

A Dual-Task Paradigm Sensitive to Listening Effort in a Realistic Scenario

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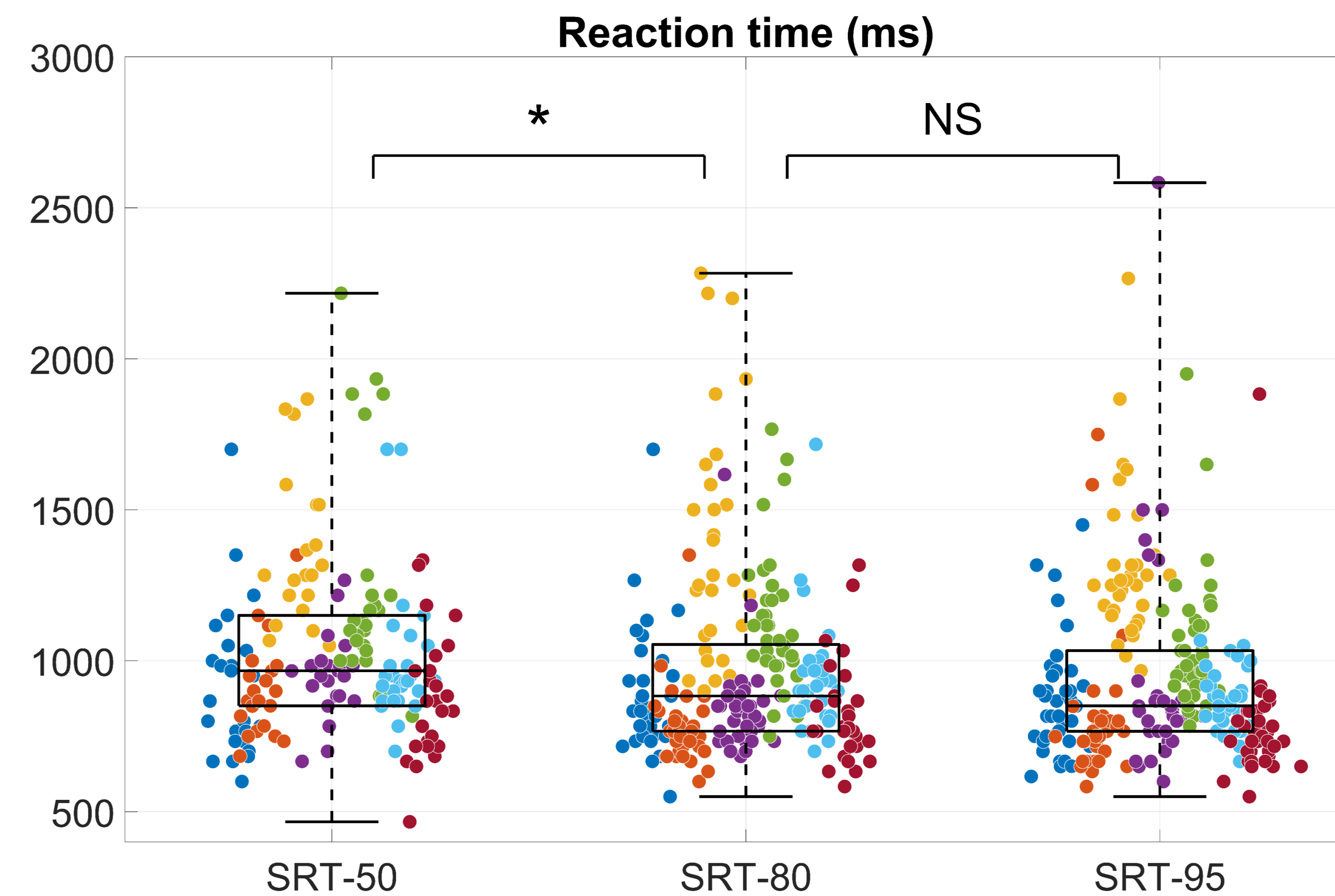
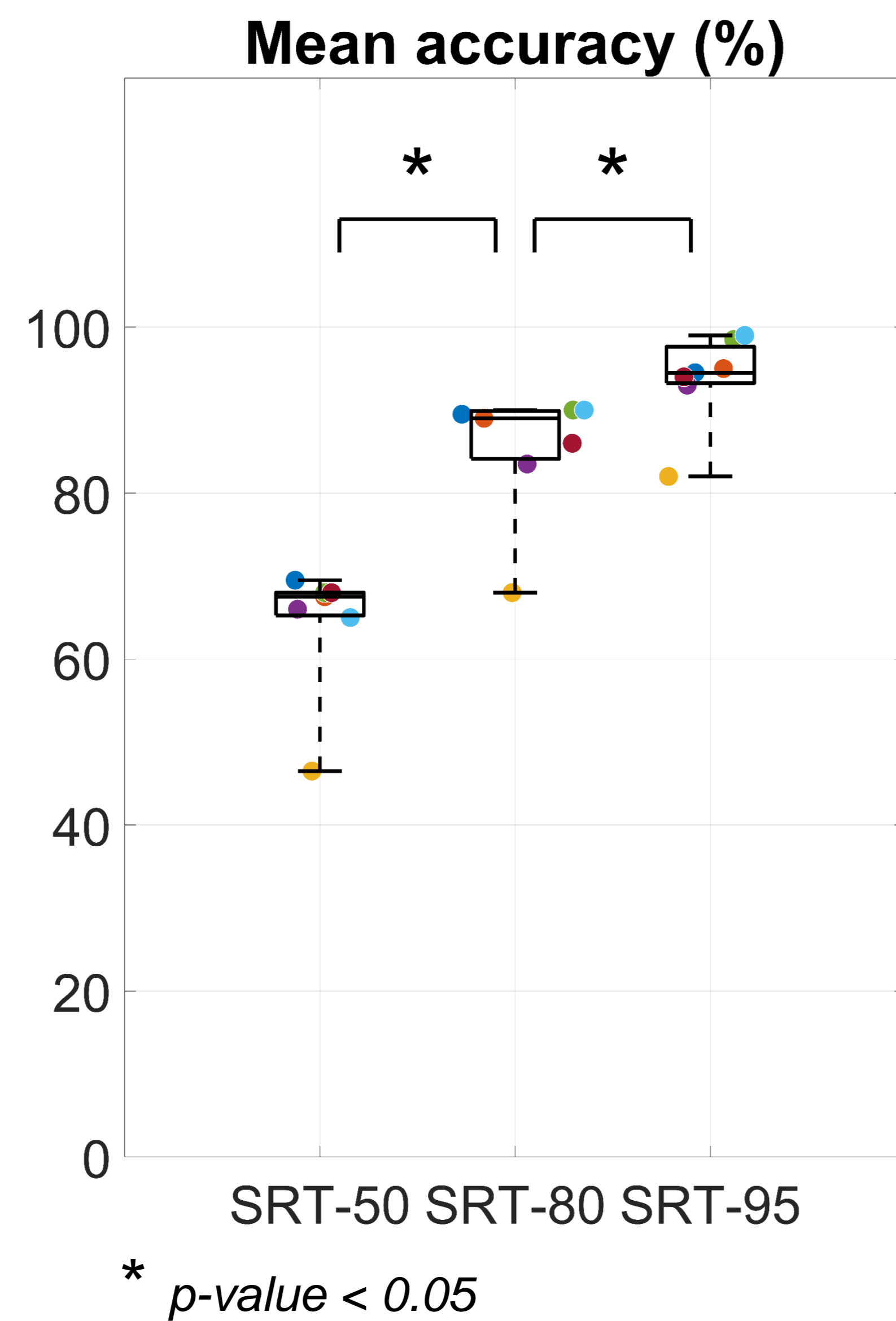
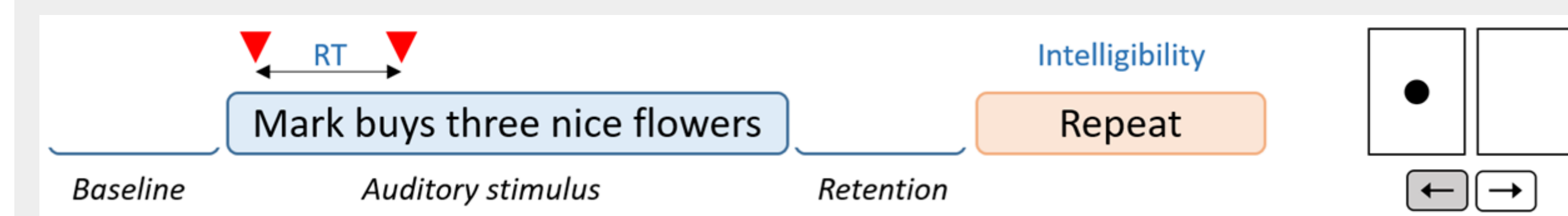
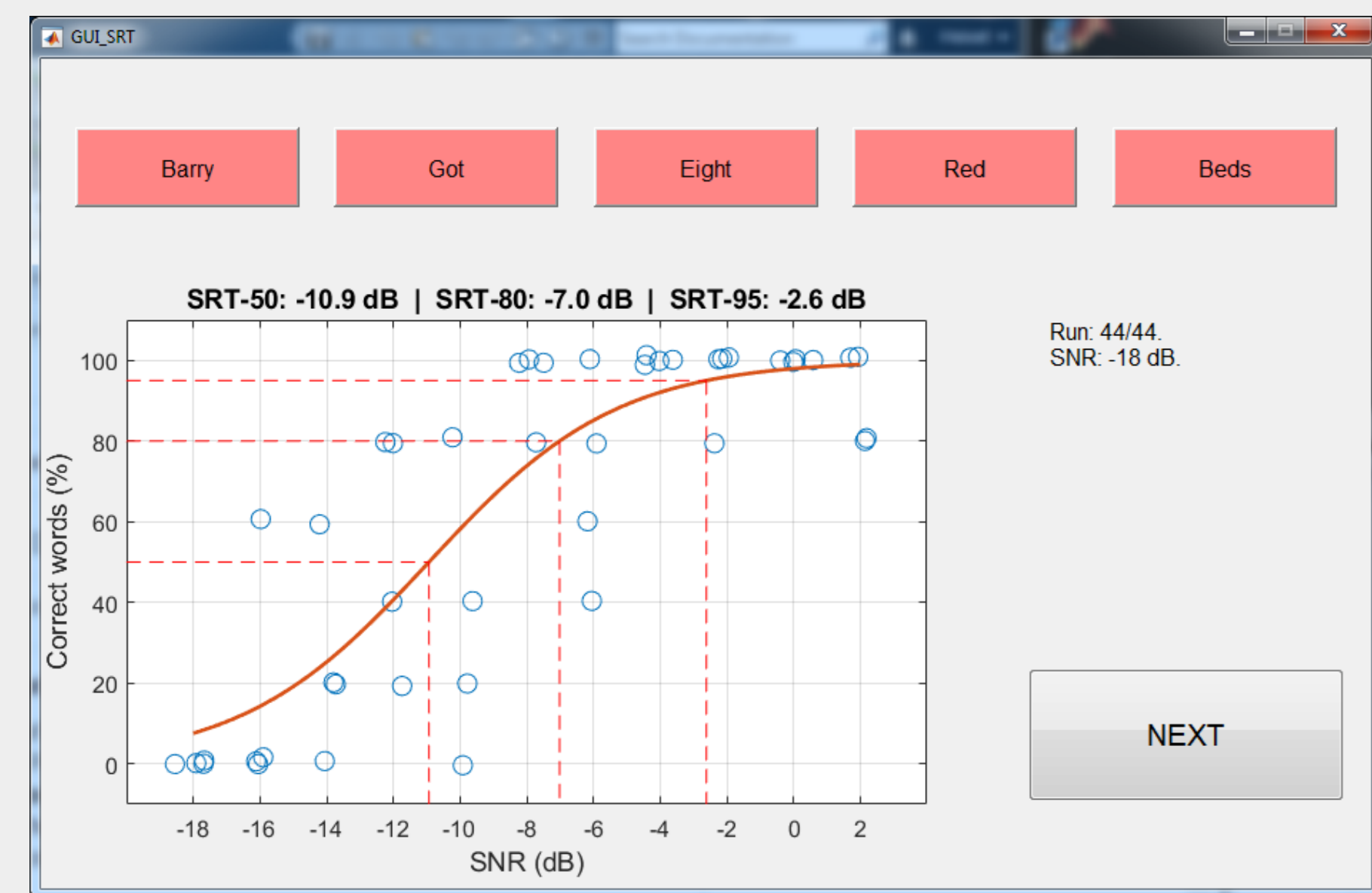
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Methods

- 7 normal-hearing participants (3 males, 18-31 years).
- Matrix sentence test in Australian English.
- Realistic cafeteria noise delivered by a 41-channel Ambisonics speaker array in anechoic chamber.
- Dual-task:
 - Primary: Repeat the sentence [Intelligibility].
 - Secondary: Identify gender of the subject in auditory-visual task [Reaction time].
- SNRs: SRT-50, SRT-80, SRT-95.



SNR (dB)	#S1	#S2	#S3	#S4	#S5	#S6	#S7	Mean
SRT-50	-10.0	-9.6	-12.3	-10.9	-9.8	-10.2	-11.5	-10.6
SRT-80	-6.5	-5.1	-9.9	-7.0	-4.5	-6.9	-8.6	-6.9
SRT-95	-2.5	0.0	-7.3	-2.6	+1.4	-3.3	-5.2	-2.8

Mean effect	Accuracy	Reaction time
SRT-50	64.4 %	1039 ms
SRT-80	85.1 %	967 ms
SRT-95	93.8 %	945 ms

Results

- Reducing the SNR from SRT-80 to SRT-50 leads to a decrease in intelligibility and an increase in reaction time.
- Reducing the SNR from SRT-95 to SRT-80 leads to a decrease in intelligibility and a (non-significant) increase in reaction time.

Conclusion

- The paradigm is sensitive to listening effort, with a greater effect size when intelligibility is highly compromised.
- This dual-task paradigm effectively separates intelligibility from listening effort.
- This paradigm could be combined with other physiological and self-reported measures of listening effort.
- It can be used to evaluate the performance of technology in hearing aids, cochlear implants, and hearables.

