

Differences in Respiratory-Swallowing Patterns Across Eating Conditions Among Healthy Older Adults

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Introduction

Safe and efficient eating relies on the precise coordination of the respiratory and swallowing systems.^{1,2}

- To prevent food and liquid from entering into the lungs, the airway needs to be closed during the swallow itself.
- Exhaling before and after the swallow is considered to be the most protective pattern and is most commonly observed in healthy (younger) adults.

Non-oral, pre-swallow sensory cues (e.g., proprioception from the arm as it starts to feed) are known to influence certain eating actions.^{3,4}

- Both older and younger adults begin to open their mouths in anticipation of eating.
- This mouth opening movement is variable depending on the types of cues available.

However, there is lacking research on the effects of aging and sensory environment on respiratory patterns during swallowing.

Purpose of the Study

The goal of this study was to characterize the pre- and post-swallow respiratory patterns in older adults across different eating environments.

Methods

Participants and Procedure

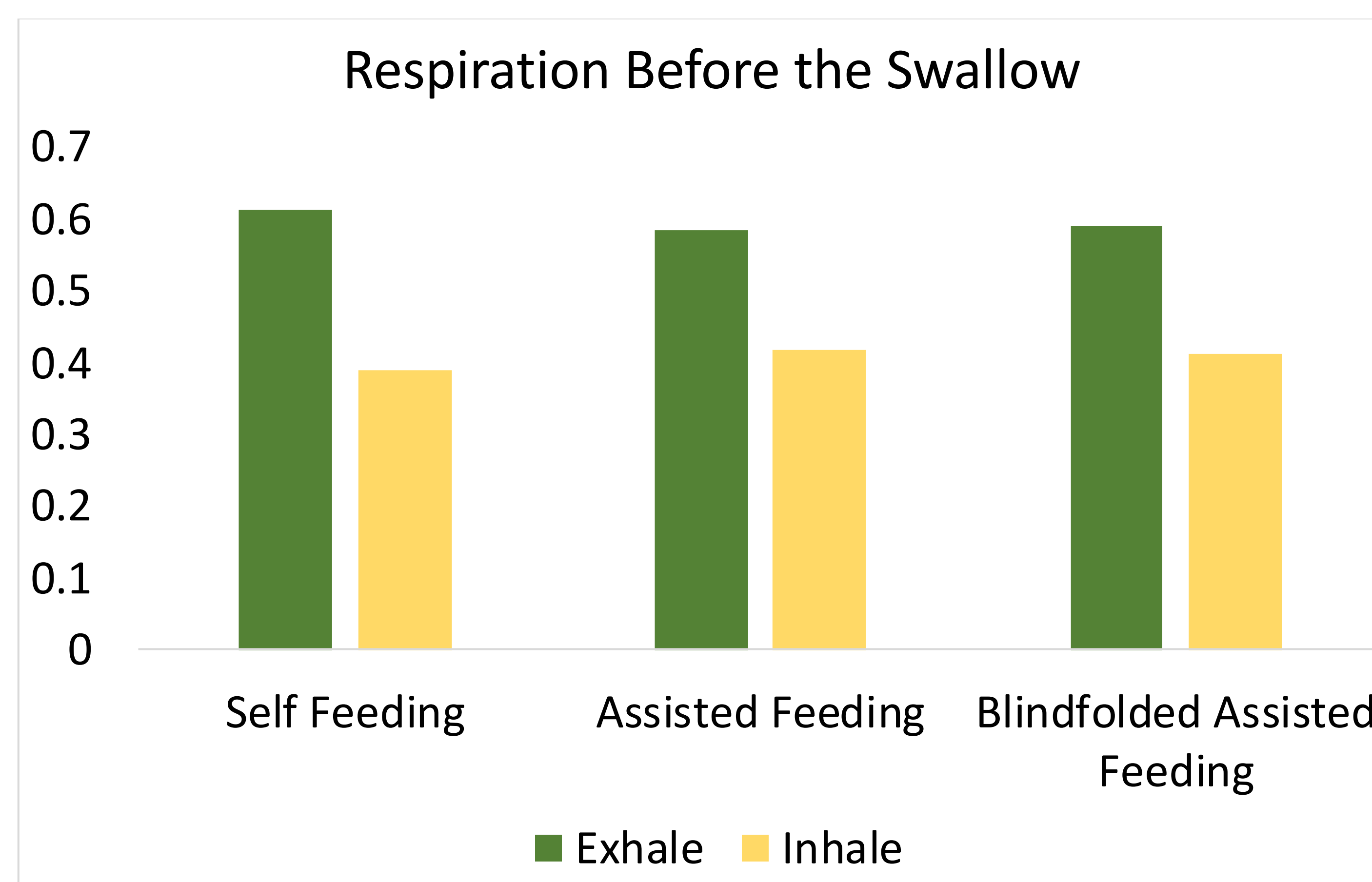
- Eighteen healthy older adults (range 65-90 years; 11 females)
- Each participated in three conditions:
 - Self-feeding
 - Assisted feeding
 - Blindfolded assisted feeding
- In each condition, they consumed ten bites of applesauce by spoon and ten sips of water by metal straw
- Data was collected via the Biopac MP150 system and analyzed in AcqKnowledge and Excel.
- The variables of interest for the current study were respiratory and laryngeal patterns. Specifically, we analyzed whether there was an inhalation or exhalation before and after the laryngeal swallow.



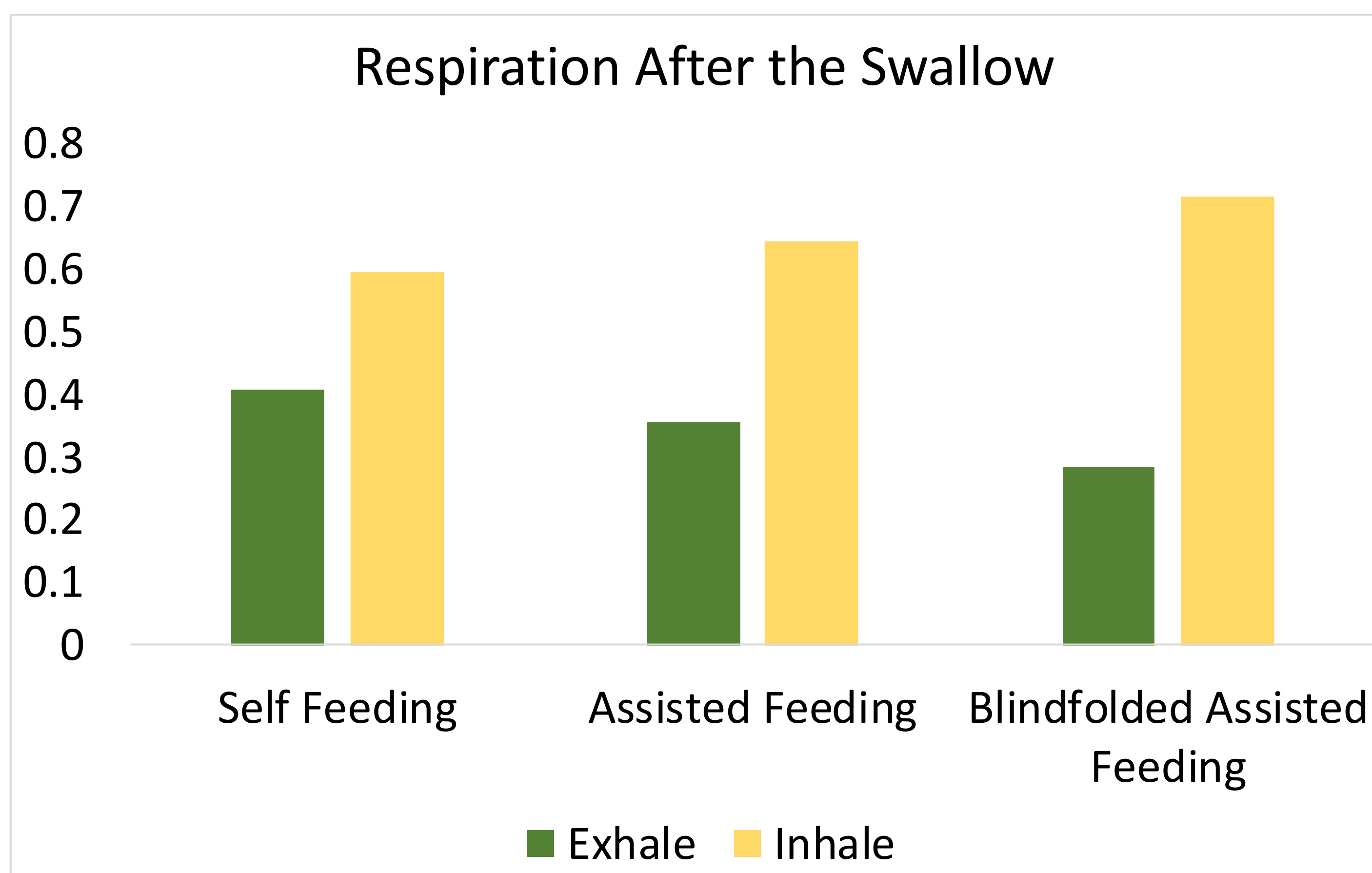
Results

Data from 972 and 960 swallows were analyzed to determine pre-swallow and post-swallow respiratory patterns, respectively. Data was collapsed across all participants.

Across all conditions, exhalations were most commonly observed prior to the swallow, with no significant differences across the three conditions.



Across all conditions, inhalations were most commonly observed after the swallow, with a trend for increasing percentages given increased non-oral, pre-swallow sensory loss.



Conclusions

A majority of the swallows by older adults were followed by an inhalation.

Notably, though, these respiratory patterns appeared to be influenced by eating environment, with an increased percentage of inhalations occurring during blindfolded assisted feeding as compared to self feeding.

Together, these preliminary findings support that alterations in the sensory environments associated with eating may increase risk for airway compromise (e.g., aspiration, pneumonia) among older adults.

Implications for clinical practice for speech-language pathologists and nursing staff include challenging the assumption that providing patients with feeding assistance is a “safer” eating environment.

Future work should continue to explore differences across sensory environments within individuals and also explore differences across consistency type (e.g., water versus applesauce).

References

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3. Shune, S. E., Moon, J. B., & Goodman, S. S. (2016). The effects of age and preoral sensorimotor cues on anticipatory mouth movement during swallowing. *Journal of Speech, Language, and Hearing Research*, 59(2), 195-205.
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