly observe parents reading to their children in two languages, this remains unclear. In particular, we know little about how parents' proficiency in each language affects shared book-reading practices. It may be that in addition to reading less often to children and owning fewer children's books in the family's weaker language (Gonzalez-Barrero et al., 2021), parents also talk less and evoke their children's participation less when reading books in their non-dominant language, in other words, engage in lower quality shared reading interactions.

Parents raising bilingual children can read books of different formats. They can read books written in one of their two languages, or bilingual books—books written in two languages. This format may facilitate parents' reading if the presence of the story in the dominant language provides scaffolding which allows parents to discuss and read in more engaging ways in their non-dominant language. However, to our knowledge, this possibility has not been tested.

We address these gaps by observing French-English bilingual parents with varying proficiency in these languages as they read bilingual and single-language books to their preschool-aged children. We examine the extent to which parents use the two languages and reading strategies that may support children's comprehension and learning while reading different book types. In the following sections, we introduce the study's sociolinguistic context, overview literature on shared reading and the bilingual book format, and discuss factors that may determine parents' language choices in reading.

Sociolinguistic Context

This study took place in Montreal, the urban center of the Canadian province of Quebec. In Quebec, the official language is French; however, there is also a sizable English-speaking minority in Montreal, officially recognized under Canadian law. Both French and English are

used widely in Montreal and held in high esteem (Kircher, 2014). This sociolinguistic context is fairly unique in North America in that two languages function as majority languages. There are both French and English-language public schools, although French-language schools are more common. Early childhood care is available in both French and English. French and English literacy materials are also widely available from the city's public libraries and bookstores. This unique sociolinguistic context allowed us to view the effect of parents' proficiency on shared reading in two languages while controlling for social variables that are often confounded with bilingualism, such as the family's socioeconomic status, the immigrant status of parents and the status of the languages in society.

Shared reading frequency and use of dialogic and bilingual reading strategies

The frequency with which children engage in shared reading predicts their vocabulary development (Sénéchal et al., 2008), which in turn facilitates their literacy development (Sénéchal & LeFevre, 2002). Certain adult behaviors, such as asking children questions and eliciting predictions, constitute high-quality reading behaviors, in that they enhance the beneficial effect of shared reading on language learning. These behaviors, called *dialogic reading strategies* (dialogic RS), elicit children's active participation in shared reading (Whitehurst et al., 1994) and induce a "shift in roles" (Lonigan et al., 1999, p. 307), whereby the child also acts as storyteller. The use of such strategies leads to improved vocabulary development in young monolingual children (e.g. Whitehurst et al., 1988).

Few studies have investigated the relationship between shared reading frequency and dialogic RS use on bilingual children's language learning outcomes. Those that have reported that parents in bilingual families use similar strategies as parents in monolingual families (Jiménez et al., 2006; Boyce et al., 2004) and the use of such strategies has similar facilitatory

effects on word learning (Patterson, 2002; Quiroz et al., 2010). Researchers have also asked whether reading in one language might confer benefits in another language. Cross-language benefits to word learning have not been observed (Ryan, 2021; Patterson, 2002), perhaps because word learning is generally language-specific. Since shared reading seems to primarily affect learning in the language in which books are read, it is important to understand how bilingual parents use each of their languages when reading to their children.

Bilingual parents can also use reading strategies that are unavailable to monolingual families, such as switching to the other language in discussions of the story and translating new words (Gonzalez-Barrero et al., 2021). We call these bilingual reading strategies (bilingual RS). To our knowledge, how bilingual RS impact word learning has not been directly examined. In investigations of spoken parent-child interactions, findings are mixed. For example, parental code-switching – the mixing of two (or more) languages in discourse – has been associated with slower vocabulary development in some contexts (Byers-Heinlein, 2013), while in others, parental code-switching of a certain kind (across, not within sentences) has been linked to faster vocabulary development (Bail et al., 2015). More recently, analyses of day-long parent-child recordings have revealed that parents strategically use code-switching to boost children’s understanding and teach them new words (Kremin et al., 2022). Bilingual RS may enhance shared reading quality, similar to dialogic RS. Specifically, “code-switching” children’s books, which embed words in a child’s weaker language into sentences in the child’s stronger language, have been found to improve word learning relative to traditional single-language books in the child’s weaker language (Read et al., 2021a). This is in line with the literature on code-switching in the L2 classroom, which finds that bridging behaviors that leverage knowledge in a stronger language support development in the weaker language (e.g. Lugo-Neris et al., 2010).

Bilingual books

Bilingual books have been proposed as a means for developing biliteracy and bilingual language skills (Domke, 2018). Supporting this proposal, in Urdu/Punjabi-English bilingual children, shared reading with bilingual books in the classroom promoted knowledge of English letter-sound correspondences (Naqvi et al., 2013). In a laboratory setting, children learned novel words in English and French equally well when presented in single-language and bilingual book formats (Brouillard et al., 2022). An additional benefit to bilingual books is that they make more efficient use of bilingual families' resources, as one bilingual book is equivalent to two single-language books. Given that parents have limited resources and generally own more dominant language books (Gonzalez-Barrero et al., 2021), the availability of bilingual books could boost children's access to stories in the non-dominant language.

Bilingual books can take many formats. Most of the above-mentioned studies, as well as the current study, involved *dual-language books*, in which all story text appears in both languages. In the United States, another genre gaining in popularity is "*code-switching*" books, in which words in a non-English language (often Spanish) are interwoven into stories largely told in English (Chaudri & Torres, 2021). Typically, the intent of these books is to support learners whose dominant language is English. The majority language status of both English and French in Montreal may be why this style of bilingual book is rarer than dual-language books, although bilingual books in general are uncommon (Gonzalez-Barrero et al., 2021).

Parental language use, language dominance and book format

Bilingual parents' language choices have implications for their children's development. Specifically, the amount of time young children are spoken to and read to in a language is a predictor of their development in that language (Hammer et al., 2011). Parents' choices about

which language to use with their child may be based on their relative proficiency in their languages (e.g., Ballinger et al., 2020). Relative proficiency can be expressed continuously in terms of the size of the difference in proficiency across languages; this is often called *language balance*. It can also be expressed categorically, that is, in terms of having a *dominant* and a *non-dominant* language. Bilingual parents reported reading to their children more often in their dominant language than their non-dominant language (Read et al., 2021b), a pattern strongest in families with the least balanced proficiency in their languages (Gonzalez-Barrero et al., 2021). When a single language is dominant in the community, this imbalance favors that language over the home language (e.g. Luo et al., 2021). However, other factors may influence parents' language choices. In a study of bilingual families in Ontario, a predominantly anglophone province in Canada, 66% of parents reported reading to children in both of their languages, while only 24% of parents reported using both languages when speaking with their co-parent. This suggests that different factors (e.g. the desire to support children's learning in one or both languages) motivated their language choices with children than with adult family members (Slavkov, 2017). Thus, it seems that while parents generally prefer reading in their stronger language, other factors may override this preference.

One such factor may be the book's language, which we refer to as *book format*. Bilingual parents may read *single-language* books written entirely in one language, or bilingual books, which use both languages. Little is known about parents' language choices while reading in these different book formats. In one case study of a bilingual English-Mandarin family in the United States, the mother read the book text in English, the family's non-dominant language, but switched to Mandarin to discuss the book with her children to facilitate their understanding (Yang et al., 2021). This is in line with the finding that parents report switching to the other

language more often when reading books in their non-dominant language than in their dominant language (Gonzalez-Barrero et al., 2021), and predicts that parents will code-switch more frequently when reading the non-dominant than dominant book format. Studies with bilingual books are rare; however, in one study of six families transmitting French and a heritage language in Quebec, parents most often read bilingual books in a single language, although which language they used differed across parents (Gosselin-Lavoie & Armand, 2019).

Finally, another factor that may influence parents' language choices is their child's language dominance. Parents are sensitive to their children's language development and adapt their language use accordingly (e.g. De Houwer & Bornstein, 2016). Thus, they may tailor their language use in reading to accommodate gaps in their children's vocabulary knowledge, for example, providing translations, as has been observed in spoken interactions (Kremin et al., 2022). Thus, in parent-child dyads with different dominant languages, parents' preference to read in their dominant language may be overridden by their desire to boost children's comprehension.

In addition to the frequency with which bilingual parents read in a given language, there is the question of how frequently parents produce dialogic RS in a specific language. Parents of bilingual children with different home languages reported producing similar rates of dialogic RS overall (Read et al., 2021b); however, the rate at which dialogic RS are produced in a specific language has not, to our knowledge, been explored.

Research Questions and Hypotheses

In this study, we analyzed language use during shared book reading in terms of the *quantity* produced by parents, the number of words used while reading and discussing the book, and *quality*, how frequently they used dialogic and bilingual RS. All the above measures were calculated *language-agnostically*, considering all productions in either language, and *language-*

specifically, considering parents' dominant and non-dominant languages separately. Our analyses also considered the book format parents were reading: single-language books in their dominant language, bilingual books with text in both languages, and single-language books in their non-dominant language. Our research questions (RQ) and predictions were pre-registered.

First (RQ1a,b), how does book format influence the quantity and quality of interactions during parent-child shared book reading when measured a) language-agnostically and b) language-specifically? For language-agnostic measures, we predicted that parents would produce more speech and bilingual RS in the bilingual format than in the single-language formats, as the presence of the story in both languages would afford unique opportunities for discussions of words and word meanings. We expected, however, that use of dialogic RS would stay stable across book formats. For language-specific measures, we expected the most dominant-language speech and dialogic RS when reading the dominant language book, an intermediate amount when reading the bilingual book, and the least when reading the non-dominant language book. For the non-dominant language, we predicted the inverse pattern, with one caveat: we expected a similar or higher number of dialogic RS when reading the bilingual book compared to the non-dominant language book, due to the presence of both languages in the story facilitating the transfer of dialogic RS across the languages. Finally, we predicted that for both languages, parents would produce the most bilingual RS when reading the bilingual book.

Second (RQ2a,b), how does parent language balance¹ influence the quantity and quality of interactions during parent-child shared book reading when measured a) language-agnostically and b) language-specifically? We predicted that language balance *would not be related to the*

¹ In the pre-registration the word "dominance" was used to refer to continuous dominance, i.e. the difference in parents' proficiency estimates; however for clarity, here we use the term "balance" to distinguish this type of dominance from categorical dominance, i.e. whether the parent is more proficient in French or English.

quantity or quality of parents' shared reading interactions measured language-agnostically, in that parents would maintain a stable quantity and quality of interactions across book formats by using their dominant language to compensate for lower proficiency in their non-dominant language. We also expected individual variation in terms of quality, which would come from other sources outside of the study's scope. We predicted, however, that parents' language balance *would* be related to their language-specific quantity and quality of shared reading. In particular, we expected that the more balanced parents' proficiency was, the more similar quantity and quality would be across their languages; the more unbalanced their proficiency was, the lower the quantity and quality of their non-dominant language compared to their dominant language.

Finally (RQ3), how does parent language balance influence the quantity and quality of interactions during parent-child shared book reading across book formats? We predicted that for bilingual books (compared to other formats), we would observe a weaker relationship between balance and language-specific quantity and quality. We reasoned that the presence of the dominant language could provide scaffolding for parents' reading in the non-dominant language, boosting both the quantity and quality of their shared reading interactions in the non-dominant language.

Method

This study was approved by the Human Research Ethics Committee at Concordia University, and participants provided written consent. The pre-registration, materials, scripts and data are available on the [Open Science Framework \(OSF\)](#). In the following subsections, we describe our participants, materials, procedure, and analyses.

Participants

Participants were recruited through government birth lists and online advertisements. To be included, parents had to have acquired French, English or both as a native language, not speak another language to the child more than 10% of the time², and read or speak to the child at least “occasionally” (a rating of 2 on a 5-point scale from “never” to “always”) in both English and French. Children had to be between 3 and 5 years old and have an estimated proficiency of 3 (on a scale from 0 “no proficiency” to 10 “perfect proficiency”) in both languages. Children born prematurely, with a suspected or diagnosed developmental issue, or with any major medical problem were not recruited. Data collection occurred between December 2021 and June 2022.

The final sample comprised 24 Montreal-based parent-child dyads (23 mothers, 1 father)³. Children (N=13 females) were on average 4 years and 2 months old ($SD = 7$ months). Families reported having mid to high socio-economic status based on parental education: All had completed high school, and 18 had obtained a bachelor’s degree or higher. Parents reported that 15 children and 13 parents were English-dominant while 9 children and 11 parents were French-dominant. 14 parent-child dyads reported different dominances. However, parents’ proficiency was generally high in both languages (English $M=9.1$, $SD=1.4$, French $M=9$, $SD=1.3$), while childrens’ differed slightly more (English $M=7.5$, $SD=2.3$, French $M=7.5$, $SD=2$).

In a language background questionnaire, parents estimated the percentage of time that they spoke and read to their children in each language. Parents were more likely to use a mixed approach when reading than when speaking to their child: 19 parents read to their child in both languages while only 10 parents spoke to their child in both languages.

² This is a widely-used criterion for exposure to a language in bilingualism research (see Place & Hoff, 2011 for discussion).

³ 26 dyads completed the study, but 2 were excluded due to poor sound quality in the recorded reading session.

Books

Three stories were read to all children: *How do I love you...? / Je t'aime comme...*, *Why I love winter/Pourquoi j'aime l'hiver* and *My friends/Mes amis*. These were chosen because they are similar in style, complexity, and length. All featured a word or phrase repeated on each page, such as “I learned to ... from my friend the...” in *My friends*. Four versions of each story were used: a single-language English version, a single-language French version, and bilingual versions with either French appearing before the English equivalent or the inverse. French and English versions of these stories were all commercially available except for the French version of *My friends*, so two native French-speaking research assistants created a translation⁴. Bilingual versions were created by applying stickers to the books. Example pages are shown in Figure 1. The English and French versions of *How do I love you...?* diverged from one another more than the other stories. This was because the translator replaced certain words to maintain a rhyme in the English version. Since these changes could affect how parents read, we edited the English version so that the English and French texts matched more closely.

Questionnaires

A modified version of the Language Experience and Proficiency Questionnaire (Marian et al., 2007; LEAP-Q) was used to assess parents' and children's language background, including language dominance, the age of acquisition, and proficiency estimates on a scale from 0 to 10 for speaking and understanding English and French. Parents also estimated how much they and other primary caregiver(s) used each language with the child. Parents were asked to order their languages and their child's in terms of dominance, which determined categorical dominance

⁴ We were unable to find commercially-available books with French/English translations that matched the other books in terms of age-appropriateness and style.

(French or English) for both. In the case of ties, age of acquisition or proficiency estimates were used. Parent reports are commonly used for assessing children's language dominance and correlate with objective measures of proficiency (e.g. Bedore et al., 2011). For parents only, a continuous balance measure was also calculated, which was the average of the proficiency differentials for speaking and understanding in each language subtracted from 10, the maximum proficiency. Higher quotients indicate greater balance. Parents also completed a demographic questionnaire and the Bilingual Home Reading questionnaire (Gonzalez-Barrero et al., 2021).

Language Quality Coding Scheme

The quality of shared reading was measured through dialogic and bilingual RS use. For bilingual RS, we coded for translations of words/phrases from a dominant to non-dominant language and vice versa, and for code-switching while discussing the story in *extra-textual* speech, or speech related to the book which was not reading. Examples of the 11 dialogic RS⁵ we coded for are listed in the Appendix (Table 1), with detailed descriptions on the OSF. These were chosen because they have been found to support word learning in monolingual (e.g., Whitehurst et al., 1988) and bilingual children (Quiroz et al., 2010).

Three trained bilingual research assistants transcribed and coded the recorded reading sessions using ELAN (version 6.4), which was then reviewed by another research assistant who identified and discussed potential inconsistencies with the original transcriber/coder. Any unsettled issues were then resolved by the first author. Two recordings, containing 362 adult utterances, were double-coded to assess inter-rater reliability. The resulting files differed minimally (by 1 word/dialogic RS or less) in 97.5% and 95% of utterances, respectively.

⁵ We planned to include pointing as a dialogic RS in our pre-registration; however, pointing was not always visible, so we omitted this strategy. We also noticed frequent use of a fill-in-the-blank strategy not in the pre-registration, which we then added to our coding scheme.

Procedure

Data were collected remotely due to the COVID pandemic over two sessions. In an initial Zoom/phone call, parents provided informed consent and the researcher administered the LEAP-Q. Then, parents completed the other online questionnaires independently in the order of their choice. Finally, parents were mailed three books adhering to one of 12 book orders that were counterbalanced in terms of the book format: in their dominant language, their non-dominant language, or bilingual (itself counterbalanced for dominant or non-dominant language first). The order of the three stories was fixed. For example, a French-dominant parent assigned to the order 1) dominant language book, 2) bilingual book, and 3) non-dominant language book would have received *How do I love you....?* in French, *My Friends* in bilingual format, and *Why I love winter* in English. In a second recorded Zoom session, the researcher met with the parent and child at their home, and asked parents to read the three stories. Apart from story order, parents were told to read however felt natural to them. Then, the researcher turned off their video/sound to minimize distractions. After the reading was finished, the researcher followed up with questions about the parent's and child's impressions of the books. Sessions ranged from 8 to 30 minutes.

Analyses

All analyses were performed in the open-source statistical language R. To view the independent contributions of parents' language balance and book format to quantity and quality of shared reading, we ran linear mixed-effects models predicting quantity and quality of shared reading (that is, number of words⁶, number of bilingual RS, and number of dialogic RS) from book format (RQ1) and parents' language balance (RQ2). All models also included a random effect for participant to account for within-subject variance. In cases where the overall coefficient for

⁶ All speech was tokenized with `udpipe` in R (Wijffels, 2021) and then words spoken by the parent were counted.

the model was significant, post-hoc pairwise *t*-tests were run to investigate the nature of differences.⁷ To test for differences in the effects of parents' language balance across book formats (RQ3), we ran two sets of linear mixed-effects models: the first predicted the number of words and RS with parents' language balance and book format as fixed effects (additive models), and the second was identical to the first set but with an interaction term for language balance by book format (interaction models). We then compared the additive and interaction models with an ANOVA to see if adding the interaction term significantly improved the fit of the models.

Results

Language-Agnostic Effects of Book Format on Shared Reading Interactions (RQ1a)

As predicted, book format affected the number of words parents produced in either language ($p < .01$). Parents on average produced 124 more words when reading the bilingual book than when reading the dominant-language book. To test whether this was due to the bilingual book containing more text (i.e. the story is written twice), we ran the same analyses with only the parents' extra-textual speech. In these analyses, the number of words produced across book formats was not significantly different, suggesting this was indeed the case.

We also investigated the effect of book format on language-agnostic quality in terms of dialogic and bilingual RS. Parents produced similarly high numbers of dialogic RS on average across book formats: 35.1 ($SD=34.2$), 26.7 ($SD=23.2$) and 31.3 ($SD=25.1$) in the dominant, bilingual, and non-dominant book readings, respectively. As predicted, the number of bilingual RS differed significantly ($p < .001$). On average, parents produced 10 more bilingual RS when reading the bilingual book and 16 more bilingual RS when reading the non-dominant language

⁷ Note that due to space constraints, these results are summarized in table format in the Appendix (Table 8).

book than the dominant language book (Appendix Table 2). [FIGURE 2]

To better understand the nature of the effect of book format on bilingual RS, we conducted exploratory (i.e., not pre-registered) analyses on each of the three types of bilingual RS separately, that is, for translation from a dominant into a non-dominant language, translation from a non-dominant into a dominant language, and code-switching when discussing the book. We ran the same models as for RQ1a, but predicting production of each bilingual RS type separately. Book format was not a significant predictor of translations in either direction but did predict extra-textual code-switching ($p < .01$). Parents switched approximately 5 and 10 more times when reading the bilingual and non-dominant language books, respectively, relative to the dominant book (Appendix: Table 3). Note that, on average, parents produced far more extra-textual code-switches per book ($M=9.6$, $SD=11.1$) than translations from the dominant into a non-dominant language ($M=0.7$, $SD=1.5$) or in the opposite direction ($M=0.6$, $SD=2.2$).

In another exploratory analysis, we investigated whether the effect of book format on the production of bilingual RS differed across parents that shared the dominant language of their child and those that did not. Specifically, we wanted to know if parents who did not share a dominant language with their child followed the general pattern of producing fewer code-switches while discussing a book written in their dominant language. We found that low use of bilingual RS was specific to parent-child dyads with the same dominant language when reading the dominant language book; in all other conditions, parents did use bilingual RS. [FIGURE 3]

Language-Specific Effects of Book Format on Shared Reading Interactions (RQ1b)

As predicted, there was also a significant effect of book format on the number of words parents produced in their dominant and non-dominant languages ($ps < .001$). We focus on the non-dominant language here since the results for the dominant language were generally the inverse.

Parents produced more words in the non-dominant language when reading the non-dominant language book (238 more words) and bilingual book (189 more words) than when reading the dominant language book, as seen in Figure 4. [FIGURE 4]

As for parents' use of dialogic RS, as predicted, there was also a significant relationship between book format and production of dialogic RS in the dominant language ($p < .01$): parents produced more dialogic RS in the dominant language when reading the dominant language book in comparison to the bilingual (12 more RS) and non-dominant language (13 more RS) books. However, the effect of book format on the production of dialogic RS in the non-dominant language was not significant ($p = .13$). Parents on average produced 9 more dialogic RS when reading the non-dominant language book compared to the dominant language book (Appendix: Table 4), but this difference was marginally significant ($p = .05$). Thus, against our prediction, the presence of the stronger language in the bilingual book did not bolster parents' production of dialogic RS in the non-dominant language. On average, parents produced fewer dialogic RS in the non-dominant language while reading the bilingual book than the non-dominant language book, although the difference was not significant. [FIGURE 5]

As for bilingual RS, there was a significant effect of book format on both the production of bilingual RS in the dominant language ($p < .01$) and in the non-dominant language ($p < .001$). As seen in Figure 6, parents' use of bilingual RS in the dominant and non-dominant languages followed a similar pattern across book formats. For bilingual RS in both languages, parents produced more when reading the non-dominant language book and the bilingual book (although the difference was marginally significant for dominant language bilingual RS, $p = .06$) than when reading the dominant language book (Appendix: Table 4). This was counter to our prediction that the most bilingual RS would occur when reading the bilingual book. [FIGURE 6]

Effects of Balance on Shared Reading Interactions (RQ2a, RQ2b)

We had hypothesized that in addition to categorical dominance, which was encoded in the book format variable, parents' language balance would be related to the quantity and quality of their language-specific (but not language agnostic) shared reading interactions. Contrary to predictions, we found no significant relationships between language balance and any measure of quantity or quality (Appendix: Tables 5 and 6).

While the relationship did not reach significance ($p=.12$), the regression lines in Figure 7 show that the less balanced parents were, the fewer words in the non-dominant language they produced, as expected. However, most parents differed minimally in terms of their dominant and non-dominant language proficiency, with 6 of 24 parents reporting no difference, which may have obscured the relationship between parents' dominance and the language-specific quantity and quality of shared reading. We return to this point in the discussion. [FIGURE 7]

Interaction of Balance and Book Format Effects on Shared Reading Interactions (RQ3)

We also hypothesized that parents' language balance might relate differently to quantity and quality measures across book formats. To test this, we ran the same regressions as above but added an interaction term for the effects of balance and book format. The interaction models were a significantly better fit than the additive models for use of bilingual RS both in the dominant ($p<.05$) and non-dominant ($p<.01$) languages when reading the non-dominant language book compared to the dominant language book (Appendix: Table 7). The less balanced parents' proficiency was, the stronger this effect, that is, the more they favored using bilingual RS when reading the non-dominant versus the dominant language book. The interaction models for dialogic RS were not a better fit than the additive models, indicating that parents' relative proficiency in their languages did not affect how well they read to children in terms of their use

of dialogic RS in any book format. As an example, the least balanced parent of the sample produced 13 dialogic reading behaviors when reading the book in their non-dominant language, compared to 4 and 10 in the dominant and bilingual book readings, respectively.

Individual-level and story-level variation in quantity and quality of shared reading

Individual variation in our outcomes that was not accounted for by the fixed effects of book format and language balance was high. For instance, parents produced as few as 106 words and as many as 910 words in their dominant language when reading the dominant language book despite there being minimal variation in dominant language proficiency and all books being similar in length. In terms of quality, the random effect of participant accounted for nearly 40% of all variation in dialogic RS use ($\rho=.39$). Likewise, 9 parents produced no bilingual RS during the session, while one parent produced a total of 83. Furthermore, while the fixed effect of book format was not significant for either number of words or dialogic RS measured language-agnostically, most parents varied in their reading quality across book formats, as seen in Figure 8. This suggests that in addition to across-individual variation, there was also variation *within* individuals across book readings not captured by our book format variable.

Based on these results, we explored one potential source of variation: the story itself, which parents read in various book formats due to counterbalancing. To do so, we compared the mean number of words, dialogic and bilingual RS across the three stories with an ANOVA. There was a significant difference in the number of dialogic RS ($p<.01$), but not words ($p=.16$) or bilingual RS ($p=.23$). The mean number of dialogic RS in *How do I love you?* ($M=16.7$, $SD=15.7$) was lower than for *Why I love winter* ($M=40.7$, $SD=30.7$) and *My friends* ($M=35.0$, $SD=28.0$). Given that books were read in a fixed order and counterbalanced for book format, this could be due to characteristics of the story itself and/or its reading order.

To view the effect this had on our results, we re-ran our analyses with a random effect of story. This improved the fit of the model predicting dialogic RS ($p < .001$, AIC without = 676.49, AIC with = 666.59), but not any others. Thus, we re-ran models predicting dialogic RS with a random effect of story. This had a minimal impact, with only two relationships⁸ changing from non- to marginally significant. Thus, while there was variation accounted for by the story/reading order, this did not change the overall patterns in our results. [FIGURE 8]

Discussion

The current study examined shared book reading across different book formats in French-English bilingual families living in Montreal. Overall, our findings shed light on three aspects of bilingual shared reading, namely how parents used their dominant language, how they used their non-dominant language, and how they engaged with single-language and bilingual book formats. We discuss each of these themes before turning to implications, limitations, and future directions.

How parents read books in their dominant language

Bilingual parents own more books and read to their children more often in their dominant language, making this an important context to understand (Gonzalez-Barrero et al., 2021). This study found that parents tended to stay in “monolingual mode” when reading this format, rarely using their non-dominant language. Likewise, parents tended to very rarely code-switch or translate when reading books in their dominant language. However, in dyads where the parent and child had different dominant languages, parents were more likely to code-switch from their

⁸ These were: 1) dialogic RS produced in any language when reading the bilingual book and the dominant language book ($p = .12$ vs. $p = .07$), 2) the main effect of book format on the production of dialogic RS in the non-dominant language ($p = .13$ vs. $p = .09$).

dominant language to their non-dominant language (i.e., their child's dominant language), a behavior likely used to strategically support children's comprehension (Kremin et al., 2022). This suggests that bilingual parents use their two languages flexibly in bilingual book reading to support children's learning, even at a cost to their own language preferences.

How parents read books in their non-dominant language

With respect to the non-dominant language books, we had expected to observe an overall decrease in shared reading quantity and quality, but this was not the case. Instead, parents drew more on their two languages when reading these books, but in doing so, maintained a similar level of quantity and quality of reading relative to the other book formats. Furthermore, contrary to predictions, parents produced the most and highest quality reading interactions in their non-dominant language when reading non-dominant language books. This unexpected finding suggests that single-language book reading in the non-dominant language may be the most effective way to boost children's language and literacy development in that language. However, as noted earlier, our participants had high proficiency in their non-dominant language, which may be a requisite to providing plentiful and high-quality reading interactions in the non-dominant language without the support of the dominant language. Future research with parents with less balanced proficiency could test this possibility.

As predicted, we also found that the more balanced a parent was, the more speech they produced in their non-dominant language; however, this relationship was not statistically significant. This too may have been because most parents in our sample had highly balanced proficiency, or it may reflect that parents' language choices in shared reading were primarily driven by other factors, such as the language they habitually use with their child or the language their child responded to them in (for related findings in spoken parent-child interactions, see

Fogle & King, 2013). Perhaps the demands imposed by reading and discussing a children's book were low enough that parents were not pushed out of their comfort zone. Research with older children or less balanced parents might test this possibility.

How parents read bilingual books

Our study is rare in that we observed parents reading bilingual books which included complete text in both languages ("dual-language" books). We expected this format to optimally support parents' shared reading in their non-dominant language. Instead, we found evidence of a boost to parents' non-dominant language reading when comparing this format to the dominant language book, but not relative to the non-dominant language book. Finally, the quality of reading in the non-dominant language in terms of dialogic RS was similar across all three book formats.

One interpretation of these findings is that these parents did not need the scaffolding provided by the dominant language text in the bilingual book in order to produce high quantity and quality shared reading in their non-dominant language because of their high proficiency in that language. Another possibility is that constraints imposed by children's attention made it impossible for parents to achieve equivalent levels of quantity and quality in both languages relative to single-language book reading. "Dual-language" books may not be the most engaging format for eliciting plentiful high-quality reading in the non-dominant language due to their repetitive nature. Indeed, we observed some children express their desire for parents to read the bilingual book in one language only. Future research can test this possibility by comparing reading behaviors across different bilingual book formats, including code-switching formats which interweave the two languages. These may put lower demands on children's attention and thus lead to higher quantity and quality reading in the non-dominant language. This would be in line with prior research which found that this format was associated with better word learning in

the non-dominant language than books written entirely in that language (Read et al., 2021a).

Parents in our study generally had limited access to bilingual books and thus might not have read books in this format to their children prior to the study. Nevertheless, in a follow-up interview, several parents mentioned that they enjoyed reading the bilingual book because of the presence of both languages. It is possible that after being introduced to this format, parents may choose to read bilingual books more often than single-language books in the non-dominant language, thereby increasing children's exposure to that language. Thus, our results do support the use of bilingual books as one method of exposing children to shared reading in both of their languages, but questions remain, for example, with respect to who would benefit most from their use and what format they ought to be in.

Implications, limitations, and future directions

Our findings have important implications for understanding how shared reading in bilingual families can provide opportunities for parents to support their children's development in both of their languages. An overarching theme in our results is that book format strongly affected the extent to which parents used their dominant versus non-dominant language. This implies that the availability of books written in both of bilingual families' languages can impact their ability to support the development of both languages through shared reading. Indeed, the relative lack of literacy materials in the home language has been linked to weaker home language skills in immigrant children (Scheele et al., 2010). In addition to access, future research might investigate whether shared reading interactions in a parents' lower-proficiency language provide the same support for children's word learning as interactions in their higher-proficiency language. Our quality measures may not have captured nuanced differences between parents' reading in the two languages that could influence children's learning, such as the richness of the

vocabulary parents used. Indeed, spoken language exposure from parents with low proficiency⁹ in that language may not support children's language development to the same extent as exposure from parents with high proficiency in that language (Unsworth et al., 2019). This may also hold for exposure during reading interactions.

We found that parents reported using their non-dominant language with their children more often during shared reading than in spoken interactions, highlighting the importance of shared reading as a means of supporting a language less often spoken at home. While this pattern has also been reported for bilingual families living in predominantly English-speaking parts of Canada (Slavkov, 2017), it may not generalize to other sociolinguistic contexts. In Canadian contexts, literacy materials in French and English are reasonably accessible compared to materials in other languages. In other contexts, where literacy materials in home languages are not widely available, the home literacy environment may be more often limited to one language (e.g. Luo et al., 2021). Future studies should investigate this pattern of non-dominant language use in other sociolinguistics contexts.

Our study design had several notable strengths. First, by carefully controlling the number and types of books, their languages, and the order of reading, we can make causal interpretations of the effects of book format on shared book reading. However, a limitation of this approach is that it does not account for how often parents spontaneously choose to read the different formats. For example, bilingual books allow parents to choose which language to read the story in. In our study, all but two parents chose to read the book text as written, reading each sentence in English and in French. In repeated readings in more naturalistic contexts, parents may choose to vary their style of reading in ways that may better suit children's attention and comprehension.

⁹ It is important that proficiency be distinguished from native speaker status. In fact, Unsworth et al. (2019) found that the former but not the latter was a predictor of children's outcomes.

A second strength of our study was its careful focus on parents' language use, as this is a central driver of language development in children of our participants' age. Specifically, parental behaviors during shared book reading predict children's language and literacy development (e.g. Whitehurst et al., 1998). However, in older children, teachers' language use during shared reading may be equally or more important. Dialogic RS in the classroom have been examined in monolingual contexts (e.g. Hindman et al., 2019); however, far less is known about their use with multilingual learners. Research that builds on findings from bilingual home contexts to, for example, the L2 classroom, is an important avenue for future research. One limitation is that we did not measure children's outcomes or analyze children's behavior during the session. Previous research has shown that some dialogic RS relate differently to outcomes in bilingual and monolingual children, and the relationship between reading experiences in one language and developmental outcomes in the other language is not straightforward (Quiroz et al., 2010). Also, simply providing children opportunities to speak during shared reading may not be enough. In the classroom, children's active participation during shared reading has been found to predict word learning better than teachers' use of open prompts (Hindman et al., 2019). During bilingual shared reading, children may also influence readers' language choices, and hence their language exposure (Gosselin-Lavoie & Armand, 2019). Thus, future research should incorporate outcome measures and more detailed examinations of children's behavior during reading sessions.

A third strength of our study is that families were living in a bilingual context where both languages are widely spoken in society and are of high sociolinguistic status. This is rare, as most studies of bilingual shared reading have included families speaking a majority and a minority language. This allowed us to disentangle the effects of book format and parent dominance from language-specific effects, for example due to language prestige. However, more

research is needed to examine how our findings apply to families in other contexts. Moreover, our sample consisted primarily of mothers who were of mid to high socioeconomic status and had fairly high proficiency in both their dominant and non-dominant language. Future studies should aim to observe shared reading with caregivers from more diverse backgrounds and parents with less balanced proficiency.

Finally, our study focused on quantifying the frequency of language use and parents' use of dialogic and bilingual RS. However, there are many other ways that this rich dataset could be investigated, which we plan to pursue in future studies. While we measured the frequency of code-switching, we did not investigate, for example, parents' reasons for code-switching (see Kremin et al., 2022, for parents' reasons for code-switching in another context). Future research might also examine children's behavior during the shared book-reading session.

Conclusions

This study provided insights into how bilingual parents and children read together. Parents drew on both of their languages, especially when reading books that included their non-dominant language (both in single-language and bilingual formats). While parents used their dominant language more often in discussing what they read, they adjusted their language use to match the primary language of the book they were reading. Regardless of proficiency, parents were able to provide high-quality reading interactions for children in both languages. With respect to bilingual RS, such as code-switching and translating, these were particularly frequent in the parents' non-dominant language and among parents with less balanced language proficiency. This highlights the importance of future research investigating how parents' bilingual RS use relates to children's language and literacy outcomes in both of their languages.

Acknowledgements:

We would like to thank Laurie Lambert and Camélia Masella for their help with transcription and coding, and Madison Williams for her help with transcription, coding and proofreading of the manuscript. We would also like to thank Claire Gaudreau and Béatrice Le Tellier for their translation of *My Friends* and Madina Kawish for her help with participant recruitment.

Declaration of interest statement:

The authors report there are no competing interests to declare.

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Appendix

Table 1. *Dialogic and Bilingual Reading Strategy Types with Examples*

Type	Name	Example
Dialogic	Open-ended questions	Parent: What's he doing?
	Fill in the blank questions	Parent: I learned to climb from my friend the...? Child: Monkey!
	Follow-up questions	Parent: Do you like winter? Child: Yeah. Parent: Why?
	Repeating	Parent: I love you as the bear loves the smells of spring. Child: The bear. (points at bear) Parent: The bear, yeah!
	Helping	Parent: How many kids are there? Let's count. One, two, and?
	Praising	Child: The cat (points to book). Parent: The cat, yeah! Wow, you know so many English words!
	Expanding	Child: He's a construction worker. Parent: Yeah, look at his construction helmet.
	Labelling	Parent: That's a snow plow. You know the snow plow, don't you?
	Describing	Parent: Uh oh. Looks like he fell on the ice. (points to image)
	Telling the story in own words	Parent: She learned to walk like this (shows marching) like the rooster, because that's how he walks.
	Relating the story to real life	Parent: He's playing hockey. Like your cousin David.
Bilingual	Translation	[Parent is English dominant]
	(Dominant to Non-dominant, or Vice Versa)	Parent: I love you as the sea loves a soft sandy beach. <i>La plage</i> . <i>La plage</i> . (The beach. The beach.) (points to image)
	Code-switching in Extra-textual Speech	Parent: <i>Non, c'est pas Jasmine</i> . (No, that's not Jasmine.) Child: But do you remember when we got a little cat? Parent: I do remember. They love to sleep.

Table 2. *Linear Mixed Effects Model Coefficients Predicting Language-Agnostic Quantity and Quality of Shared Reading from Book Format*

	Words	Dialogic RS	Bilingual RS
(Intercept)	451.12*** (42.54)	35.29*** (5.59)	7.29* (3.23)
Bilingual	124.38** (43.34)	-9.42 (6.18)	9.67* (4.03)
Nondominant	-12.33 (43.34)	-4.08 (6.18)	16.12*** (4.03)
SD (Intercept participant)	144.52	17.10	7.45
SD (Observations)	150.13	21.41	13.95
Num. Obs.	72	72	72
R2 Marg.	0.082	0.020	0.151
R2 Cond.	0.523	0.401	0.340
AIC	937.5	662.7	593.2
BIC	948.9	674.1	604.6
ICC	0.5	0.4	0.2
RMSE	127.69	18.52	12.56

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 3. *Linear Mixed Effects Model Coefficients Predicting Language-Agnostic Bilingual Shared Reading Strategies from Book Format*

	Translate into non-dominant	Translate into dominant	Extra-textual code-switch
(Intercept)	0.417 (0.31)	0.63 (0.45)	4.50* (2.13)
Bilingual	0.083 (0.41)	-0.29 (0.62)	5.33* (2.54)
Nondominant	0.667 (0.41)	0.25 (0.62)	9.96*** (2.54)
SD (Intercept participant)	0.567	0.45	5.66
SD (Observations)	1.412	2.15	8.79
Num. Obs.	72	72	72
R2 Marg.	0.037	0.010	0.133
R2 Cond.	0.171	0.051	0.387
AIC	272.0	324.0	533.8
BIC	283.4	335.3	545.2
ICC	0.1	0.0	0.3
RMSE	1.30	2.07	7.77

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 4. *Linear Mixed Effects Model Coefficients Predicting Language-Specific Quantity and Quality of Shared Reading from Book Format*

	Words (Dom)	Words (Non-dom)	DRS (Dom)	DRS (Non-dom)	BRS (Dom)	BRS (Non-dom)
(Intercept)	404.75*** (33.13)	46.38 (38.45)	29.38*** (4.27)	5.92 (4.29)	3.79* (1.70)	3.50* (1.67)
Bilingual	-64.58* (26.46)	188.96*** (37.50)	-11.88** (4.11)	2.46 (4.47)	4.25+ (2.24)	5.42** (2.01)
Nondominant	-250.42*** (26.46)	238.08*** (37.50)	-13.04** (4.11)	8.96* (4.47)	7.92*** (2.24)	8.21*** (2.01)
SD (Intercept participant)	133.92	136.43	15.31	14.19	3.09	4.32
SD (Observations)	91.66	129.91	14.22	15.49	7.74	6.96
Num. Obs.	72	72	72	72	72	72
R2 Marg.	0.303	0.231	0.075	0.032	0.132	0.149
R2 Cond.	0.778	0.634	0.571	0.473	0.252	0.386
AIC	884.9	920.6	616.2	622.4	506.8	500.7
BIC	896.3	931.9	627.6	633.8	518.2	512.1
ICC	0.7	0.5	0.5	0.5	0.1	0.3
RMSE	75.70	109.70	11.99	13.24	7.16	6.17

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 5. *Linear Mixed Effects Model Coefficients Predicting Language-Agnostic Quantity and Quality of Shared Reading from Language Balance*

	Words	Dialogic RS	Bilingual RS
(Intercept)	334.59 (290.40)	3.70 (36.12)	14.48 (19.02)
Balance	17.59 (32.95)	3.10 (4.10)	0.16 (2.16)
SD (Intercept participant)	142.14	17.31	6.46
SD (Observations)	165.28	21.48	15.88
Num. Obs.	72	72	72
R2 Marg.	0.007	0.014	0.000
R2 Cond.	0.429	0.402	0.142
AIC	956.1	668.5	611.3
BIC	965.2	677.6	620.4
ICC	0.4	0.4	0.1
RMSE	144.24	18.86	14.82

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 6. *Linear Mixed Effects Model Coefficients Predicting Language-Specific Quantity and Quality of Shared Reading from Language Balance*

	Words (Dom)	Words (Non-dom)	DRS (Dom)	DRS (Non-dom)	BRS (Dom)	BRS (Non-dom)
(Intercept)	547.40*	-212.81	28.44	-24.74	4.80	9.69
	(244.02)	(255.88)	(30.10)	(28.13)	(9.40)	(10.22)
Balance	-28.30	45.89	-0.84	3.94	0.35	-0.19
	(27.69)	(29.03)	(3.41)	(3.19)	(1.07)	(1.16)
SD (Intercept participant)	111.25	109.99	15.26	13.83	2.52	3.88
SD (Observations)	157.97	178.81	15.68	15.86	8.55	7.99
Num. Obs.	72	72	72	72	72	72
R2 Marg.	0.024	0.052	0.002	0.038	0.002	0.001
R2 Cond.	0.348	0.312	0.487	0.454	0.081	0.191
AIC	944.1	958.1	630.3	628.4	520.9	518.0
BIC	953.2	967.2	639.4	637.5	530.0	527.1
ICC	0.3	0.3	0.5	0.4	0.1	0.2
RMSE	140.36	160.91	13.55	13.82	8.16	7.35

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 7. *Book Format and Balance Interaction Coefficients Predicting Language-Specific Quantity and Quality of Shared Reading*

	Words (Dom)	Words (Non-dom)	DRS (Dom)	DRS (Non-dom)	BRS (Dom)	BRS (Non-dom)
Dom x Bilingual book	1.63 (25.39)	4.95 (36.12)	-3.90 (3.89)	-2.97 (4.28)	-1.94 (2.00)	-2.78 (1.76)
Dom x Non-dominant book	-13.31 (25.39)	-4.65 (36.12)	-4.38 (3.89)	-2.71 (4.28)	-5.26* (2.00)	-5.29** (1.76)
Num. Obs.	72	72	72	72	72	72
R2 Marg.	0.319	0.275	0.082	0.072	0.195	0.210
R2 Cond.	0.776	0.630	0.584	0.478	0.348	0.484
AIC	864.7	897.8	607.5	613.0	497.8	490.4
BIC	882.9	916.0	625.7	631.2	516.0	508.6
ICC	0.7	0.5	0.5	0.4	0.2	0.3
RMSE	75.43	110.24	11.77	13.19	6.53	5.53

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 8. Post-hoc T-test Results for RQs1a and1b: Language-Agnostic and Language-Specific Effects of Book Format

	Outcome variable	Book formats compared		
		Dominant book vs. Bilingual book	Dominant book vs. Non-dominant book	Bilingual book vs. Non-dominant book
RQ1a	Words (All)	$t(22) = -2.27, p. adj = .1, ns$	$t(22) = 0.77, p. adj = 1, ns$	$t(22) = 3.19, p. adj = .03, *$
	BRS (All)	$t(22) = -2.38, p. adj = .08, ns$	$t(22) = -3.57, p. adj = .002, **$	$t(22) = -1.71, p. adj = .1, ns$
	DRS (All)	NA	NA	NA
RQ1b	Words (Dom)	$t(22) = 2.08, p. adj = .15, ns$	$t(22) = 9.19, p. adj < .001, ***$	$t(22) = 7.65, p. adj < .001, ***$
	BRS (Dom)	$t(22) = -1.88, p. adj = .22, ns$	$t(22) = -3.29, p. adj = .01, *$	$t(22) = -1.67, p. adj = .33, ns$
	DRS (Dom)	$t(22) = 2.37, p. adj = .08, ns$	$t(22) = 2.54, p. adj = .06, ns$	$t(22) = 0.32, p. adj = 1, ns$
	Words (Non-dom)	$t(22) = -3.83, p. adj = .003, **$	$t(22) = -10.50, p. adj < .001, ***$	$t(22) = -0.99, p. adj = .99, ns$
	BRS (Non-dom)	$t(22) = -2.69, p. adj = .04, *$	$t(22) = -3.75, p. adj = .003, **$	$t(22) = -1.42, p. adj = .50, ns$
	DRS (Non-dom)	$t(22) = -0.44, p. adj = 1, ns$	$t(22) = -2.31, p. adj = .09, ns$	$t(22) = -1.32, p. adj = .60, ns$

Figure 1



Figure 2

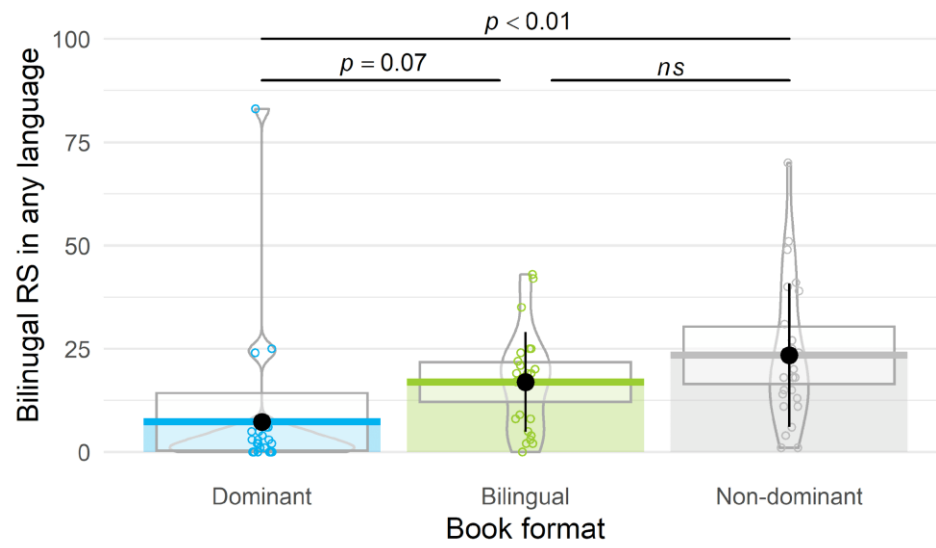


Figure 3

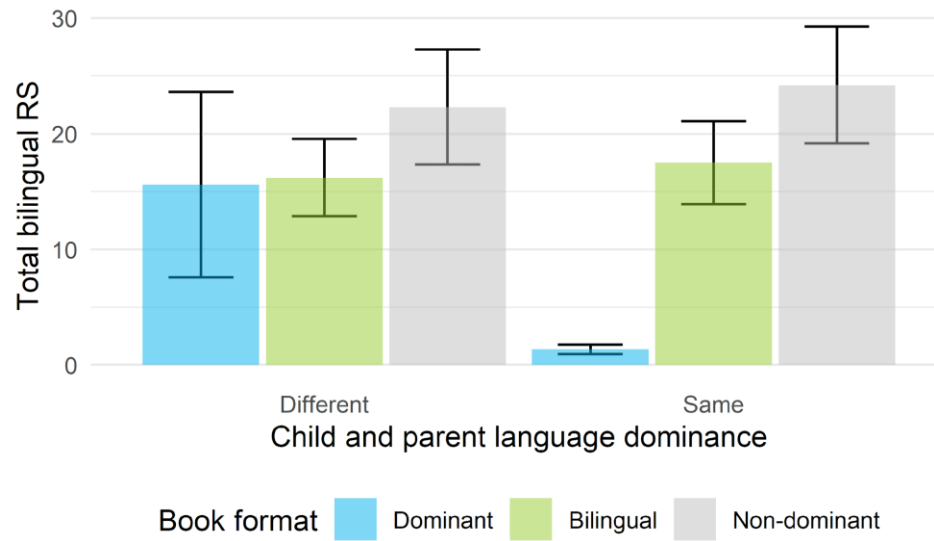


Figure 4

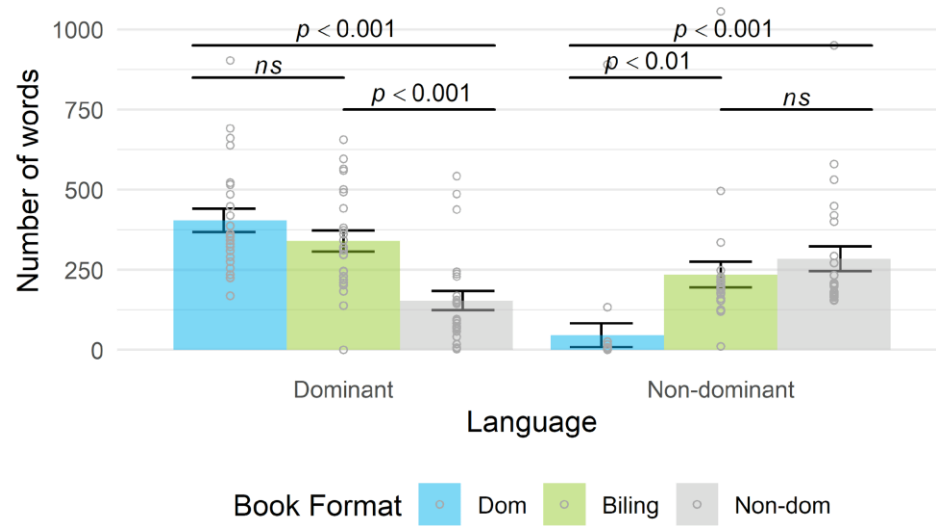


Figure 5

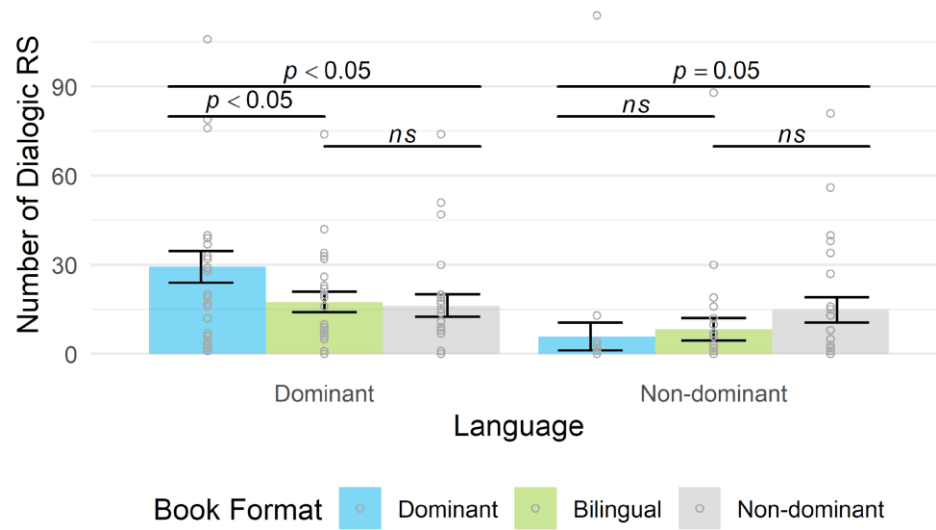


Figure 6

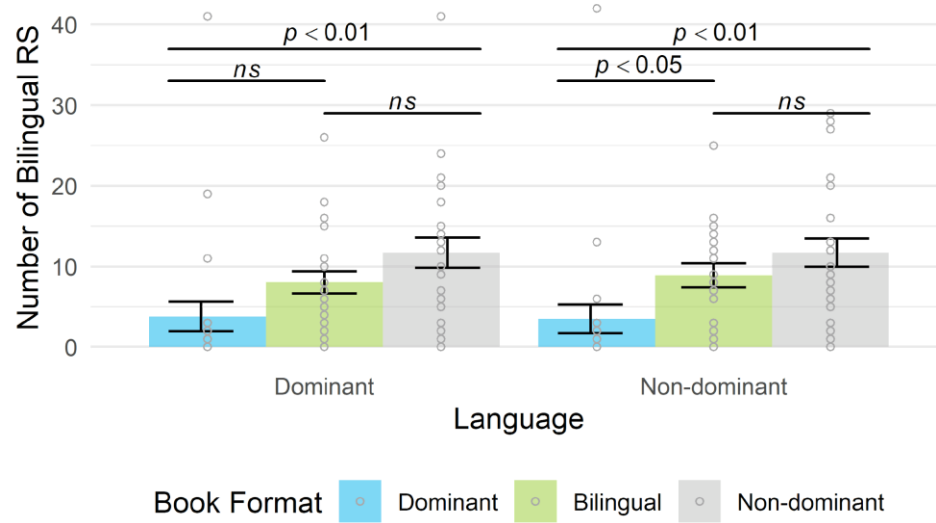


Figure 7

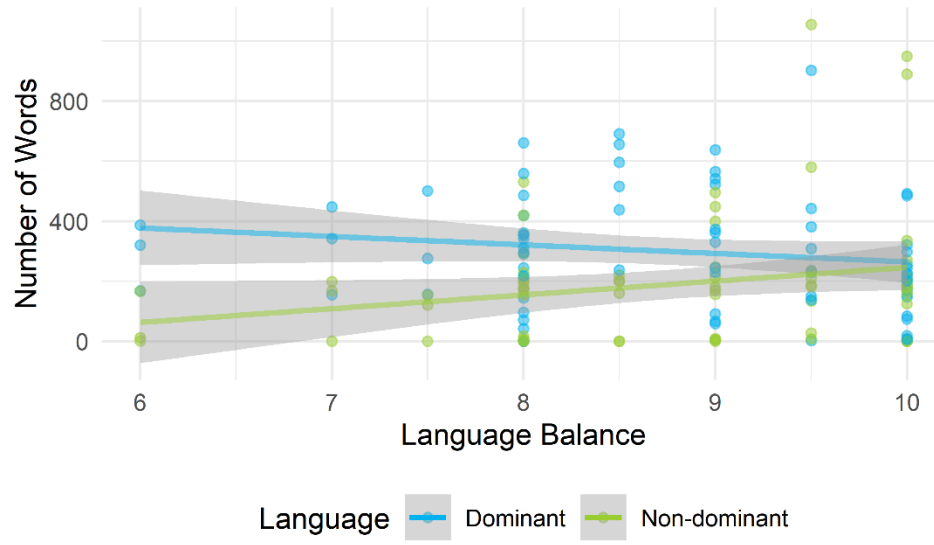


Figure 8

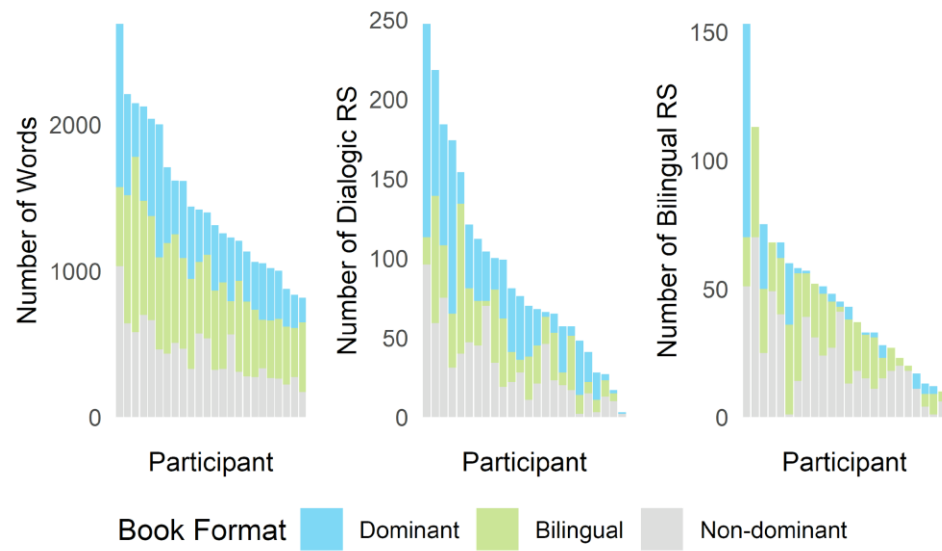


Figure captions list:

Figure 1: Sample Page from Bilingual Book

Figure 2: Frequency of Bilingual RS in Any Language across Book Formats

Figure 3: Number of Bilingual RS Produced by Parents with Same or Different Language Dominance as their Child across Book Formats

Figure 4: Number of Words Produced across Book Formats by Language

Figure 5: Number of Dialogic RS Produced across Book Formats by Language

Figure 6: Number of Bilingual RS Produced across Book Formats by Language

Figure 7: Number of Words Produced by Language Plotted against Language Balance

Figure 8: Number of Words, Dialogic RS and Bilingual RS produced across Book Formats by Participant