

Table 1: Number of correct/erroneous selections and the number of selections per minute for each participant (P1-P4) and condition. Additionally the average number of scan steps needed to make a correct selection (Steps) for each condition is shown.

	CAB-SIT	CAB-STND	TRD-STND	TRD-WLK	TRD-WLK-OFF
P1	07/4, 1.0	09/1, 1.6	09/2, 1.5	10/5, 1.6	12/3, 1.6
P2	11/2, 1.6	10/1, 1.4	10/2, 1.2	09/1, 0.9	5/1, 0.7
P3	07/1, 0.7	08/2, 0.9	07/0, 1.3	07/3, 0.9	2/1, 0.4
P4	08/0, 1.9	08/0, 1.5	06/1, 0.6	01/0, 0.3	0/0, --
Mean	8.2/1.7, 1.30	8.7/1.0, 1.35	8.0/1.2, 1.15	6.7/2.2, 0.90	4.7/1.2, 0.67
Steps	4.5	3.8	4.6	4.8	4.4

4 Discussion

The preliminary results of our study show that when EEG data is contaminated by artifacts the performance of the BCI system improves when using the developed online artifact correction method. Participant P4 had problems to spell outside the box as the light in the room was very bright and dazzled him. In total for three of the participants (P2-P4) the system performed better with artifact correction method, and for one participant (P1) the system performed equally well with and without artifact correction.

The implemented scanning mechanism sequentially accumulates evidence until a decision can be made. Hence, providing user on-demand access is an intrinsic feature of this strategy. Robustness of detection can be enhanced by optimizing scanning time and selection threshold for each individual. Selection time can be enhanced by optimizing the scanning protocol.

One big issue when designing the experimental paradigm was to find a strategy to naturally elicit artifacts. As a first step, we asked participants to walk on a treadmill and hold the tablet in their hand. Since the results of the study suggest that the developed methods work at a fundamental level, in the next step we will explore their performance with CP users and adapt methods and scanning protocols following user-center design principles.

Acknowledgments

This work was supported by the FP7 Framework EU Research Project ABC (No. 287774). This paper only reflects the authors views and funding agencies are not liable for any use that may be made of the information contained herein.

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