Improving Voice Identification Procedures
Testing sample duration and parade size

Nikolas Pautz (@NikolasPautz), Harriet Smith (@harrietsmith15), Kirsty McDougall, Alice Paver (@aegpvr), Francis Nolan

IVIP

UKRI Economic and Social Research Council

Try a short version of the experiment!

Background

Voice parade decisions are admissible evidence in many common law jurisdictions. However, unfamiliar voice identification is error-prone and under-researched. The Home Office guidelines for administering voice parades [1] are adapted from the procedures used for facial identification. This is potentially problematic because face and voice memory are largely independent cognitive processes [2]. The guidelines recommend that parades should consist of 9 voices, and that each sample should be 60s in duration. We investigated whether this procedure could be simplified. Based on temporal ratio models of memory [3, 4], we hypothesised that shorter voice durations may improve discriminability. Additionally, we hypothesised that fewer voices in a parade may reduce cognitive demands [5] thereby reducing the risk of erroneous identifications.

Research Questions

(1) Is identification accuracy affected by sample duration? (15s, 30s vs 60s)?

(2) Is identification accuracy affected by parade size? (6 voices vs 9 voices)?

Method

We conducted two experiments. Participants were exposed to a 60s recording of a suspect before completing a 5-minute 'filler task' and then attempting to identify the suspect's voice in a voice parade. Each experiment used a serial voice parade (i.e., listen to all voices before deciding). We tested performance on both target-present and target-absent accuracy to simulate situations when a guilty or innocent suspect has been apprehended. All stimuli were taken from forensic speech databases (DyVIS, YorVIS, WYRED). You can try a simple version of the experiment using the QR code.

Exp 1 A 9-voice parade using a 2 (presence: absent, present) by 3 (sample duration: 15s, 30s, 60s) factorial design with N=271 ppts

Exp 2 A 6-voice parade using a 2 (presence: absent, present) by 3 (sample duration: 15s, 30s, 60s) factorial design with N=270 ppts

Results

- In Exp 1 and Exp 2 we found that there was no meaningful difference between sample durations.

- The only statistically relevant main effect was parade presence (participants were more likely to be accurate in target present parades, while target absent parades were at chance level).

- Combined data analyses revealed no statistically meaningful interaction between parade size (6, 9) and sample duration (15s, 30s, 60s).
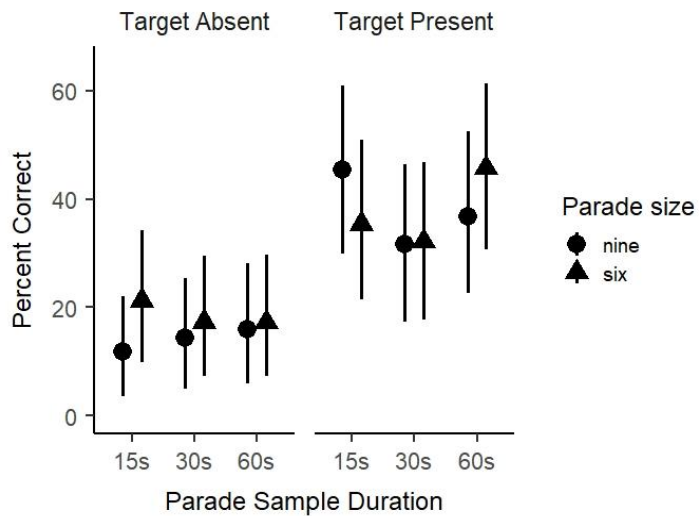
Voice identification accuracy for 15s, 30s, and 60s sample length conditions for 6 and 9-person target-present and -absent parades. Error bars show 95% HDPIs for the condition means.

Discussion

- Our results suggest that the voice identification procedure currently recommended in England and Wales can be safely adapted by reducing voice sample duration, significantly reducing the time required to construct and administer a voice parade.

- Our results do not indicate that the procedure should be adapted by reducing the number of foils from 8 to 5. Innocent suspects get more protection from larger voice parades.

[1] Home Office. (2003). Home Office circular 057/2003: Advice on the use of voice identification parades. Retrieved from https://bit.ly/3v13jJE

[2] Stevenage, S.V. and Neil, G.J., 2014. Hearing Faces and Seeing Voices: The Integration and Interaction of Face and Voice Processing. Psychologica Belgica, 54(3), pp.266–281. DOI: http://doi.org/10.5334/pb.ar

[3] Bjork, R. A., & Whitten, W. B. (1974). Recency-sensitive retrieval processes in long-term free recall. Cognitive Psychology, 6(2), 173-189.

[4] Brown, G. D., Neath, I., & Chater, N. (2007). A temporal ratio model of memory. Psychological review, 114(3), 539.

[5] Zimmermann, J. F., Moscovitch, M., & Alain, C. (2016). Attending to auditory memory. Brain research, 1640, 208-221.

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