The Impact of Parental Gender and Home Input on the Minority Language Proficiency of Dutch Bilingual Children

Research report

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Abstract

Home input is a major factor that contributes to the acquisition of the minority or heritage language (HL) in bilingual children that belong to One Parent, One Language (OPOL) families. However, the role of parental gender in OPOL families is unexplored. The present study examined this with 7-10-year-old Dutch-German (*n*=31) and Dutch-English (*n*=9) children. First, we investigated the relationship between HL home input and the gender of the HL-speaking parent. Then, we examined if this relationship predicts their children's performance on a sentence repetition task (SRT) and a cross-linguistic lexical task (CLT). Analyses revealed that mothers contribute more to HL input compared to fathers. Further, HL home input was indeed a significant predictor of CLT scores but not SRT scores. An interaction effect was also seen between parental gender and HL home input: as home input increased, children with HL-speaking fathers performed better than children with HL-speaking mothers. However, follow-up models suggest that this could be due to the thresholding of maternal input, suggesting that parental gender differences do play a crucial role in children's HL development.

Keywords: bilingualism, parental input, OPOL, gender, home input

1. Background

Input majorly contributes to language development in both monolingual and bilingual children (Thordardottir, 2017; Huttenlocher et al., 1991; Pearson, 2007). Bilingual children may be exposed to the majority language in various scenarios outside the home, but exposure to the minority or heritage language (henceforth, *HL*) may be more restrictive (Unsworth, 2016).

Home input primarily arises from parents, caregivers, and siblings (Unsworth, 2016). Various aspects of home input across languages have been linked to children's growing language skills, including parental proficiency (Paradis, 2011; Chondrogianni & Marinis, 2011), input quantity (Buac et al., 2014; Thordardottir, 2011; Altinkamis & Simon, 2020; Daskalaki et al., 2018; Flores et al., 2016), input quality (Rowe, 2012; Daskalaki et al., 2020), and family language patterns (Verhagen et al., 2022). Family language patterns refer to which languages are used with the child at home by different caregivers in the family. There is great heterogeneity in the family patterns adopted by caregivers to ensure HL home input (Unsworth et al., 2019). Children are most likely to be bilingual if both parents speak the HL and at least one parent speaks the majority language (De Houwer, 2007). However, this strategy may not be possible for all families because not all parents may speak the HL or majority language natively. A popular alternative is the One Parent, One Language (henceforth, *OPOL*) approach. Here, each parent speaks exclusively one language to the child, either the majority language or the HL. The present study concerns the effect of HL home input quantity (henceforth, *HL home input*) on children's HL proficiency in OPOL families.

The success of OPOL as a language strategy greatly depends on the above-mentioned aspects of home input. However, it has not been examined if the gender of the HL-speaking parent affects the success of this bilingual parenting strategy (De Houwer, 2007). Few studies have examined the contribution of input from both parents separately in improving children's HL proficiency. Sun et al. (2022) found that maternal HL proficiency mediated the relationship between socio-economic status and children's HL proficiency after controlling for home input in English-Mandarin bilinguals. They also found a positive correlation between mothers' HL proficiency and use, but not fathers'. Additionally, Hammer et al. (2012) found evidence of the mothers' education predicting Spanish-English children's proficiency in both L1 and L2 tasks, since high maternal (but not paternal) education correlated to high home input. Place and Hoff (2011), also studying Spanish-English bilinguals, found that children had lower native HL input with HL-speaking fathers compared to HL-

speaking mothers. Romanowski (2022) found that the *motivation* and *willingness* to indulge in joint childcare practices influence the extent to which fathers pass on the HL in Polish-English bilinguals, not parental gender per se.

In sum, while HL home input has been shown to affect children's HL acquisition, the role of parental gender and its interaction with HL home input remains unclear.

2. Research Questions (RQs)

The present study used this premise to examine data from the 2in1 project (Unsworth et al., 2022), which investigated cross-linguistic influences in Dutch bilingual children. This project comprises data from a parental questionnaire, the BiLEC (Bilingual Language Experience Calculator; Unsworth, 2012), scores of the Cross-linguistic Lexical Task (CLT; Haman et al., 2017) and the Sentence Repetition Task (SRT; Armon-Lotem & Meir, 2015).

> ***RQ 1****: To what extent does the use of the HL differ between mothers and fathers in OPOL families?*

Prediction 1 (Main Effect 1): HL input from the mother is significantly higher than that of fathers, as observed by Place and Hoff (2011).

> ***RQ 2****: To what extent does the relation between parental input and children's proficiency in the HL differ depending on which parent uses the HL?*

Prediction 2 (Main effect 2): HL home input predicts the child's HL proficiency as seen by Buac et al. (2014), Thordardottir (2011), and Altinkamis and Simon (2020). We predicted higher HL proficiency (CLT and SRT) scores for children with higher HL home input.

Prediction 3 (Interaction effect): There is a significant interaction between parental gender and HL home input. Since not many studies have examined this interaction, we made no predictions but could speculate:

- As home input increases, children with HL-speaking mothers perform better than children with HL-speaking fathers, since mothers are seen as "caretakers of first-language maintenance" (Akoğlu & Yagmur, 2016, p.9).

- As home input increases, children with HL-speaking fathers perform better than children with HL-speaking mothers, since HL-speaking fathers may play an even more significant role than mothers: fathers represent children's "outside world" (Hammer et al., 2012, p. 1261).
- A lack of significant interaction would indicate no impact of parental gender.

3. Methods

3.1 Participants

Since the RQs examine HL proficiency scores and information about family constellations, only datasets that had no missing entries for CLT scores, SRT scores, and the BiLEC were examined. The datasets that met these criteria comprised 7-to-10-year-old Dutch-German, Dutch-Turkish, and Dutch-English children. We defined OPOL families as those in which only one parent speaks the HL to the child and does so at least 70% of the time. This cutoff was chosen because we noted that using 95% cutoff used by Verhagen et al. would be too restrictive for the families in our sample. The majority of families with only one HL-speaking parent in our sample did not speak the HL 95% of the time, reflecting the fact that the OPOL strategy may not be systematically enforced in practice (Venables et al., 2013). Although the cutoff value is arbitrary as a reviewer pointed out, 70% is more practically relevant for our sample.

Only three Dutch-Turkish children met this criterion. Since this number was too low to carry out inferential statistical analysis, the Dutch-Turkish data was excluded. Our final participant pool was unbalanced with respect to the gender of the HL-speaking parent because of the nature of our sample. More HL-speaking mothers were surveyed compared to HL-speaking fathers. Table 1 details the final participant pool.

Table 1
Overview of Participants (N=40)

Language pair	*n* (after exclusion)
Dutch-German	31
Dutch-English	9

3.2 Methodology and Analyses

For each subset, corresponding BiLEC data was used to create a new variable 'HL_Parent.' This variable coded the gender of the HL-speaking parent, with two values, M (mother) or F (father).

Since there was no direct of HL home input in the questionnaire, another new variable HL_Home_Input, which indicated the percentage of HL home input per week, was created. This was calculated as the complement of the percentage of Dutch home input per week ('nl_pc_home' in the BiLEC document). This variable took values between 0 (no HL home input) to 1 (HL home input 100% of the time). Additionally, a variable 'HL_Name' was created to code the HL of our participants, with two values ENG (English) and DEU (German).

SRT scores were obtained from the variable VerbatimPropCorr (the proportion of verbatim correctly repeated sentences), with values between 0 (the child did not repeat any sentences verbatim) to 1 (the child repeated all sentences verbatim). Finally, CLT scores were obtained from the variable 'Percentage,' which denoted the percentage of correct scores. This variable took values from 0 (no correct answers) to 100 (all correct answers).

One of the factors that contributes to differences in bilingual acquisition is the typological distance between the majority language and HL (Blom et al., 2019). Dutch and German are both Germanic languages. Turkish, in contrast, is from the Turkic family, which is not as closely related to Dutch as German. To check if the variation in HL (English/German) in our dataset was a confound, an independent samples t-test was run to see if there was a systematic difference in HL home input between the two groups. The *t*-test showed no significant differences, $t(20.25)=-.33$, $p=.742$. Dutch-English ($M=.48$, $SD=.11$) and Dutch-German children ($M=.46$, $SD=.17$) did not differ in the amount of HL home input. Therefore, language distance was not included as a

control variable in further analyses.

Regression analyses were performed using the *lm* function of the *lme4* package (Bates et al., 2015) in R (v4.2.3; R Core Team 2023) and RStudio (Rstudio Team, 2023), and summaries were created with the *car* package (Fox & Weisberg, 2019) . One base model each was constructed with CLT scores or SRT scores as the dependent variable and HL home input as a predictor. Subsequently, predictors of interest (HL Parent and an interaction between HL home input and HL Parent) were added. Sum and polynomial contrast coding were applied to the categorical fixed effects variable (HL Parent). For each model, a stepwise variable selection procedure was used to remove non-significant predictors to obtain the most parsimonious model. Likelihood ratio tests were performed to compare the goodness of fit using the *anova* function of the *base* package (R Core Team 2023).

4. Results

The number of HL-speaking mothers (n=27) was higher than HL-speaking fathers (n=13). To investigate the relationship between parental gender and HL home input, an independent samples t-test was run. This revealed significant differences in HL home input as a function of parental gender, $t(32.93)=-4.17$, $p<.001$. Maternal HL home input (M=.53, SD=.15) was significantly higher than paternal (M=.36, SD=.11), confirming our first prediction.

For the second hypothesis, regression analysis revealed that HL home input was a significant predictor for CLT scores but not SRT scores. An analysis of variance revealed that adding HL Parent as a predictor improved the model fit for the CLT score, $F(2, 38) = 5.16$, p=.014. These results are summarized in Table 2. Since HL home input did not significantly predict SRT scores, only CLT scores were used for further analyses.

Table 2

Summary of Regression Models for SRT and CLT Scores

	SRT Score					CLT Score				
Model	Adjusted R^2	F	df	*p*	AIC	Adjusted R^2	F	df	*p*	AIC
Base	.06	3.5	38	.07	7.69	0.3	15.44	38	<.001	316.34
Final	.14	3.19	36	.05	5.78	0.41	9.719	36	<.001	310.26

For CLT scores, there was indeed a main effect of HL home input, in line with Prediction 2. In addition, a significant interaction was observed between HL home input and HL Parent (Table 3). As HL home input increased, children with HL-speaking fathers performed better than those with HL-speaking mothers (Figure 1).

Table 3

Final Multiple Linear Regression Models for Children's CLT Scores With Significant Predictors, Estimate (b-coefficient), Standard error (SE), t-value, and p-value

Model	Significant predictors	Estimate	*SE*	*t*	*p*
Base	HL home input	47.96	12.21	3.93	<.001
Final	HL home input	58.37	16.72	3.49	.001
	HL Parent	-19.82	6.81	-2.91	<.01
	HL home input × HL Parent	39.08	16.72	2.34	.02

To further analyse this interaction, one follow-up model was created for each level of the variable HL Parent. HL home input was added as a predictor for CLT scores. HL home input was a significant predictor only at the level of the father but not the mother (Table 4). Therefore, while children with high HL home input from

HL-speaking fathers had high proficiency, this was not observed with HL-speaking mothers.

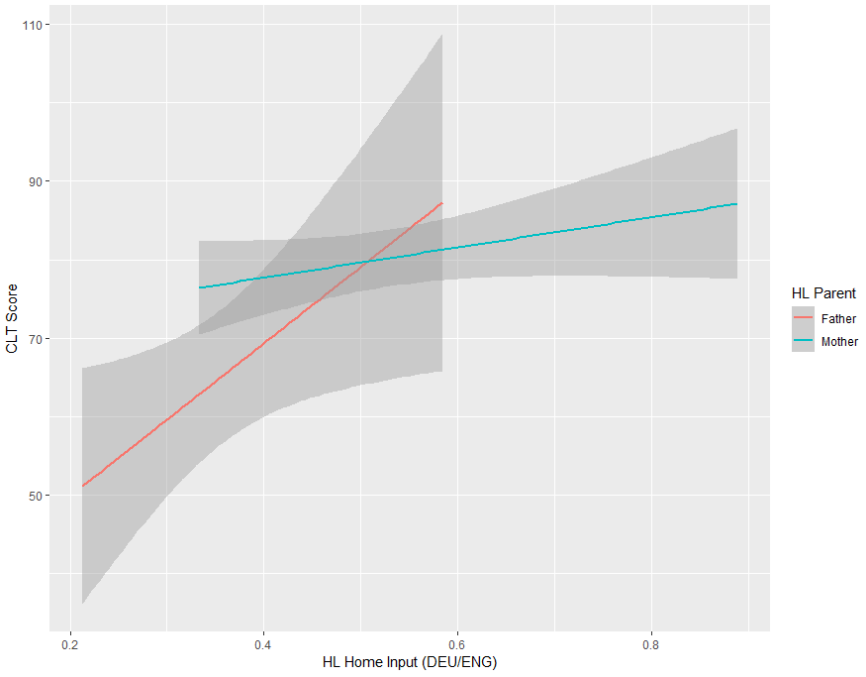
Table 4

Follow-up Models to Predict CLT Scores With Levels 'Father' and 'Mother' of HL_Parent With Model Summaries, Estimate (b-coefficient), Sandard Error (SE), t-value, and p-value.

Level	Adjusted R^2	F	df	Estimate	*SE*	*t*	*p*
Mother	.06	2.62	25	19.29	11.92	1.62	.12
Father	.31	6.19	11	97.45	39.18	2.49	.03

Figure 1

Interaction Effect of Parental Gender and HL home input on CLT Scores



5. Discussion

This study examined the relationship between parental gender and HL home input in influencing the HL proficiency of Dutch bilingual OPOL children.

First, it was found that HL-speaking mothers provide much higher HL home input than HL-speaking fathers, in line with our prediction. Such a trend motivates researchers to rely on maternal metrics to study bilingual development (Duncan & Paradis, 2018; Akoğlu & Yağmur, 2016).

Secondly, it was seen that HL home input predicted only CLT and not SRT scores, partially confirming our second prediction. The CLT and SRT scores are significantly positively correlated but it is not unusual that only the CLT score predicts HL home input. The CLT assesses comprehension and production of nouns and verbs, while the SRT is concerned with syntactic representation. Differential outcomes for the two variables show that different amounts of HL home input are necessary for different aspects of proficiency. While more input is needed to expand children's vocabulary, less input may prove sufficient to learn grammatical structures and build a receptive framework. In fact, Thordardottir (2011), studying Spanish-English bilinguals, observed that while bilinguals need at least 40% exposure to a language to match monolingual scores in receptive tests, 60% is needed for expressive scores.

Analyses also revealed that as HL home input increases, children with HL-speaking fathers perform better than children with HL-speaking mothers. While this suggests that parental gender does indeed influence HL acquisition, these results must be interpreted with caution. Additional input beyond the 50-60% threshold does not result in significantly better scores (Maas, 2014; Thordardottir, 2011). In our study, the mean home input from HL-speaking mothers is 53%. The lack of significant interaction for HL-speaking mothers could be a consequence of reaching the threshold, since additional input may not be necessary beyond this point (Gathercole, 2007). For HL-speaking fathers, the mean HL home input is much below the threshold (36%). Therefore, the more input, the better the expressive test scores.

6. Limitations and Future Research

While the present study highlights the role of HL-speaking fathers in HL transmission, future research could address a few limitations**.**

First, the current results should be interpreted cautiously due to the low sample size and lack of data points at all levels of home input. To further tease apart the significant interaction, subsequent regression analyses were attempted after

thresholding HL home input into three levels – low (0 – 33%), medium (34 – 66%), and high (67 – 100%). However, the low and high levels could not be analysed as there were no data points for both genders at these levels. Additionally, the number of HL-speaking mothers and fathers was not equal due to the nature of our sample. More HL-speaking mothers were surveyed than HL-speaking fathers. Data points are needed across the entire range of HL home input from both parents to draw stronger conclusions.

Secondly, current study examined only two groups of Dutch bilinguals, as the Dutch-Turkish data had to be discarded. Future research could examine more diverse language pairs to understand the role of language distance. Our study focussed only on OPOL families. Future studies could examine other family constellations, following Unsworth et al. (2019). This would help draw stronger inferences about the role of parental gender in HL transmission.

Finally, our study examined children from age 7-10 and was restricted to *current* HL home input. Expanding this age range and studying the cumulative amount of exposure could provide insights into HL transmission at various developmental milestones.

7. Conclusion

These findings highlight the differences in distribution of HL home input from the father and the mother. Parental gender is indeed crucial in how HL home input affects HL proficiency. HL-speaking fathers must increase their HL home input to ensure HL transmission. A trend is noticed in the field of child bilingualism research about the role of each parent in the child's bilingual development – the mother's role is so established that maternal metrics are used as predictors of the child's language growth. Mothers indulge in language activities to pass on the first language as agents of HL transmission (Akoğlu & Yagmur, 2016). However, the role of fathers is unclear. The current study highlights this discrepancy significantly, as reflected in the disproportionately high number of HL-speaking mothers compared to HL-speaking fathers. These circumstances are particularly concerning when considering that fathers may represent the "outside world" to children (Hammer et al, 2012, p. 1261). If fathers do not engage sufficiently in language transmission practices, children may experience an increased difficulty in HL acquisition. In sum, this study highlights the role of HL-speaking fathers in facilitating HL transmission.

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