

# COMPARISON OF THE LEVELS OF DROWSINESS OBTAINED VIA A NEW PHOTOOCULOGRAPHY-BASED DROWSINESS SCALE AND VIA A SIMPLE VARIATION OF THE KAROLINSKA DROWSINESS SCALE (KDS)

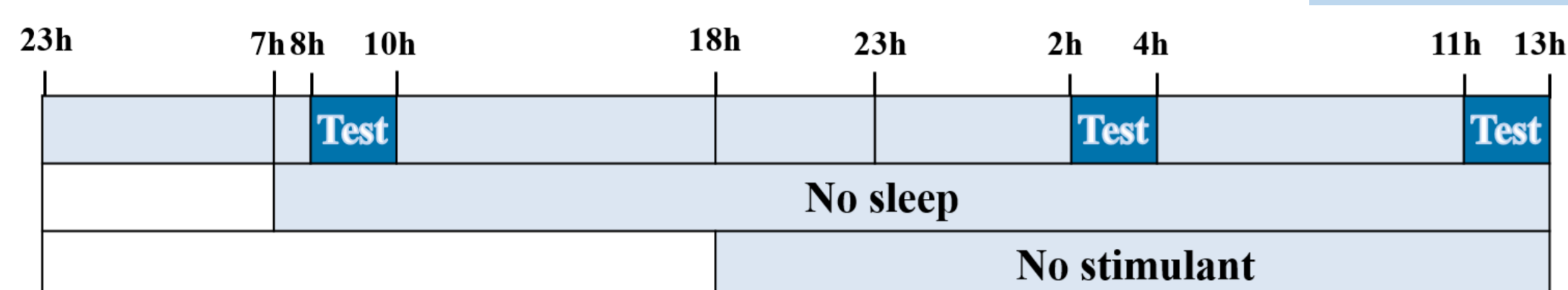
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## Objective

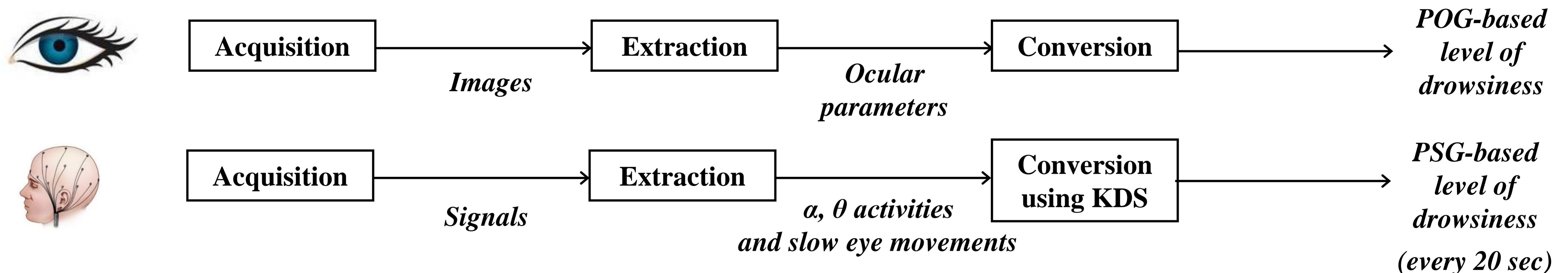
Drowsiness is a major cause of accidents [1], and oculography is one of the most sensible approaches for monitoring the level of drowsiness [2]. We have thus developed a new method, based on photooculography (POG), for producing a level of drowsiness directly from images of the eye. We talk about a “POG-based level of drowsiness”. Since polysomnography (PSG) is the “gold standard” for sleep, we have also developed a new method for producing a level of drowsiness based upon PSG signals, and called a “PSG-based level of drowsiness”. This method aggregates scores produced by our own interpretation of the “Karolinska Drowsiness Scale (KDS)” [3].

## Data acquisition



- 27 participants (12 M, 15 F, mean age of 24.3 years, range of 19-32 years)
- Test = reaction time (RT) test (duration of 15 minutes)
- Protocol approved by ethics committee.

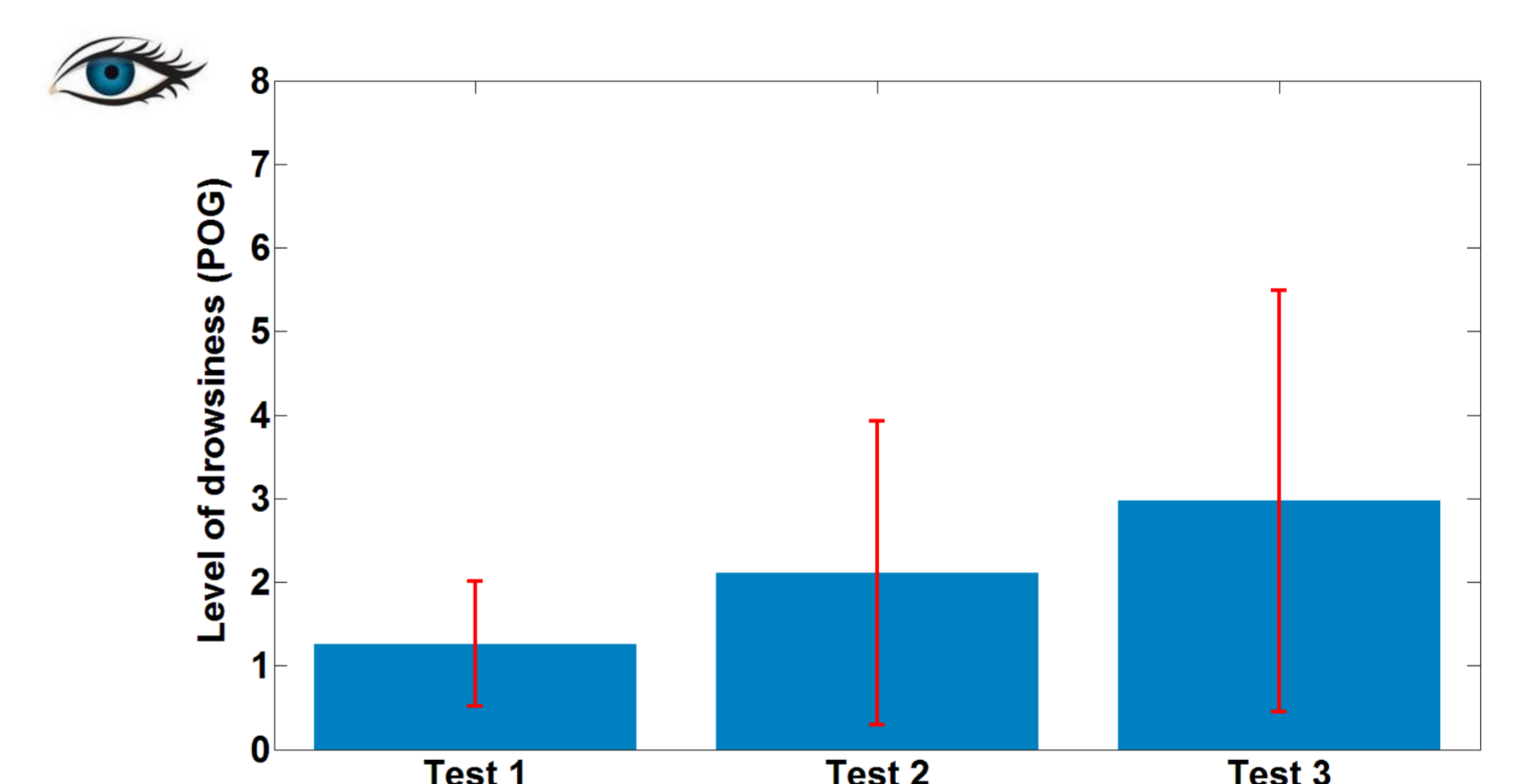
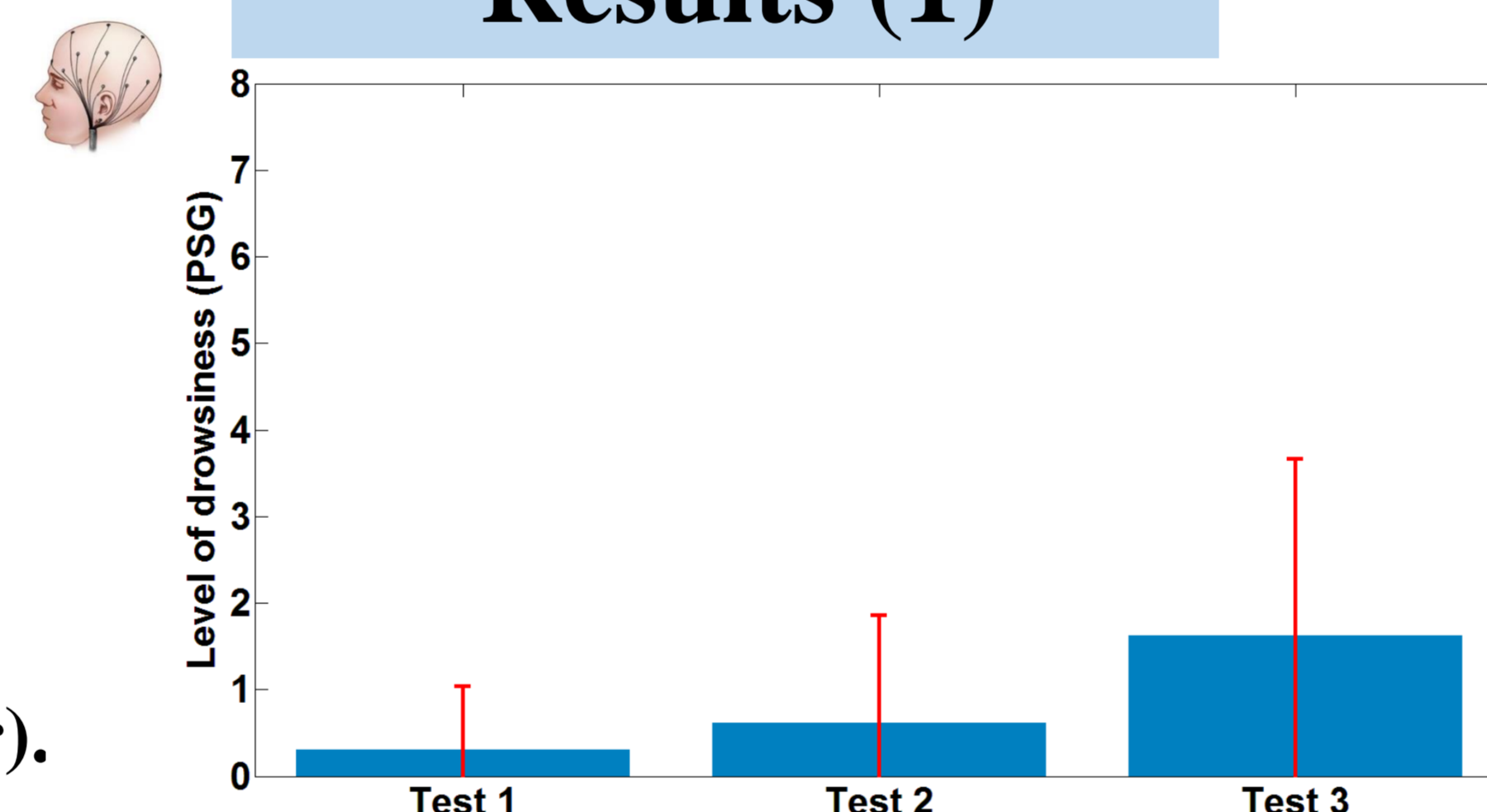
## Our POG- and PSG-based levels of drowsiness



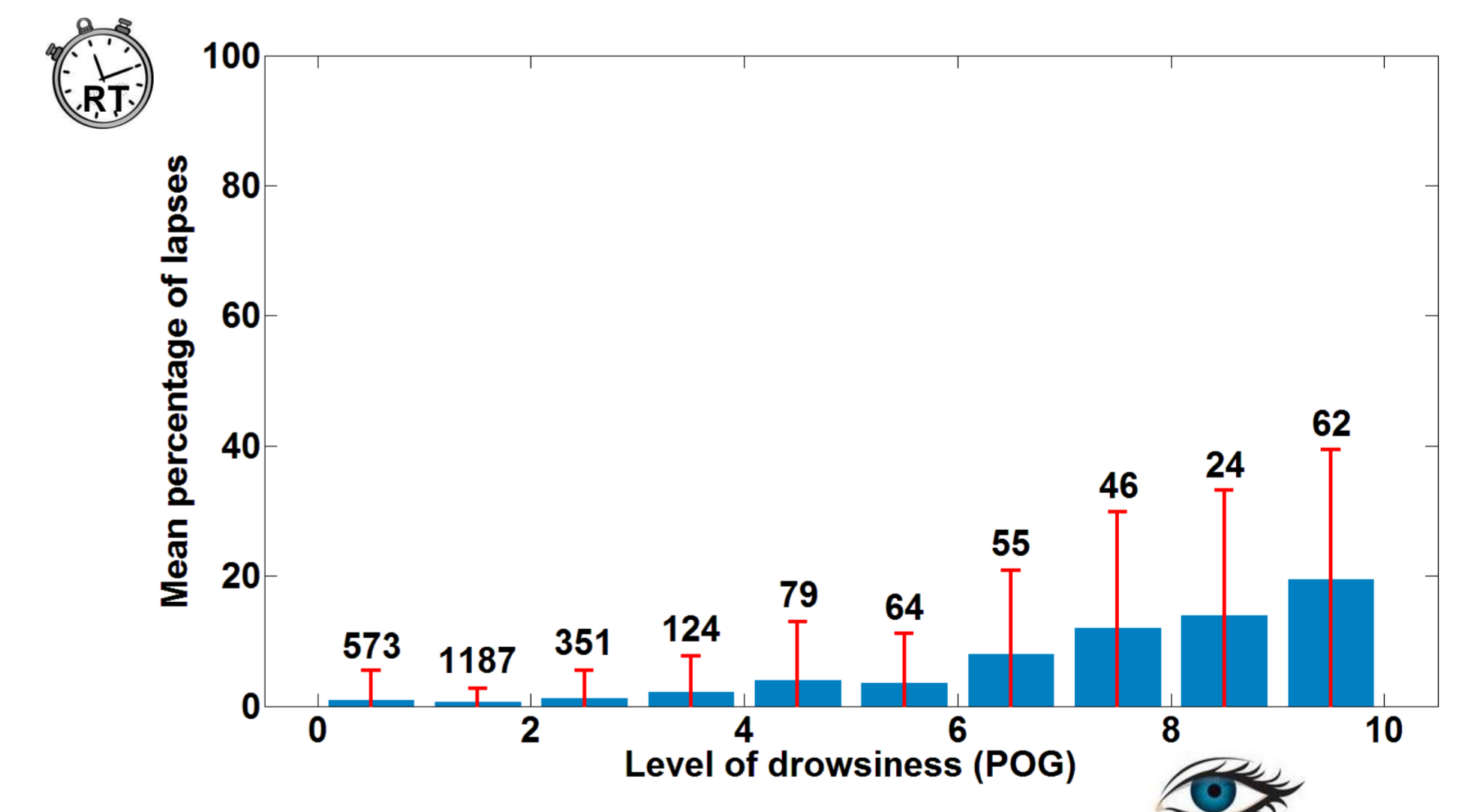
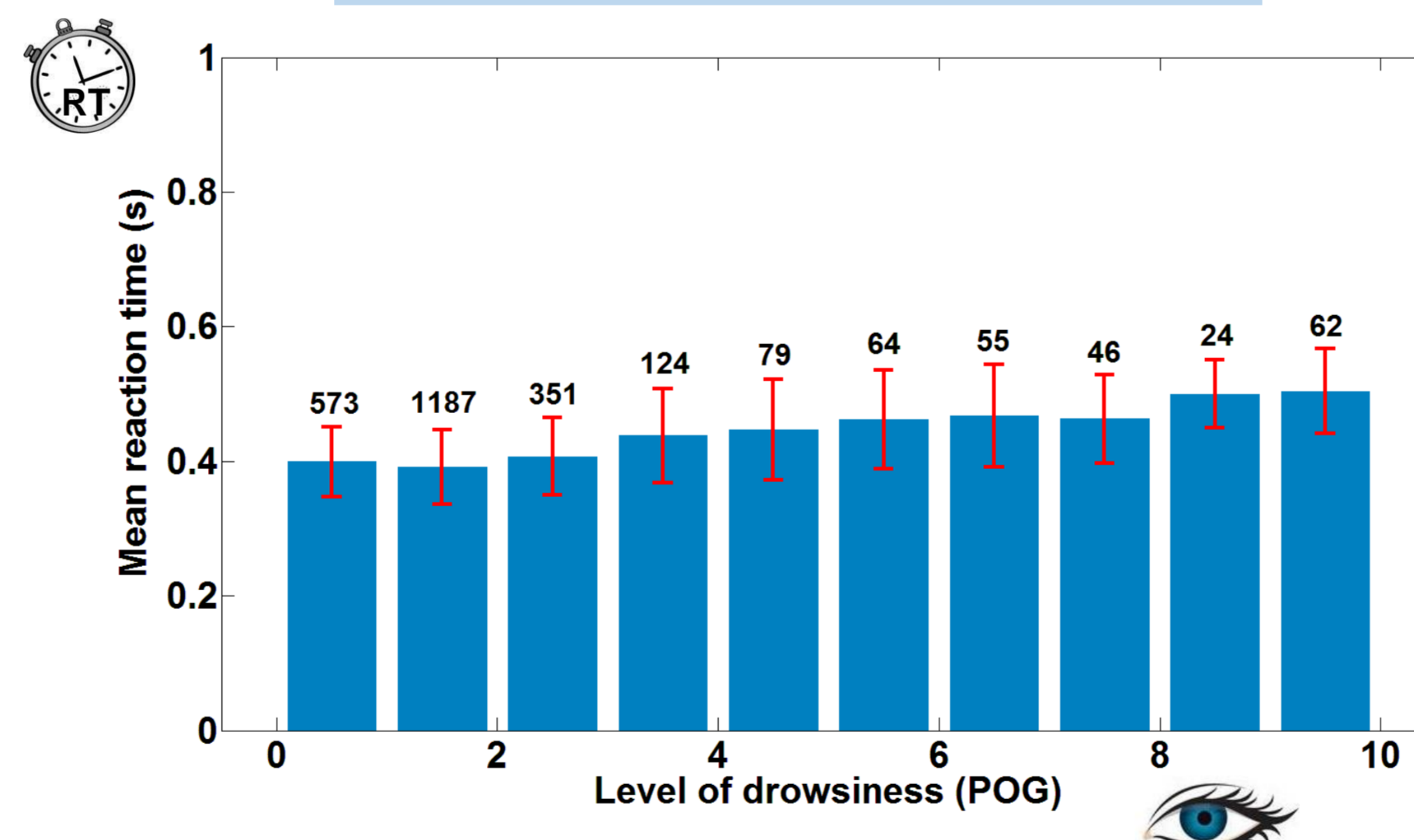
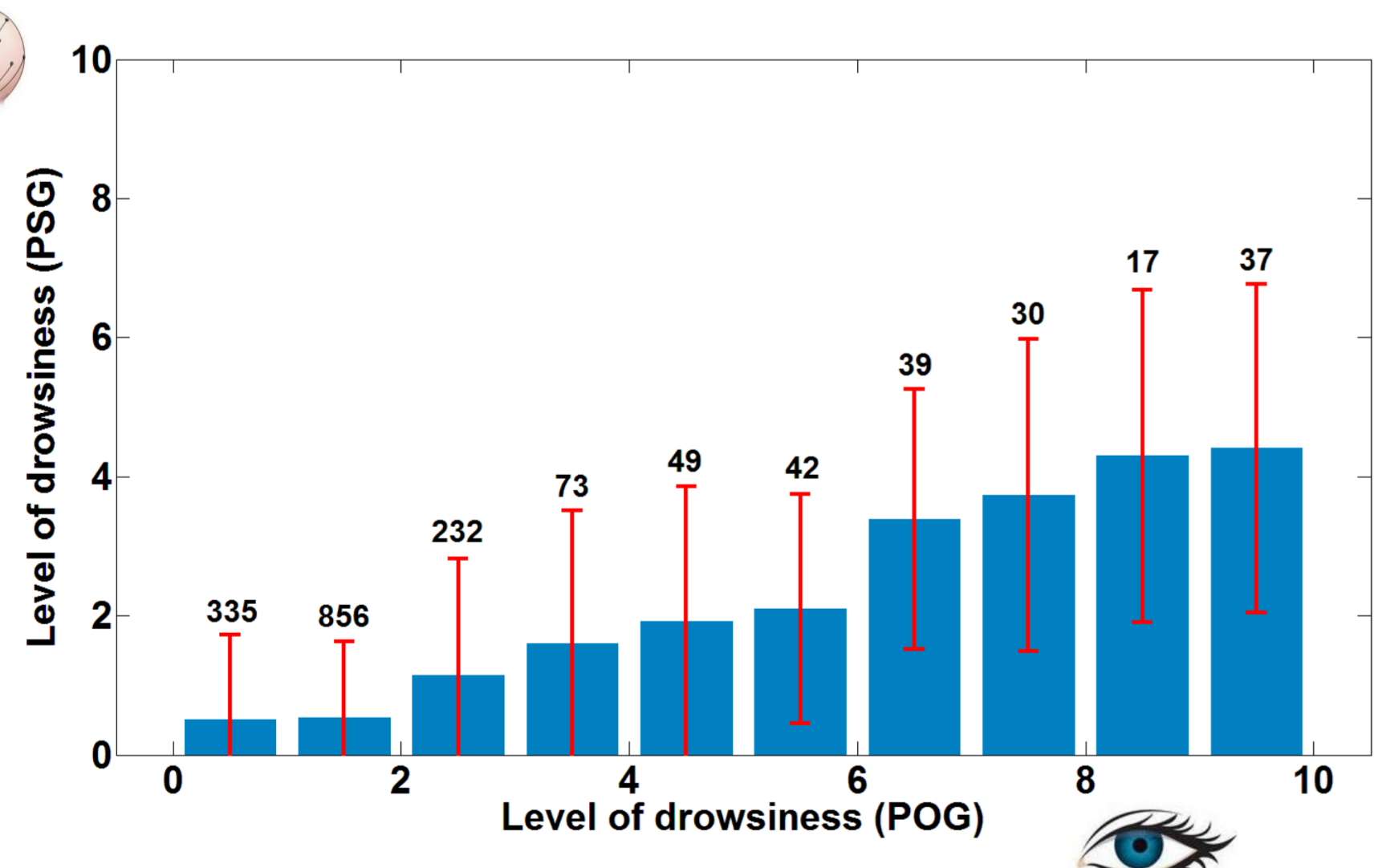
## Results (1)

For each 20 sec window of test, we computed:

- PSG-based level of drowsiness (determined manually by scoring PSG signals)
- POG-based level of drowsiness (determined automatically by our POG system)
- mean reaction time (RT)
- percentage of lapses (lapse = RT > 2s or no answer).



## Results (2)



## Conclusion

Our POG-based level of drowsiness is well “correlated” with our PSG-based level of drowsiness and has the following advantages

- noninvasive and usable in any condition
- no intervention required from the subject.

Our approach thus has significant potential for reliably and objectively quantifying the level of drowsiness of a subject accomplishing a task.

## Acknowledgments

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## References

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