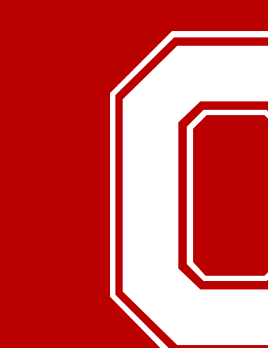


# Paternal Linguistic Input to Children with Hearing Aids during the COVID-19 Pandemic

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## Background

- There is considerable variability and delay in language outcomes in children who are deaf and hard-of-hearing (DHH) (Boons, et al., 2013).
- Our lab focuses on the early environmental factors that contribute to spoken language development in children with cochlear implants (CIs) and hearing aids (HAs).

## Maternal and Paternal Language Input

- There is an established link between quantity and quality of parental speech and spoken language outcomes (Ambrose, et al., 2014; Gilkerson, et al., 2018).
- This language input factor may be especially important for DHH children.
- While fathers do contribute to early language environments, most literature has historically focused on mothers and the factors that influence how much they talk to and around their children.
  - This is likely due to Western and American sociocultural contexts, where mothers are expected to be primary care-givers.
- Our previous research has shown that maternal speech comprises a greater proportion of early language environments, across families of children with CIs, HAs, and normal hearing (NH). (Cooke, et al., 2020).

## Gendered effects of COVID-19

- Women, particularly mothers, and especially working mothers, experience the most stress related to the pandemic (Qiu, et al., 2020).
- Men have greater resiliency related to global or national crisis and are more likely to transition well to working from home. As such, working fathers are likely to take on more child-rearing responsibility, if only temporarily, during the COVID-19 pandemic (Alon, et al., 2020).

## Research Question

How are differences in maternal and paternal language input to DHH children impacted by the COVID-19 pandemic?

## Methods



- Participants in our research complete day-long LENA (Language ENvironment Analysis) recordings.
- LENA automated analysis of adult word count (AWC) by gender, female adult word count (FWC) and male adult word count (MWC), serve as measures of maternal and paternal linguistic input.
- Measures are normalized by hour of recording time (FWC/hr, MWC/hr) to account for variation in number of recordings by family and length of recordings.



### Participants

#### Pre-Pandemic

- 304 recordings from families of 42 DHH children and 38 children with normal hearing (NH)
- 22 CIs and 20 HAs
- Aged 5-34 months, with 3-12 months of hearing experience

#### During Pandemic

- 16 recordings from 4 families of children with HAs
- 6 before, 10 after
- All mother-father families with both parents working
- All similar education and income level

## Results

### Pandemic Effects: Adult Word Count (AWC)

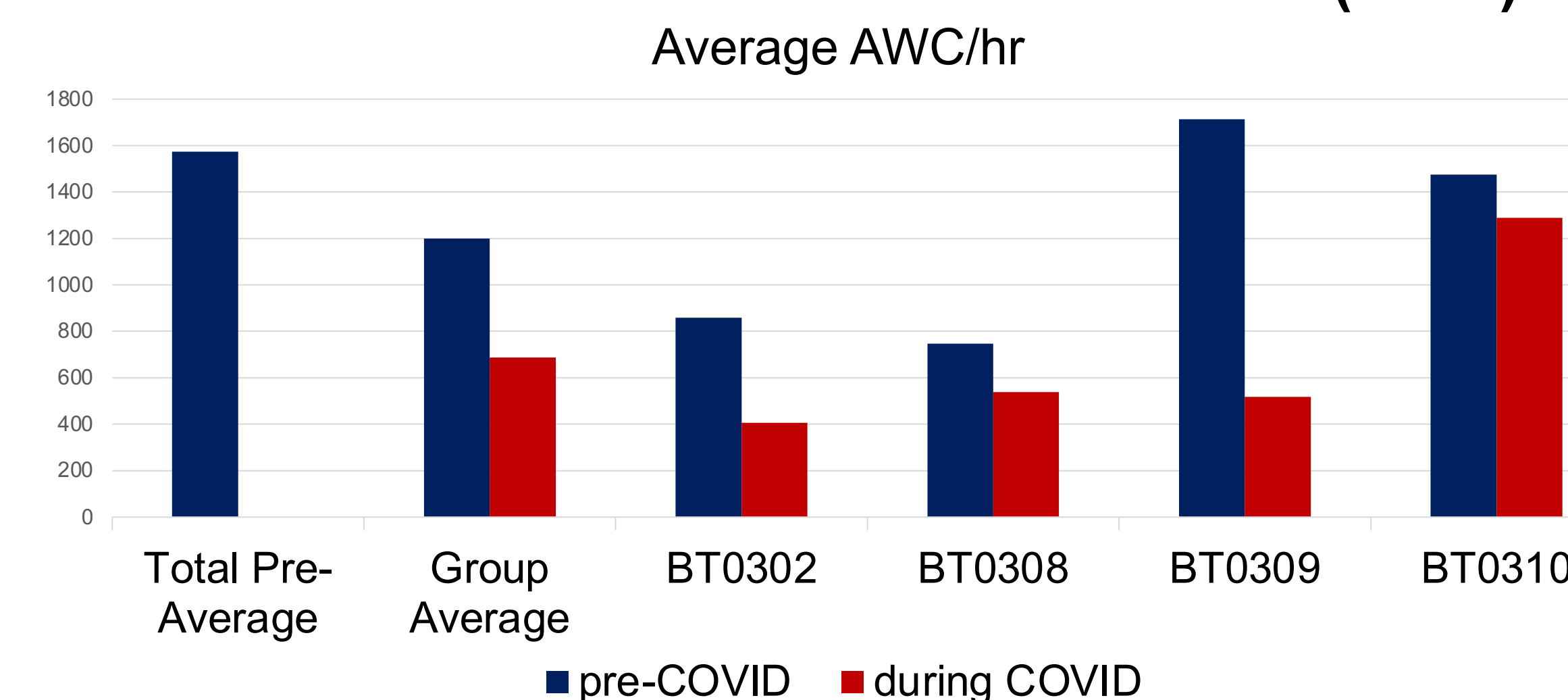


Figure 1: Adult word count (AWC) per hour before and during the pandemic, differentiated by participant, with pre-pandemic and group averages shown on the left. (DHH group pre-pandemic: 1547, HA group pre-pandemic: 1199, HA group during pandemic: 687)

### Pandemic Effects: Female Adult Word Count (FWC)

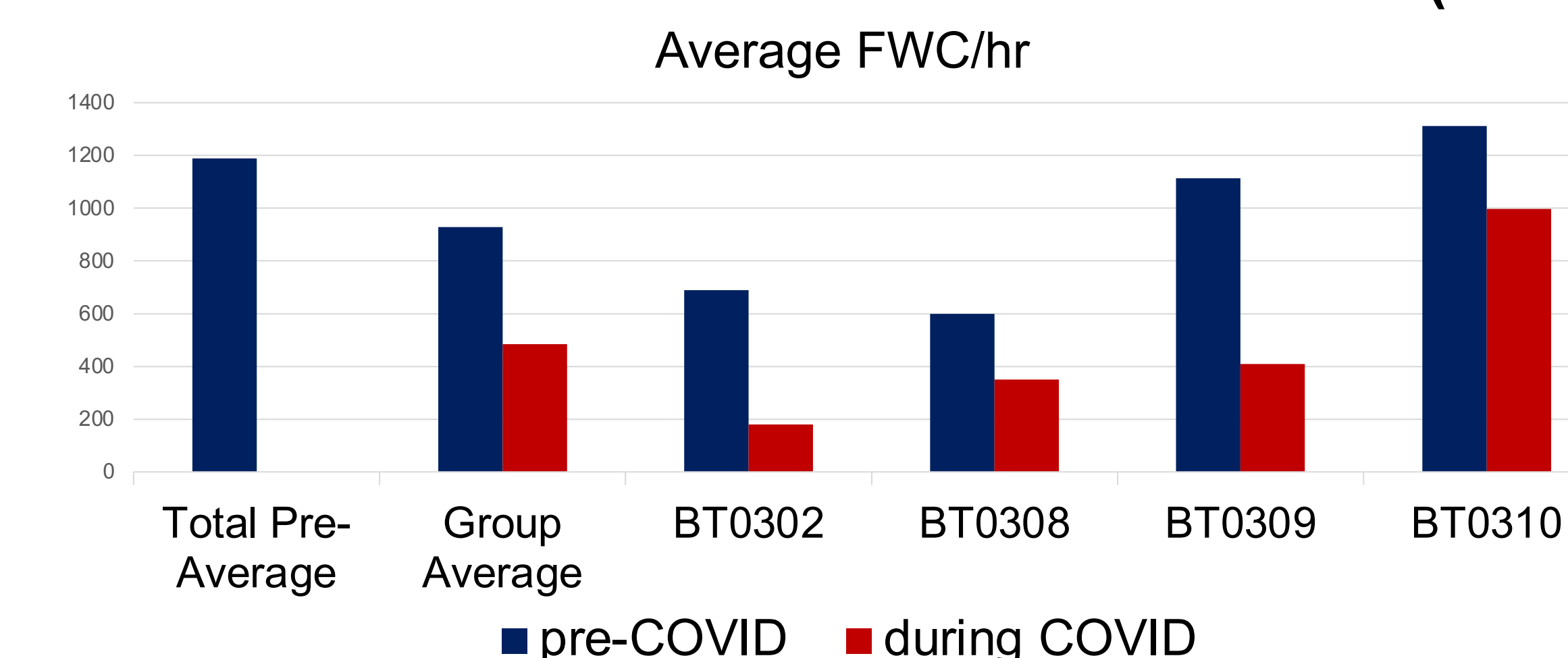


Figure 2: Female adult word count (FWC) per hour before and during the pandemic, differentiated by participant, with pre-pandemic and group averages shown on the left. (DHH group pre-pandemic: 1189, HA group pre-pandemic: 928, HA group during pandemic: 484)

### Pandemic Effects: Male Adult Word Count (MWC)

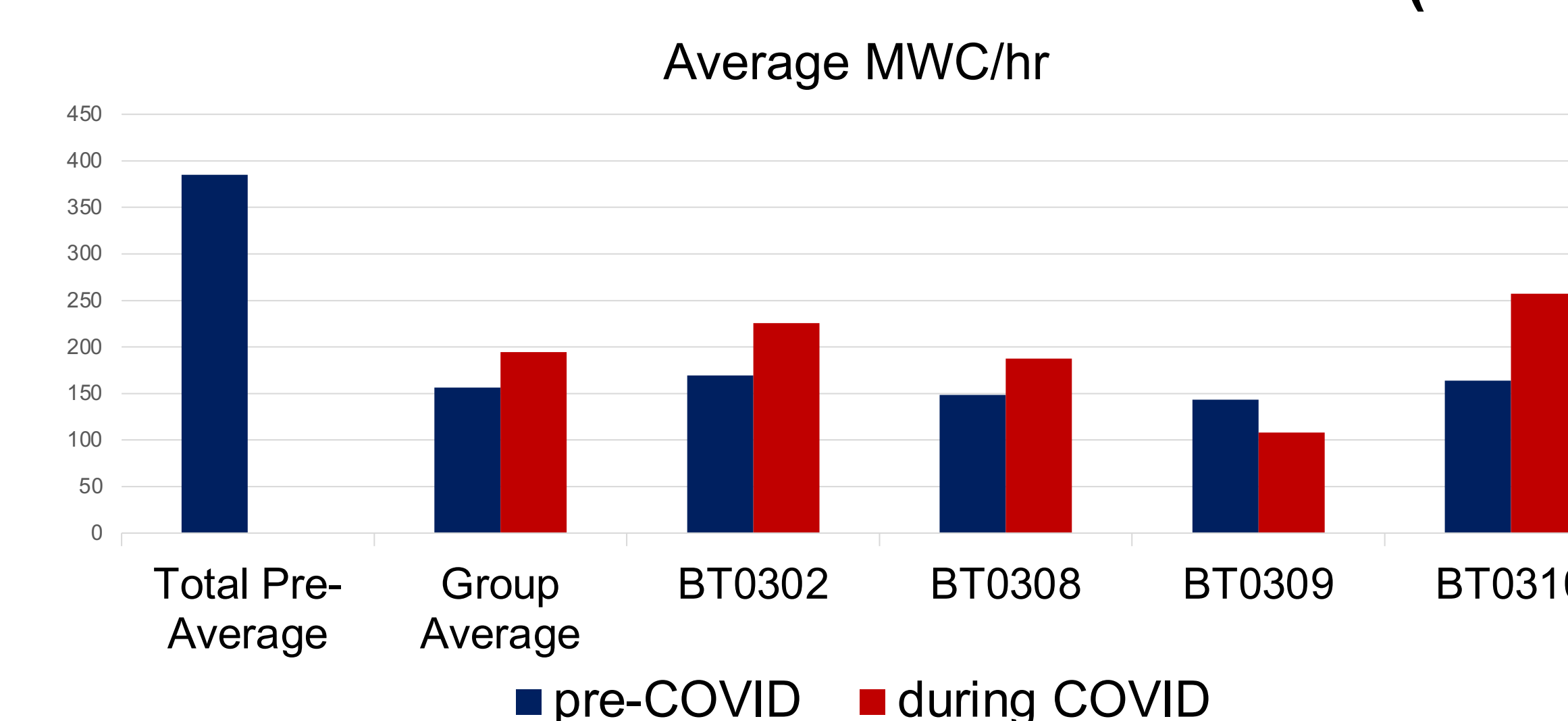


Figure 3: Male adult word count (MWC) per hour before and during the pandemic, differentiated by participant, with pre-pandemic and group averages shown on the left. (DHH group pre-pandemic: 385, HA group pre-pandemic: 156, HA group during pandemic: 195)

### Pandemic Effects: Proportion of MWC in AWC (P<sub>MWC</sub>)

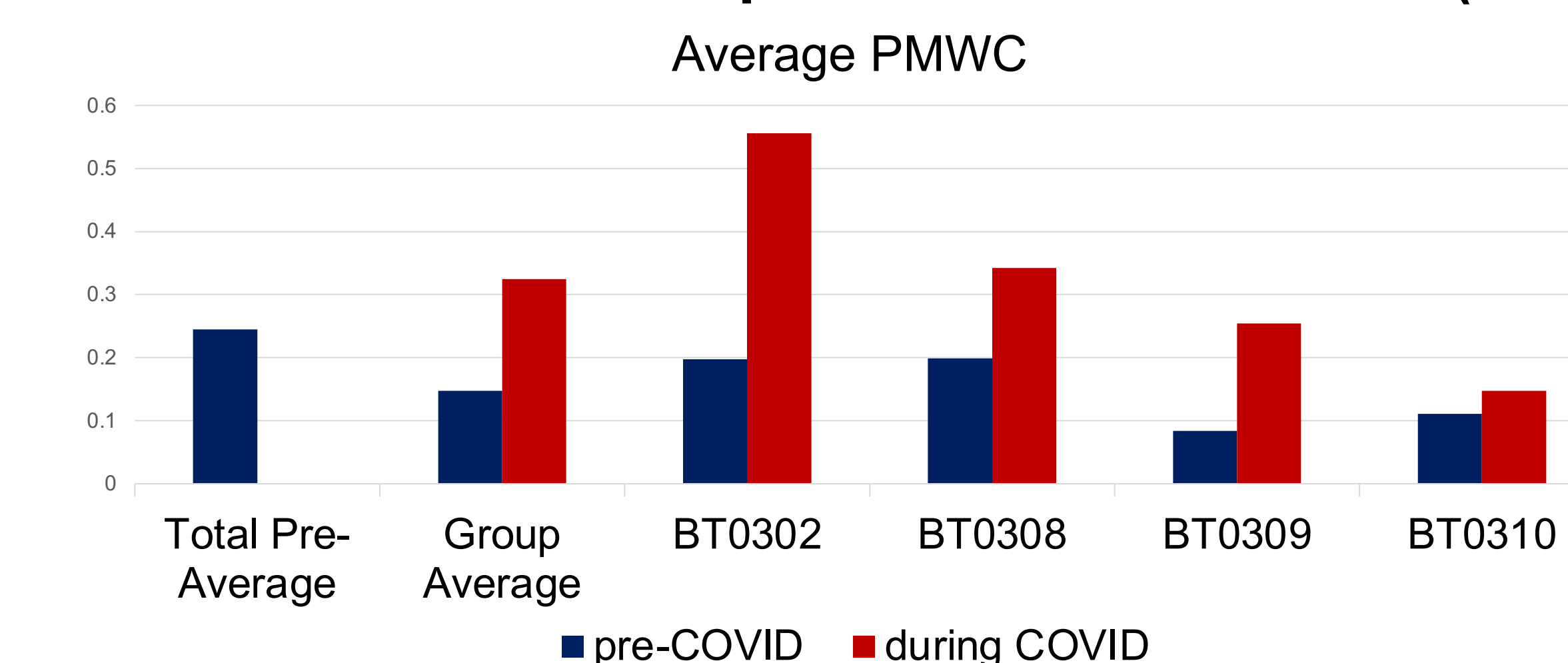


Figure 4: Proportion of male adult word count (MWC) in total adult word count (AWC) before and during the pandemic, differentiated by participant, with pre-pandemic and group averages shown on the left. (DHH group pre-pandemic: 24.47%, HA group pre-pandemic: 14.41%, HA group during pandemic: 32.5%)

## Discussion

Both the proportion and magnitude of paternal language input to children with hearing aids increased during the pandemic, while maternal speech decreased along with overall adult word count. The increased paternal input may help to mitigate the negative effects of the pandemic on DHH language environments and development, but only partially. We plan to investigate these effects further in future research.

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