



**5th International Conference on Human Systems Engineering and Design:
Future Trends and Applications (IHSED 2023)
September 27-29, 2023 – University of Dubrovnik, Dubrovnik, Croatia**



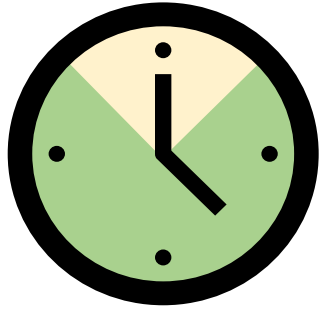
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The Effect of Micro-Breaks on Intellectual Concentration Work: An Individual's Characteristics Measurement

Orchida Dianita, Kakeru Kitayama, Kimi Ueda,

Hirotake Ishii, Hiroshi Shimoda, and Fumiaki Obayashi

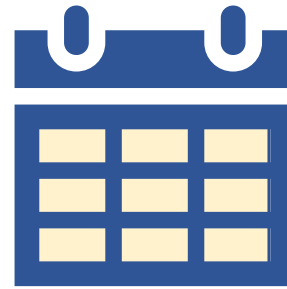
Micro-breaks



- Micro-breaks



- Recovery-
enhancement
strategy



- self-regulated *or*
by design /
systematic break.



- Activities

Intellectual Concentration



- Intellectual concentration

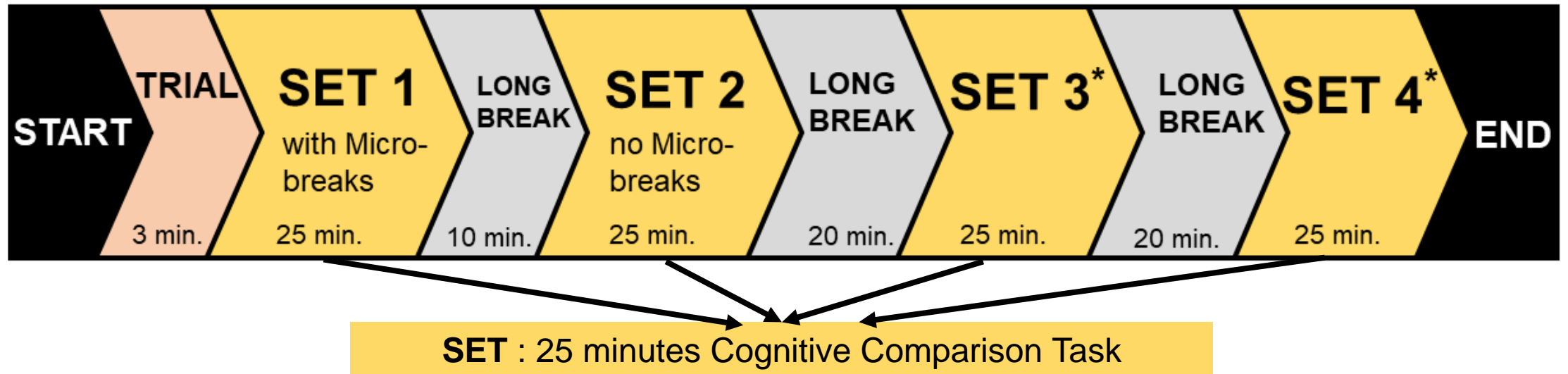


- Factors

- **The purpose in this study** : investigate the effect of the micro-breaks on intellectual concentration by considering the individual's characteristic measurement.

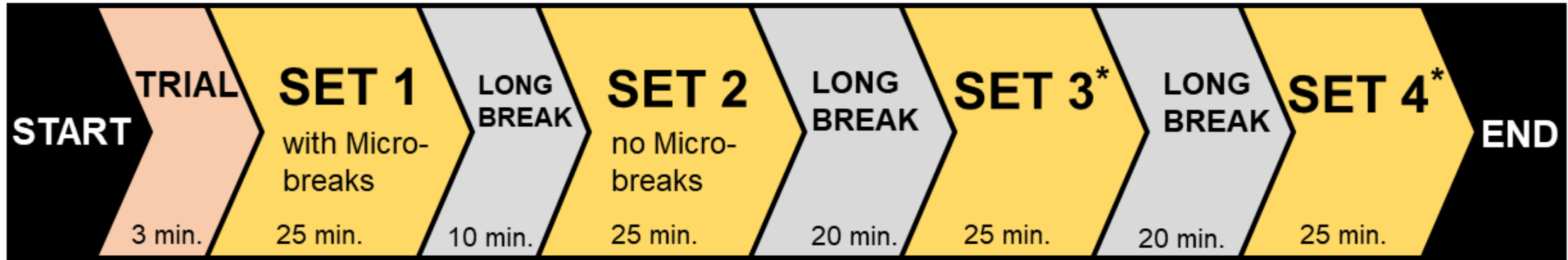
Experimental Procedure - 1

- **Experiment Task:** Cognitive comparison task
- **Participants:** 31 participants ages 18-28 years old
- **Micro-breaks form:** twenty seconds gray screen on the display
- **Design of the Experiment:**

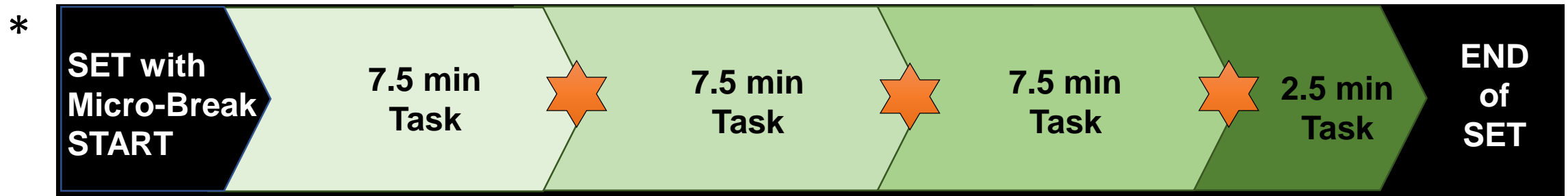


**) Micro-breaks appointed in a counterbalanced design for SET 3 and SET 4*

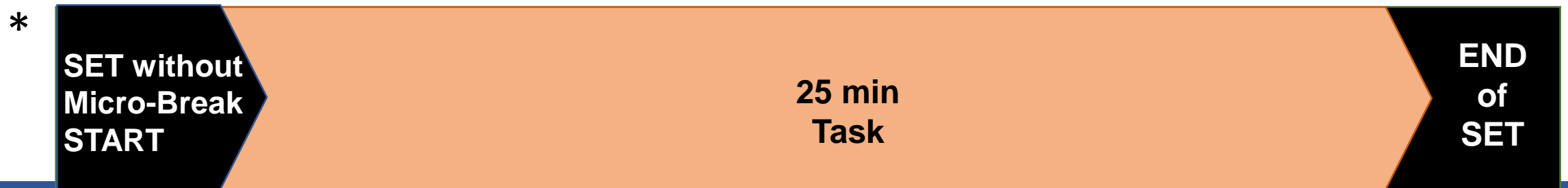
Experimental Procedure -2



*) Micro-breaks appointed in a counterbalanced design for SET 3 and SET 4



★ MB : 20 seconds



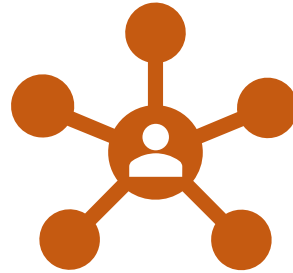
Comparison Task



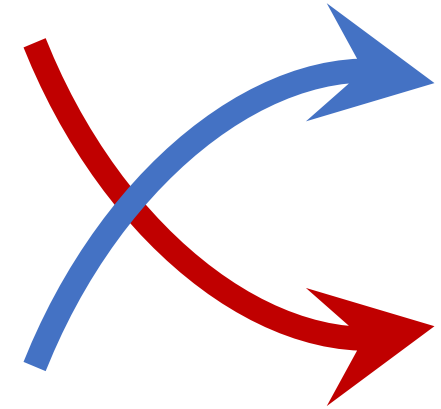
Analysis Method



- Time-series moving average method & locally-weighted scatterplot smoother analysis



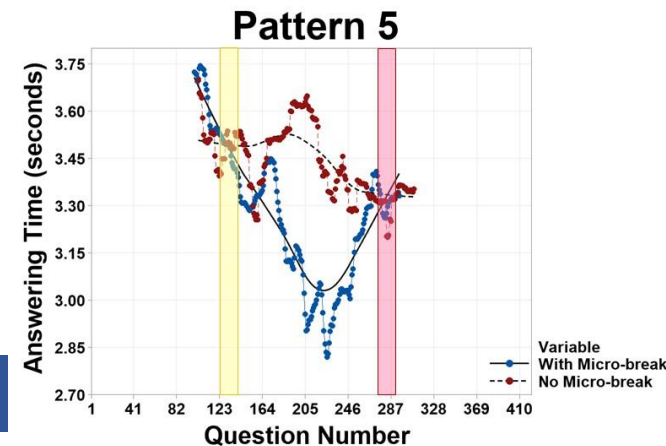
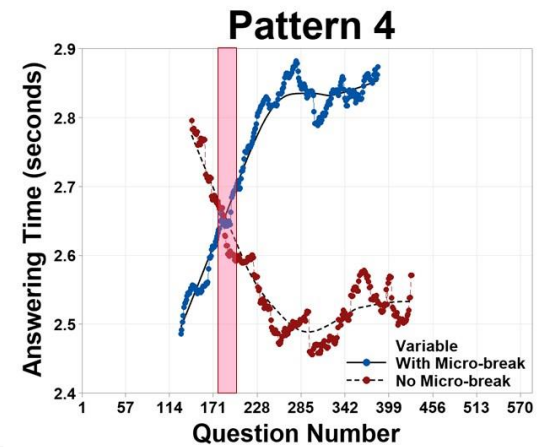
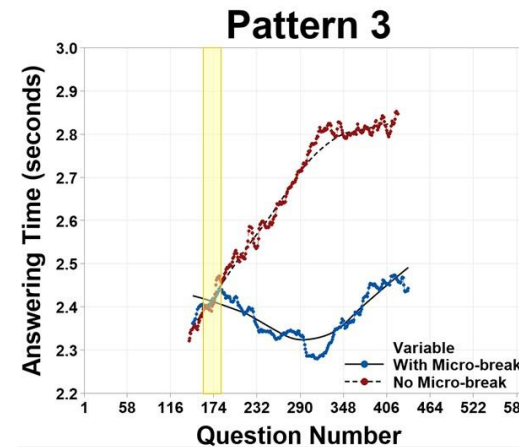
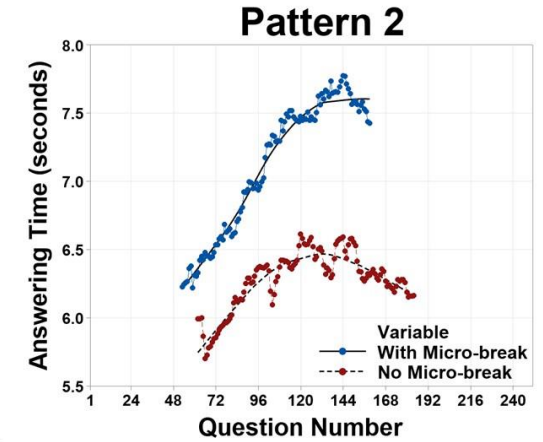
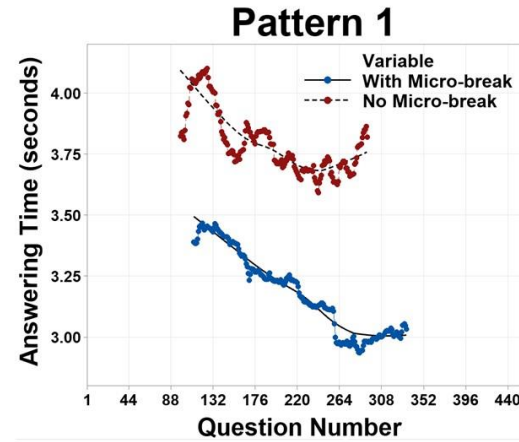
- Grouping patterns



- Intersection

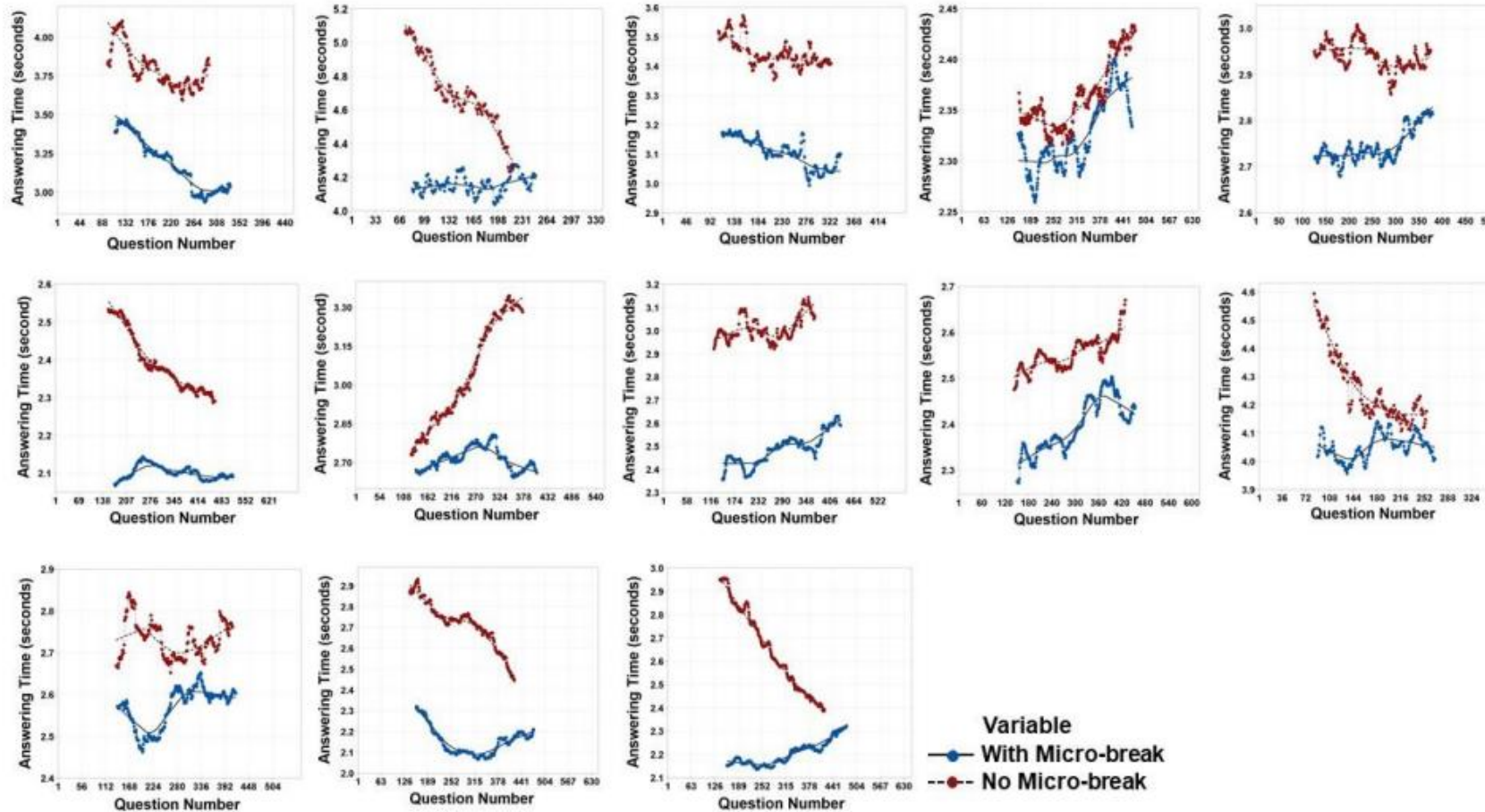
Result

Considering the performance under Micro-break condition & without Micro-break condition, 5 patterns distinguished:



Results – Pattern 1

(Micro-break excel in all working task period)

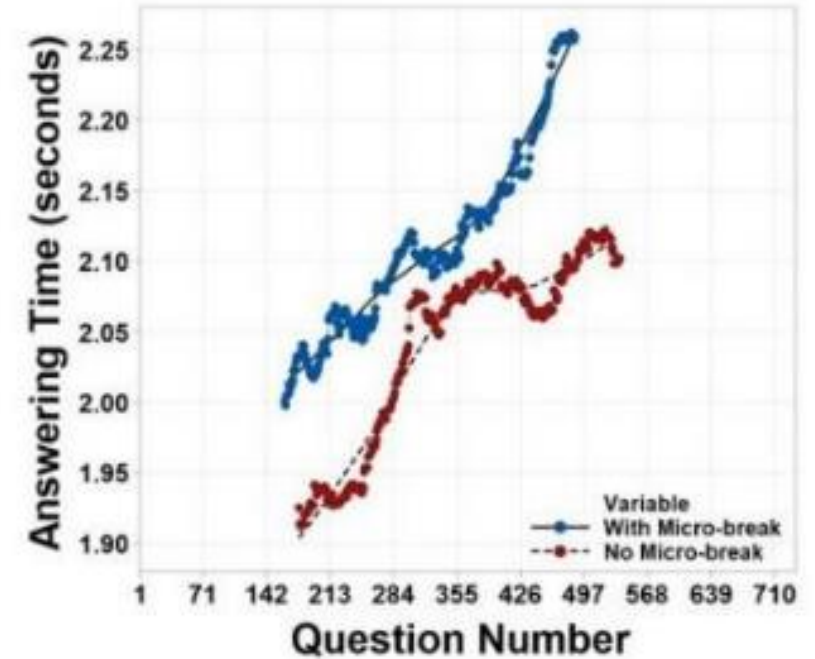
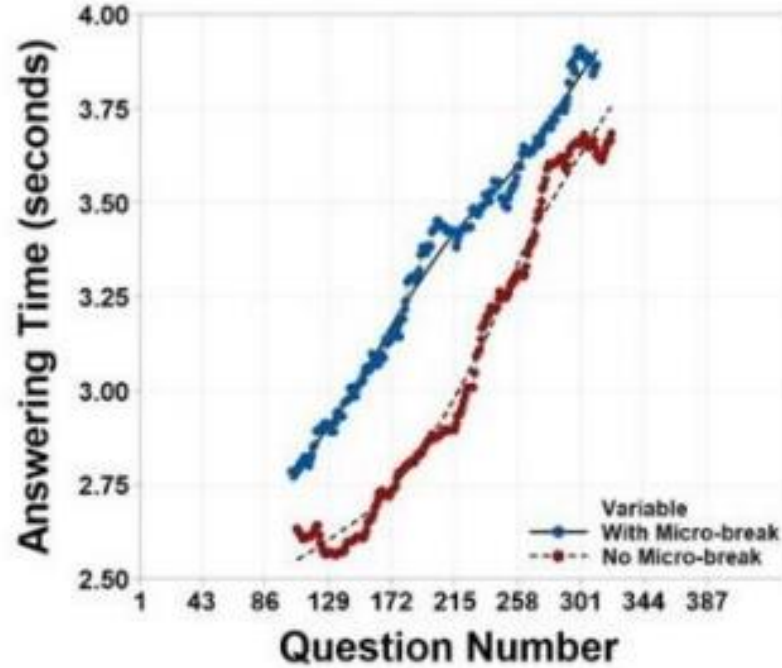
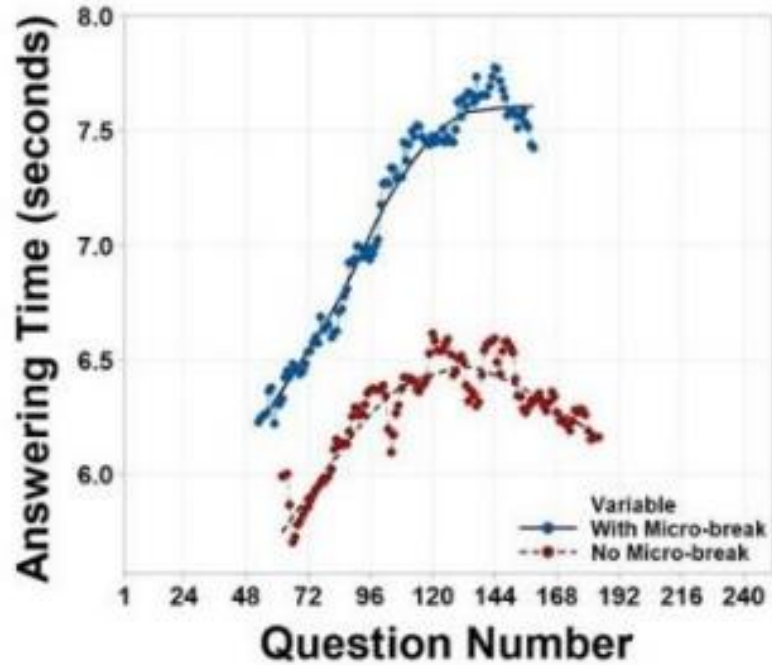


Pattern 1:

Thirteen participants (42%) show the answering pattern indicated in the first group.

Results – Pattern 2

(No micro-break excel in all working task period)



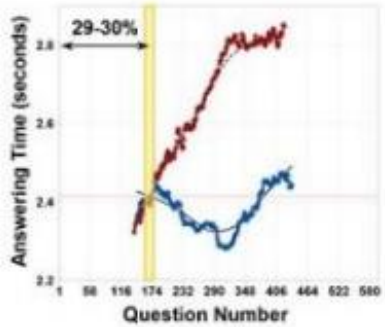
Pattern 2:

Three participants (10%) were included in the second pattern group.

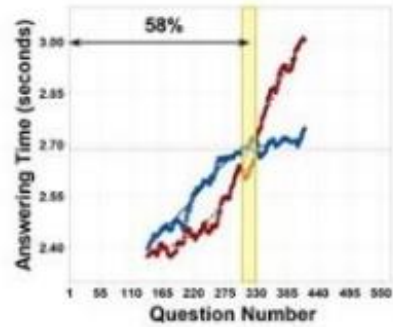
Results – Pattern 3

(After the Intersection, micro-breaks excel the no micro-breaks performance)

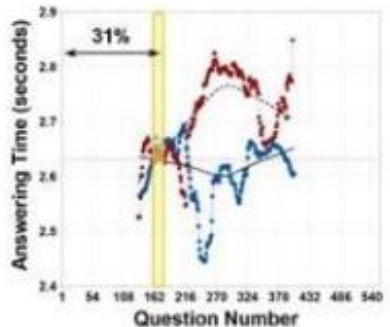
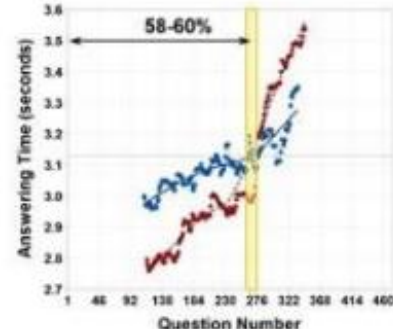
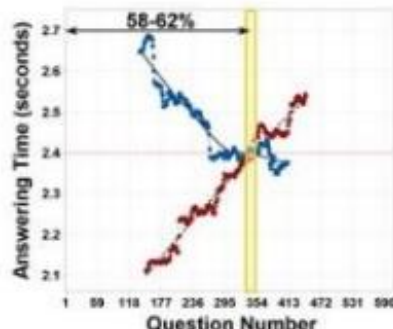
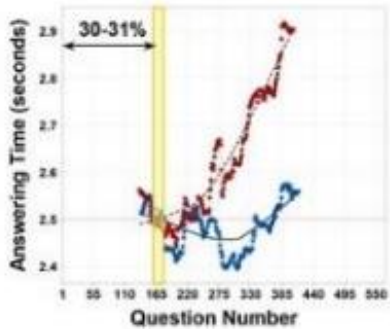
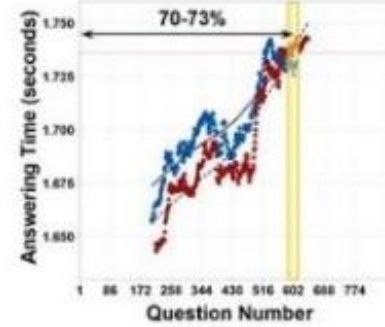
Intersection found at the beginning part of the total working task



Intersection found in the middle part of the total working task



Intersection found at the last part of the total working task



Variable
—●— With Micro-break
- -●- - No Micro-break

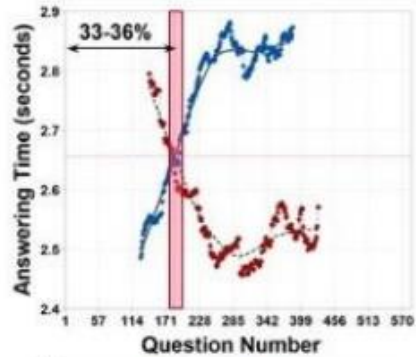
Pattern 3:

Eight participants' data (26%) were classified into the third pattern group.

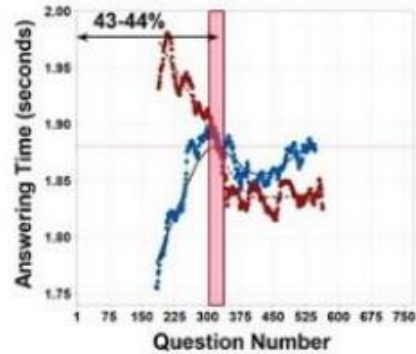
Results – Pattern 4

(After the Intersection, no micro-breaks excel the micro-breaks performance)

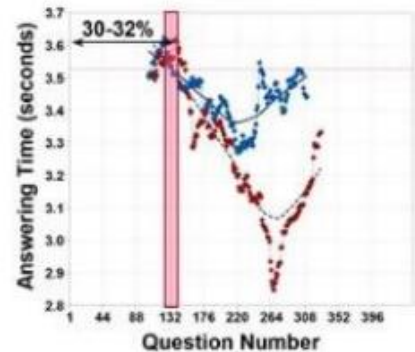
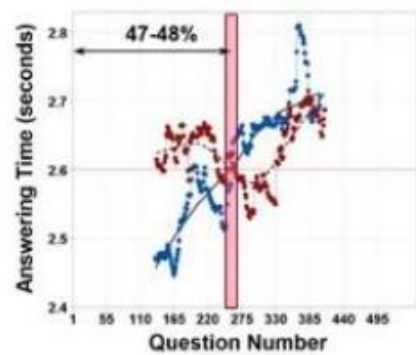
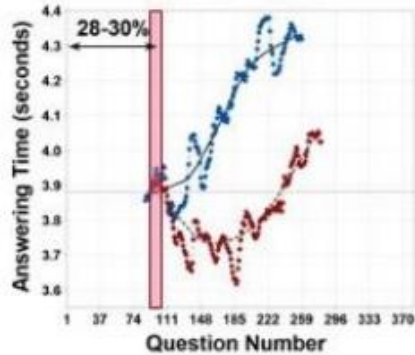
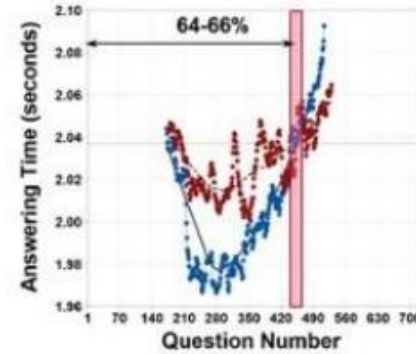
Intersection found at the beginning part of the total working task



Intersection found in the middle part of the total working task



Intersection found at the last part of the total working task



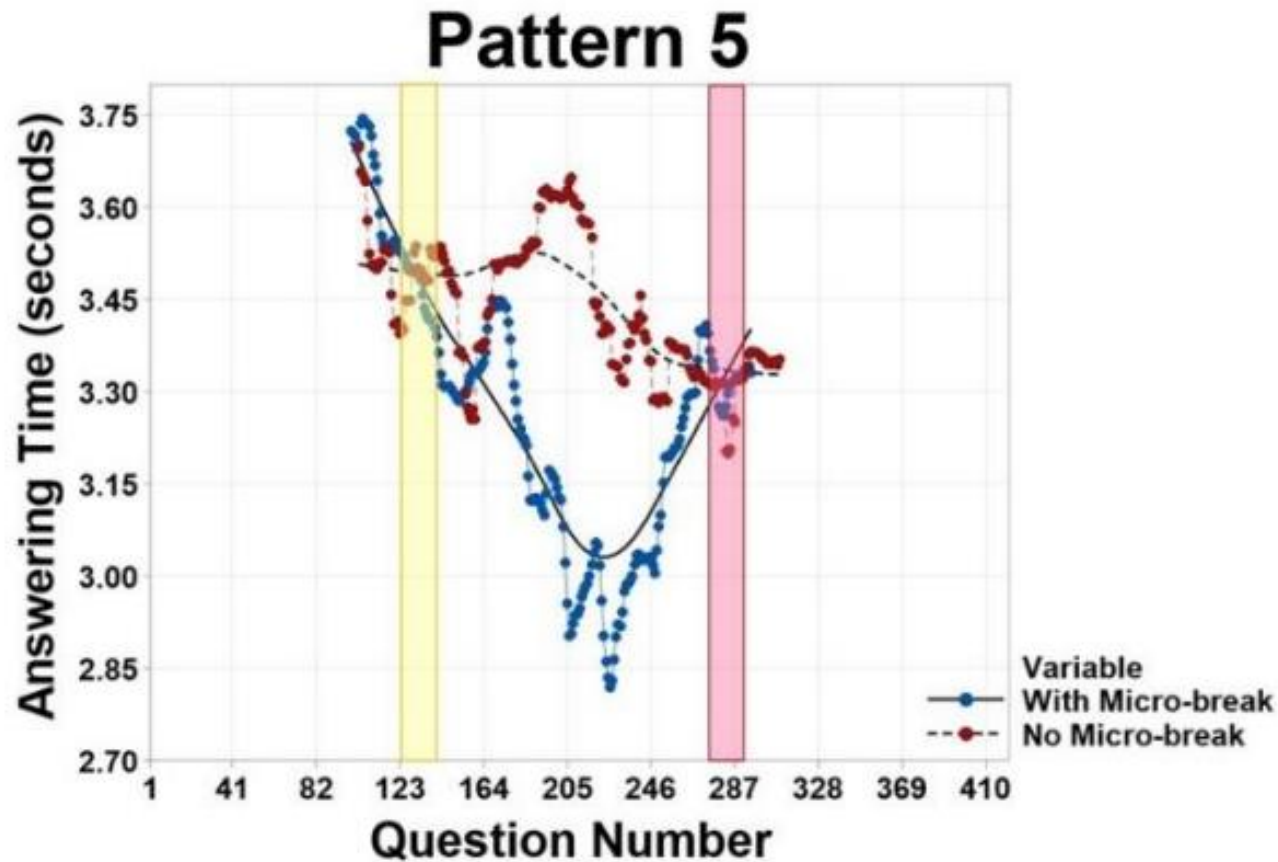
Variable
—●— With Micro-break
- -●- - No Micro-break

Pattern 4:

Six participants' data (19%) showed the pattern correlated with this pattern group.

Results – Pattern 5

(Micro-breaks excel the no micro-breaks at some point and vice versa)



Pattern 5:

Both the intersection found which characterize as pattern 3 and pattern 4. One participant's data fell into the fifth pattern group.

Discussion & Conclusions

- Five grouping patterns were determined.
- Patterns → Micro-breaks effectiveness → optimum performance in each individual.
- The majority benefited from the micro-breaks.
- Meanwhile, in pattern 2, pattern 3 (intersection at the end), and pattern 4 (intersection at the beginning → Unclear effect.
- Reference in designing the optimum work design.
- Further investigation of the micro-break variations, time duration in respect individual's characteristic.



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Thank You

