

# Like Father/Mother, Like Son/Daughter? The Influence of Parents on Children's Gendered Speech Production

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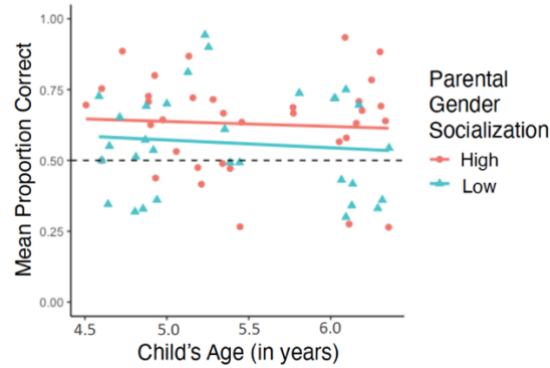
**1. Background:** The voices of cisgender men and women are typically very easy to distinguish. For example, the average f0 for adult men is about half that of the average f0 for adult women. This f0 difference, along with other salient acoustic differences such as lower spectral frequencies in men than women, is at least in part attributable to anatomical traits. But interestingly, recent work has shown that adult listeners can classify gender from children's speech as young as 2.5 years old<sup>1</sup>— long before gender-based anatomical differences emerge. This suggests that gender differences in speaking style are learned early in life through socialization. However, little is known about how young children learn these gendered speech patterns. A recent study from our lab has shown that parental gender socialization moderated children's *perception* of gender in speech, such that children whose parents endorsed stereotypical gender attitudes more strongly were more accurate at detecting their peers' gender based on their voices alone. But does parental gender attitude also play a role in children's gendered speech *production*? And does how gendered the parents sound predict how gendered their children sound? The current study investigates these questions by recording both children and their parents' voices. We then assess parents' gender attitudes. As a secondary question, because past work has failed to find consistent gender-based acoustic differences before the age of 7<sup>1,2</sup>, here, using a larger sample size, we test whether there are measurable acoustic differences between boys' and girls' speech.

**2. Method & Results:** Thus far, we have recorded 24 monosyllabic words and 4 sentences from 72 (44 girls and 28 boys) 4- to 6-year-old cisgender monolingual English-learning children and their parents. Parents also completed the parental gender socialization scale<sup>3</sup>.

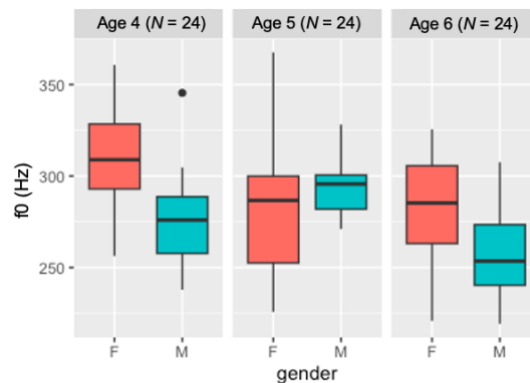
*2.1 Perception.* As a proxy measure for how gendered each individual child's speech was, we asked 70 additional monolingual English adult listeners to classify the gender of the children in each recording. Our results show that children of parents who more strongly endorsed gender stereotypes were more accurately classified, suggesting parental gender attitudes are linked to the development of gendered speech production (see Fig. 1).

*2.2 Acoustics.* We performed acoustic analyses to examine whether children exhibited gender and age differences in f0 (measured by mean f0 for sentences and mean f0 over the first half of the vowels for isolated words), and whether children's f0 is linked to their parents' f0 and gender attitudes. As expected, our preliminary results show that f0 significantly decreased across ages. However, in contrast to previous findings, we found gender-based differences in f0 at 4 years of age (see Fig. 2). To examine whether children's f0 was predicted by the gender-stereotypicality of their parents' speech, we computed standardized z-scores of each participant's f0 values (males' values were flipped so that a higher z-score represents higher gender-stereotypicality). We found a significant correlation in gender-stereotypicality for the same, but not different, gender parent-child pairs (i.e. mothers/daughters and fathers/sons; see Fig. 3). Finally, we did not find evidence that children's f0 was related to their parents' gender attitudes.

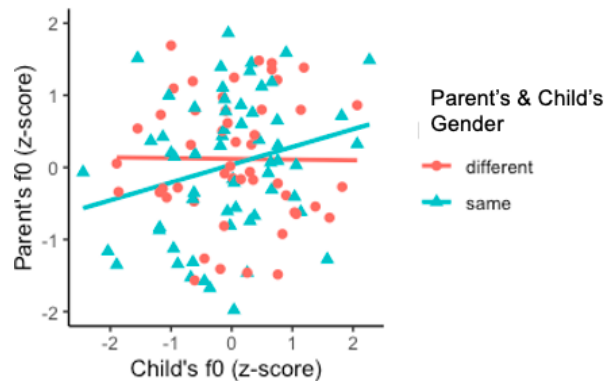
**3. Conclusion & Next Step:** Our perception data shows that parents' gender attitudes contribute to the development of gendered speech production. Although parents' gender attitudes are not related to children's f0, we did find evidence that how gender stereotypical the parents' voices are predicts the gender-stereotypicality of their same-gender children's voices. In addition, using a larger sample size, our study is the first to show gender differences in f0 in children as young as 4 years old. As a next step, we are now conducting an analysis on other acoustic measures (F1 and F2).



**Fig. 1.** Mean proportion correct of gender classification by adult listeners on different child ages, broken down by children whose parents endorsed gender attitudes more strongly (High; scores on parental gender socialization scale above the mean) and less strongly (Low; scores on parental gender socialization scale below the mean). Dotted line indicates chance accuracy.



**Fig. 2.** Gender differences in  $f_0$  values across the three ages in children.



**Fig. 3.** The relationship between parent's and child's  $f_0$  (z-scores), broken down by same vs. different gender parent-child pair. Note that all males' z-scores are flipped, such that for both males and females, a higher z-score indicates their  $f_0$  values are more gender stereotypical.

## References

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- [3] Blakemore, J. E. O., & Hill, C. A. (2008). The Child Gender Socialization Scale: A measure to compare traditional and feminist parents. *Sex Roles: A Journal of Research*, 58(3-4), 192-207. <https://doi.org/10.1007/s11199-007-9333-y>