Influence of a Thickened Liquid Diet on Visuospatial Abilities  
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Background

* One of the most common ways to decrease the risk for medical complications in dysphagia when oral control of thin liquid is poor is to modify a patient’s diet to thickened liquids (Finestone, Foley, Woodbury, & Greene-Finestone, 2001).
* While thickened liquid diets can help reduce the negative effects of dysphagia, research shows that they are associated with dehydration secondary to reduced liquid intake (McGrail & Kelchner, 2012).
* There is accumulating evidence to suggest that dehydration can lead to a number of health problems, including impaired cognitive function (Cian et al., 2000; Gopinathan, Pichan, & Sharma, 1988).
* Cognitive functions such as visuospatial abilities are imperative to carrying out activities of daily living (Stepankova et al., 2014). Visuospatial skills play a vital role in the way individuals orient themselves within their environment.
* There is a paucity of research to determine whether thickened liquid diets have an effect on cognitive performance, and particularly on visuospatial skills.
* With this in mind, it is important to further investigate how thickened liquid diets affect visuospatial skills in order to prevent adverse outcomes for dysphagic patients.

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| Purpose | Hypothesis |
| The purpose of this study was to investigate the relationship between thickened liquids, dehydration, and visuospatial awareness as it relates to cognition. | Drinking only thickened liquids for 48-hours will have a negative effect on the visuospatial skills of normal adults. |

Methods

* Twenty college-aged adults, ranging in age from 19-26 years participated in the study. All participants were considered healthy as assessed by a general health questionnaire.

*Procedures*

* Diet was recorded during the 24 hours before completing the study using a provided diet log.
* Participant urine samples were collected.
* A 10-question visuospatial task was administered to each participant.
* Eight participants served as the control group. These individuals were instructed to record diet, and to return to the lab for follow-up 48 hours later.
* The remaining twelve individuals participated in the 48-hour thickened liquid diet.
* The remaining participants were given instructions regarding the 48-hour thickened liquid diet.
* Thick-It® commercial thickener was distributed.
* Participants were instructed to record diet, and to return to the lab for follow-up 48 hours later.
* After the 48-hour period, participants returned to the lab for a second urine analysis and follow-up testing.
* A 10-question visuospatial task was administered to each participant.

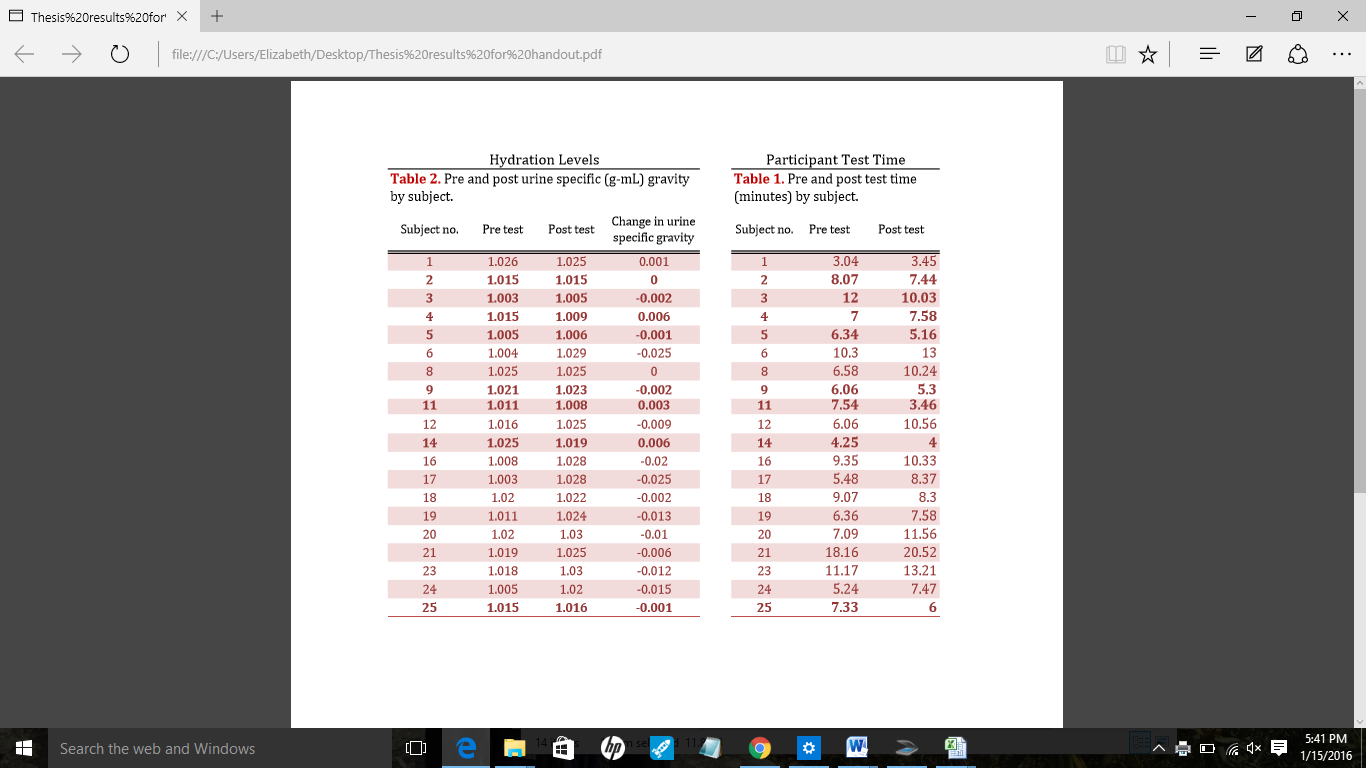
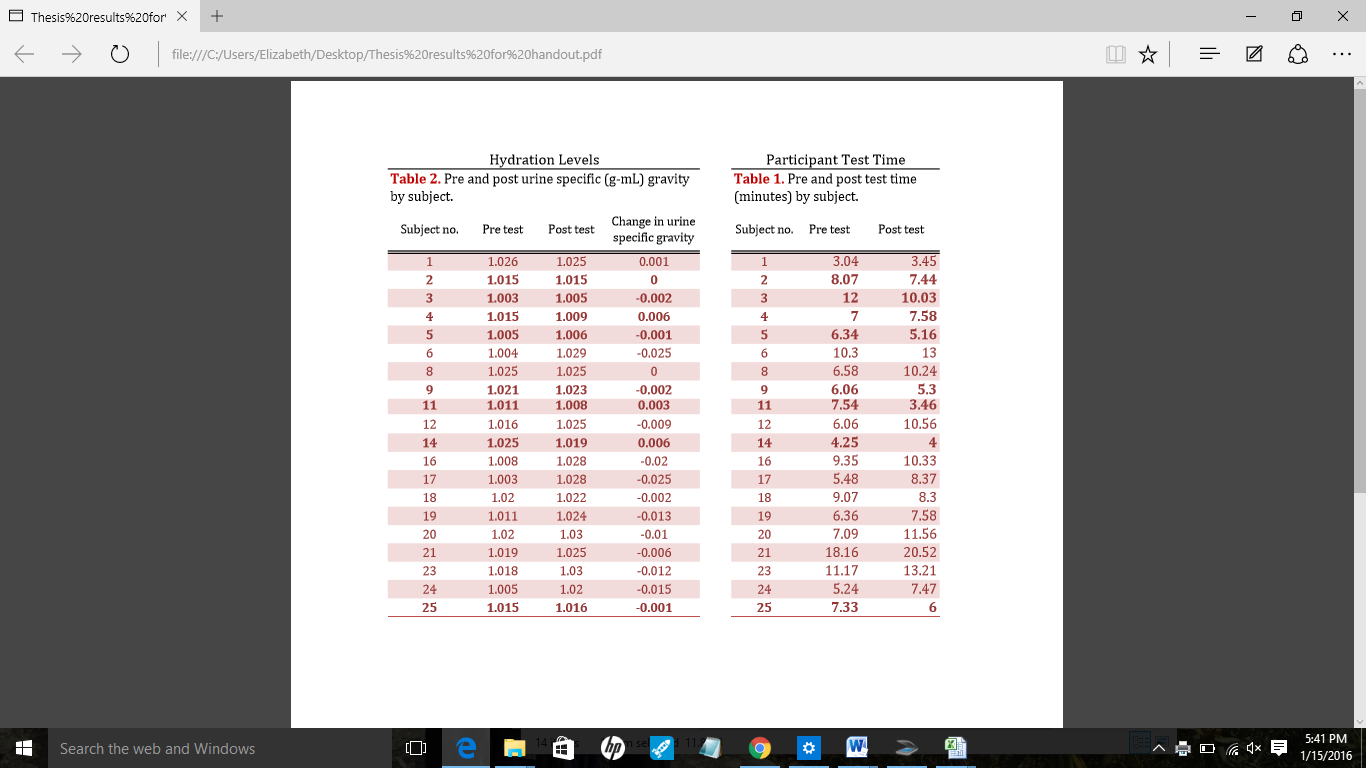
*Measures*

* Urine specific gravity (g•mL) was measured using a clinical handheld refractometer (Atago, USA, Inc., Bellevue, WA).
* Visuospatial skills were measured by version A & version B of a visuospatial test.

*Analysis*

* Participant hydration was analyzed using previously determined methods, where a urine specific gravity at or below 1.020 g•mL is considered hydrated (Silva, Mundel, Altoe, Sldanha, Ferreira, & Marins, 2010).
* Pre- and post-thickened liquid test times were calculated.

Results

**\*Bold** = control group

Discussion

* Drinking only thickened liquids for 48 hours had a negative affect on the visuospatial skills of normal adults, as it took majority of participants longer to finish the visuospatial task after the 48-hour thickened liquid diet.  
  In a study that measured the role of dehydration on mental performance, Gopintham et al. (1988) found that significant deterioration in cognitive performance occurred at 2% or more (< 2.000 g•mL) body hydration levels. None of the participants in the current study reached the critical level where cognitive deterioration is highly significant. However, deterioration of cognitive performance was noted in majority of participants at the current levels.

*Implications*

* There is evidence to suggest that thickened liquid diets have a negative effect on visuospatial abilities. However, it is important to continue to expand on the literature regarding thickened liquid diets and their effect on cognitive abilities to ensure the best quality of life for dysphagic patients.

*Limitations*

* Participant adherence to the 48-hour thickened liquid diet could not be controlled.
* A small sample size (20 participants) was obtained for this study.

Conclusion

* The results of the current study revealed that drinking only thickened liquids for 48 hours has a negative effect on the visuospatial skills of normal adults. However, these data should be interpreted with caution due to the small sample size.
* In order to prevent adverse outcomes for dysphagic patients, it is important to further investigate the relationship between thickened-liquids and visuospatial awareness as it relates to cognitive function.