Individual differences in face and voice recognition: A report for the BPS Cognitive Postgraduate Rapid Project Grant

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Background and Aims of Research

Researchers have identified a wide range of individual differences in face processing. These have ranged from those with developmental or acquired face recognition deficits, *prosopagnosia* (eg, Knutson, DeTucci, & Grafman, 2011; McConachie, 1976), to those that possess naturally exceptional levels of face identification ability, *super-face-recognisers* (eg, Davis, Lander, Evans, & Jansari, 2016; Bobak, Bennetts, Parris, Jansari, & Bate, 2016; Russell, Duchaine, & Nakayama, 2009). Similarly, analogous recognition deficits have also emerged for voices, *phonagnosia* (eg, Assal, Zander, Kremin, & Buttet, 1976; Van Lancker & Canter, 1982), however no research has examined superior voice processing. To date, no voice test has therefore examined whether individuals possess exceptional voice processing, in comparison to those with typical or poor voice processing abilities. The current standardised voice tests, the Bangor Voice Matching Test (Mühl, Sheil, Jarutytė, & Bestelmeyer, 2017), a test of voice discrimination, and the Glasgow Voice Memory Test (Aglieri et al, 2017), a test of voice memory, have focused primarily on typical-range ability participants to those possessing phonagnosia and therefore these tests are unable to properly distinguish between the very good and the exceptional.

From this literature, my PhD explores individual differences in voice processing, with a primary aim of determining whether those with superior voice recognition abilities exist, *super-voice-recognisers*, and whether they are analogous to super-face-recognisers. Secondary aims of the PhD include exploring whether super-voice-recognisers can be applied in realistic forensic scenarios whereby only voice clips are available. This is comparable to super-face-recognisers who have already been successfully deployed in several police and forensic settings (see for example, Davis, Forrest, Treml, & Jansari, 2018; Davis, Maigut, & Forrest, 2019).

Current Findings

Research within my PhD has examined whether super-recognisers with exceptional face memory and/or face matching abilities also possess similar levels of voice processing abilities. Meeting study predictions, those with exceptional face memory and matching skills outperformed typical-range face groups at voice memory and voice matching respectively (Jenkins et al, in review). Underlying cross-modality (voices *vs*. faces) and cross-task (memory *vs*. perception) mechanisms may therefore drive superior performances. However, the voice tasks used in this study, the Bangor Voice Matching Test (Mühl et al, 2017) and the Glasgow Voice Memory Test (Aglieri et al, 2017), both contain relatively small numbers of stimuli, potentially reducing their abilities to discriminate between exceptional and good performers. In comparison, the Cambridge Face Memory Test: Extended (Russell et al, 2009), a common test for super-face-recogniser classification, possesses more trial items.

Current research, the Postgraduate Rapid Project Grant, and future ideas.

I am currently recruiting participants for a voice recording study. The aim of this study is to collect a large array of voice samples in order to design a new voice recognition test, one that targets the upper end of the voice recognition ability spectrum. Possessing a distinctive accent (either through different speaker ages and/or ethnicities) can make voice recognition much easier for the listener. As such, participants being recruited include British Caucasian males and females, aged between 18 and 27 years to ensure a level of consistency in age and ethnicity.

For this voice recording study, participants will engage in an online session with the researcher and complete two speaking tasks. For Task 1, participants will be asked to talk

freely about a holiday they had two years ago and another holiday they had the year before. For Task 2, participants will be required to repeat a set of 10 short sentences, each containing different content, three times each. Evidence has proposed that voice recognition can be impacted by differences in vocal flow between sentences spoken naturally and sentences read from a script (e.g., Lavan, Burtson, & Garrido, 2019; Stevenage, Tomlin, Neil, & Symons, 2020).

The new voice recognition test itself, however, is intended to contain a large array of voice memory trials, increasing in difficulty as the test progresses, similar to the Cambridge Face Memory Test: Extended (Russell et al, 2009) for testing face memory. Changes in difficulty include variations in vocal content and distractor voice repetition.

Owing to the ongoing COVID-19 pandemic, my research moved from laboratory-based voice recording sessions to online recordings. However, the Postgraduate Rapid Project Grant will contribute to recruiting a further 30 participants for the voice recording study and combine them with previously recruited participants. The grant money will be used to purchase Amazon vouchers and subsequently compensate participants for their time.

Future PhD research will include conducting pilot studies to refine the new voice test following initial test construction. These pilot studies will help determine adequate item difficulty, test duration and stimuli content suitability. Upon completion of the pilot studies, the voice test will be used alongside similar tasks typically deployed in applied forensic voice settings. The development of the voice recognition test is ongoing, with a completion date aimed for early 2021.

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