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## The Effect Posture on Sip Size Volume

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## Background

A reclining posture, use of straws, and dependency for oral feeding have been shown to effect the risk of aspiration of thin liquids.<sup>1,2</sup> Swallowing dynamics change when a person is allowed to self-administer a bolus versus being fed orally.<sup>3</sup> A 45-degree reclining angle has been used to reduce penetration or aspiration for patients with dysphagia.<sup>2</sup> What is not known is whether this therapeutic position affects the amount of liquid consumed per swallow in an effort to exert greater oral control or whether patient administered straw sips differ from total assistance when drinking from a straw in different reclined positions.

## Purpose

Clinical observations suggest that many hospital patients and nursing home residents are given straw sips of thin liquids by others while reclining in bed. The purpose of this study is to analyze the sip size volume of healthy, young individuals when seated at differentiated angles to determine “average” sip size volumes at each angle.

## Questions

Is there an effect on sip size volume when taking a sip at a 90-degree angle versus a 45-degree angle?

Is there a difference in sip size volume when taking a sip independently versus taking a sip dependently?

The authors have non financial or financial disclosures to report.

## Methods

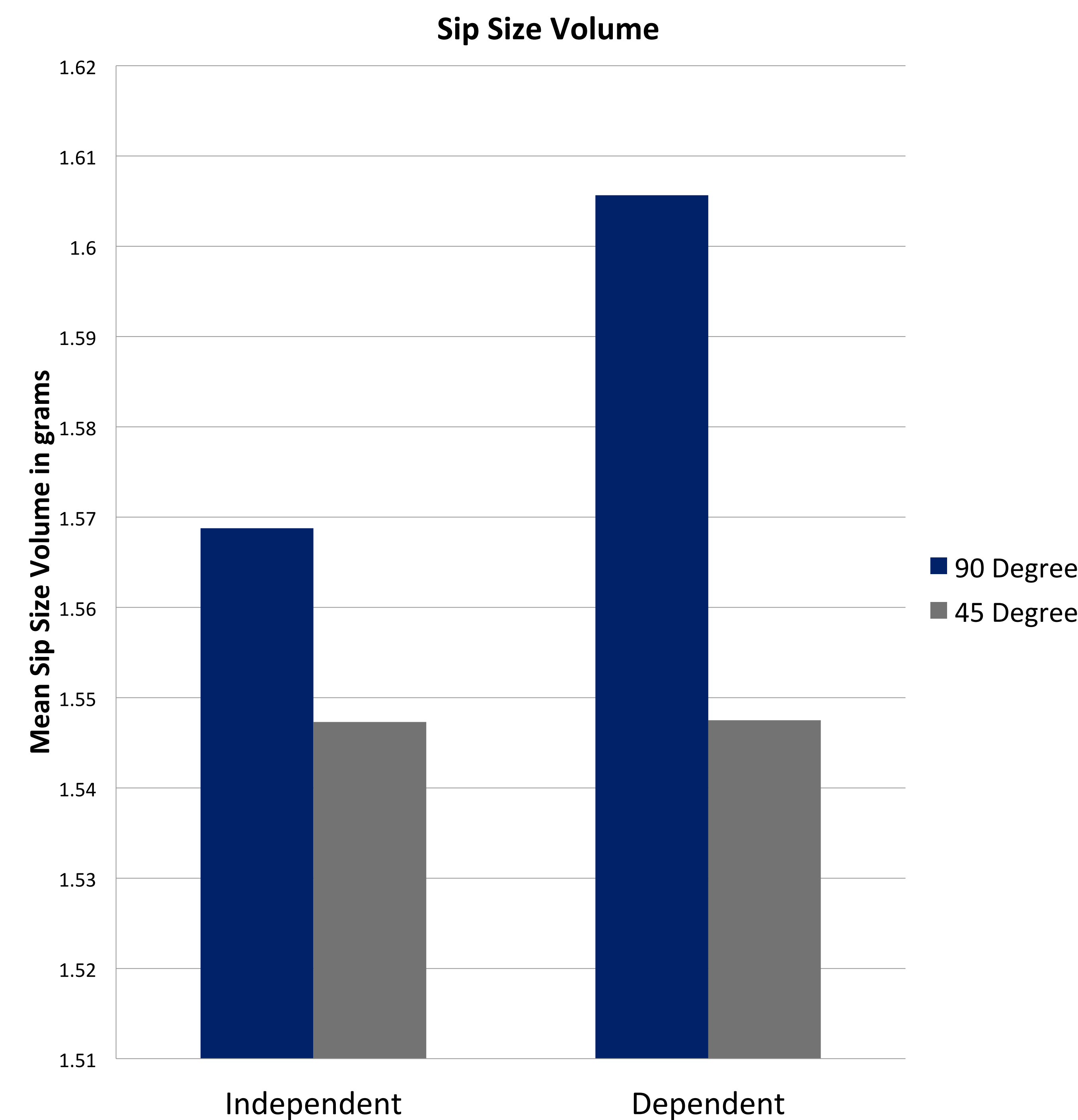
### Participants:

Twenty graduate students in the Communication Sciences and Disorders program at Longwood University participated in this study.

### Procedures:

- All participants were between 21-26 years of age with no history of dysphagia and provided informed consent. All denied symptoms of respiratory illness or any other health condition that may affect their ability to swallow liquids.
- Participants sat in a dental chair at a 90-degree angle and at a 45-degree angle, as measured by a protractor, and were instructed to keep their head against the head rest when taking a sip from a cup through a straw that was bent to a 90-degree angle.
- The participants were asked to take one sip in both reclined positions with total assistance or “dependent” (researcher maintained a grasp on the cup and straw and gave the sip to the participant) and again independently (with no assistance).
- Measurements were made with a Brecknell MBS-1200 Digital Scale (precision .001 grams), which was calibrated before each use. The cup/straw weight was removed from the calculation so that measurements reflected the actual weight of the bolus. The original weight of each full container of liquid was noted. After a sip was taken, the cup was weighed again and this value was subtracted from the original weight in order to measure sip size in grams.

## Data



## Results

The mean sip size volumes for liquids are presented in the above figure. The mean sip size volume for participants taking a sip dependently at a 90-degree angle was 1.61 grams. and at a 45-degree angle was 1.54 grams. The mean sip size volume at a 90-degree angle independently was 1.57 grams. and at a 45-degree angle was 1.55 grams. The volume of the sip size did not significantly differ based on the angle of posture nor did it significantly differ based on the dependent versus independent presentation/hold. All sip sizes were less than 1/2 tsp (2.5 ml or 2.6 grams).

## Discussion

Although there was not a significant difference in sip size volume between the dependent and independent hold ( $p > .05$ ), it was interesting that the subjects reported that taking a sip at a 45-degree angle was challenging. Regardless, the data suggests that sitting at a 45-degree angle versus a 90-degree angle did not alter their overall sip size ( $t = .002$ ,  $p = .301$ ). These results indicate that neither angle of posture nor independence/dependence of hold had an effect on the volume of sip size consumed through a straw in normal, healthy (non-dysphagic) young adult females. Future research should be done to analyze the effect of posture on sip size volume comparing males versus females as well as dysphagic versus non-dysphagic individuals. Additionally, research should include a larger age range, because as one ages, the 45-degree angle might present more of a challenge that may impact independent sip size. Research should also look at differences in the physiologic mechanics of swallowing when sitting at different postural angles.



## References

<sup>1</sup>Drakulov, M., Torres, A., Bauer, T., Noela, J., Nogue, S., & Ferrer, M. (1999). Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomized trial. *The Lancet*, (354), 1851-1858.

<sup>2</sup>Park, B. Seo, J., Ko, M., & Park, S. (2013). Effect of 45 degree reclining sitting posture on swallowing in patient with dysphagia. *Yonsei Medical Journal*, (54), 1137-1142.

<sup>3</sup>Clark, M., Anderson, C., & Hietpas, F. (2014). Volumes of discrete sips from straws of varying internal diameters. *American Journal of Speech-Language Pathology*, (23), 84.