From Lab to Livingroom: The Validation of low-cost fNIRS

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INTRODUCTION

- Functional Near-Infrared Spectroscopy is an emerging cognitive research tool.
- Utilizes near-infrared light and modified Beer-Lambert laws to describe relationship between light absorption and concentration of a medium
- Specifically, fNIRS can measure concentrations of Oxy- and Deoxyhemoglobin
- The capacity to measure oxygen change in brain is a useful diagnostic tool
- However, its capacity in a commercial setting has yet to be explored
- Here we validate a commercially viable device (Blueberry) against a research grade peer using a cognitively demanding task

METHODS

- Participants performed n-back task
- Letters of alphabet presented in serial randomly
- 1-back and 3-back condition types
- Two recording devices were used, per session over prefrontal cortex

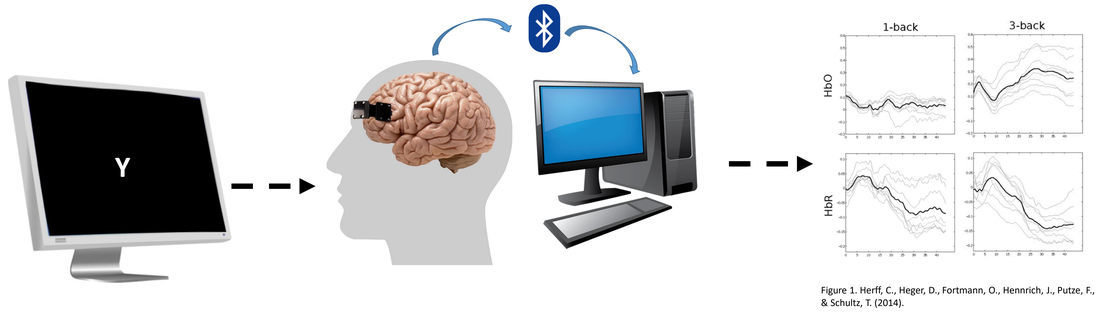


Figure 1. Herff, C., Heger, D., Fortmann, O., Hennrich, J., Putze, F., & Schultz, T. (2014).

RESULTS

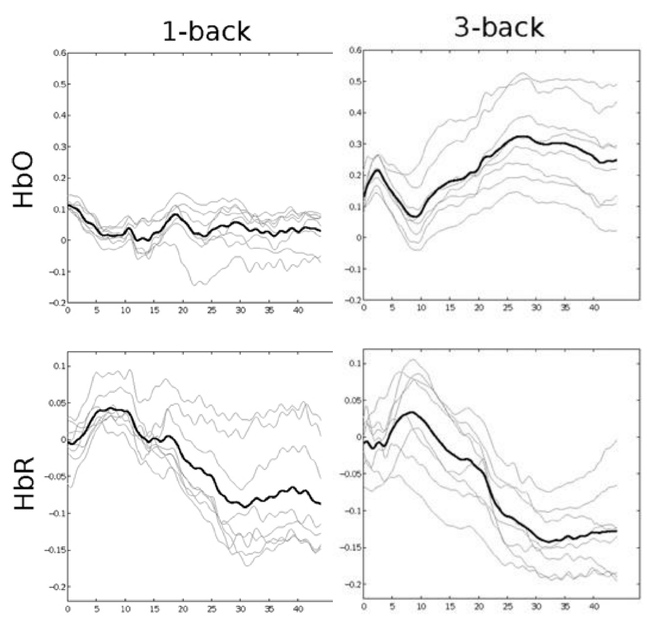
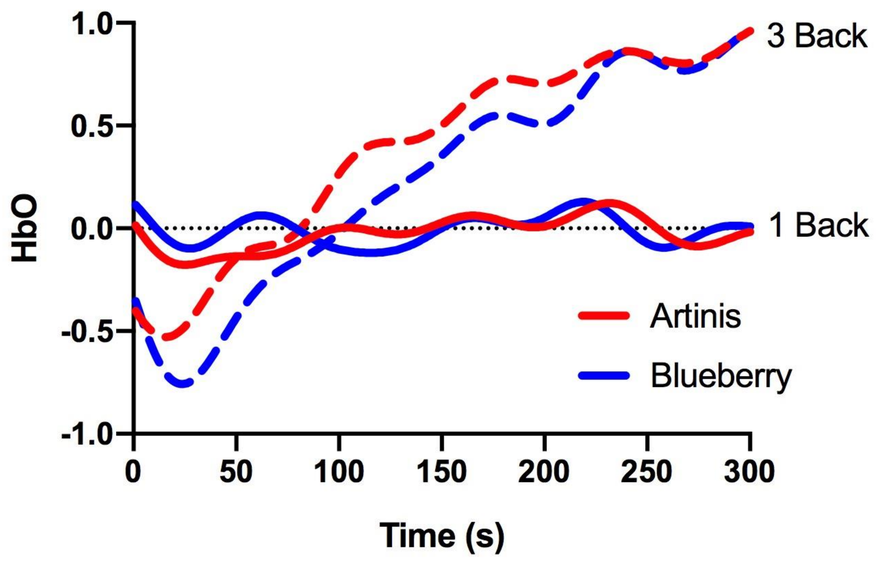
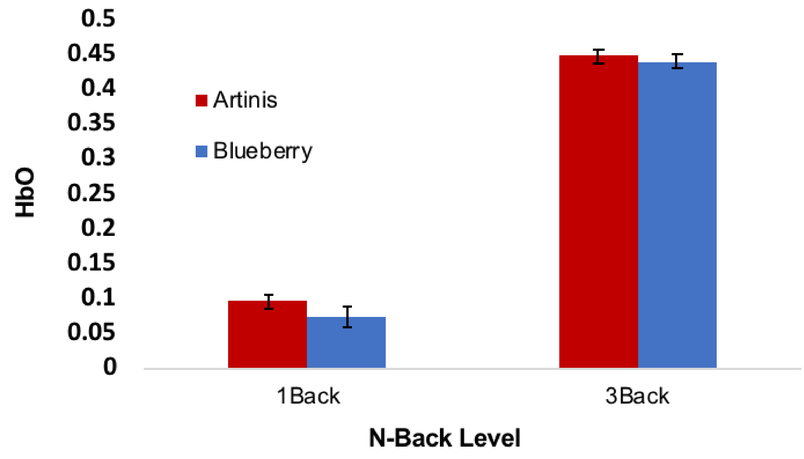


Figure 2. Herff, C., Heger, D., Fortmann, O., Hennrich, J., Putze, F., & Schultz, T. (2014).





CONCLUSIONS

Here we demonstrate a validation of a low-cost fNIRS system. Results follow a similar pattern to Schultz et al., 2014. With portable and readily available fNIRS, a new way of imaging the brain is becoming more accessible. By being able to image the hemodynamic response, we can now present data similar to fMRI that is robust against movement artifacts and does not require any special setup such as electrode gel. By also being available on a commercial level, fNIRS may also be used to improve other aspects of brain health such as meditation.