

Binocular vs monocular calibration of video-based eye-tracking system

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As video-based recording becomes more popular for different eye movement experiments, calibration is a very important tool for accurate eye gaze position identification. It faces many technical and experimental problems. Each research group prefer their own calibration procedure still giving little arguments of their choice. Performing vergence experiments, a particular question arises: what calibration is more precise – binocular or monocular. During monocular calibration, the eye could fixate closer to fixation point providing more appropriate eye gaze position coordinates. The aim of our study is to test the precision of monocular and binocular calibration using different types of stimuli: fixed dot and cross (constant size: 0.5°) and shrinking dot and cross (size decreases from 0.5° to 0.1° during 1 s). We use iViewX Hi-Speed binocular video-based tracking system (500 Hz; SMI, Germany). All stimuli are created in MS Experiment Center. We presented five calibration points on a horizontal plane; only one point was displayed at a time. We hypothesize that fixation stability may be improved with (1) shrinking compared to constant calibration targets and/or (2) monocular compared to binocular calibration targets; in the latter case, the naturally occurring vergence variability may deteriorate the fixation stability. This methodological research may be important, for example, for defining optimal experimental procedures in testing the accuracy of vergence response and measuring objective fixation disparity.

¹ Supported by ESF and UL project 2013/0021/1DP/1.1.1.2.0/13/APIA/VIAA/001