

There is extensive evidence that occupational voice disorders pose a major problem for individuals, employers and health care services. Most occupational voice disorders are classified as behavioural, and are therefore potentially preventable through appropriate and timely intervention. Unfortunately, regular voice care advice and training is not routinely available for many professional voice users. Even where it is, people may not remember to apply voice care advice in everyday contexts.

Routine monitoring of vocal health has obvious potential benefits for professional voice users. Mobile technologies have opened up new avenues for health-related data collection and analysis, and acoustic analysis could provide a cheap, accessible and non-invasive way to monitor vocal health remotely.

There are, however, some barriers to immediate implementation of vocal health monitoring via a mobile phone app. First, there is limited knowledge about the influence of hardware and environment variables on the reliability of acoustic parameter extraction. While there is increasing evidence that modern smartphones are capable of high quality audio recordings that suffice for acoustic assessment, less is known about the influence of environment variables like room size, room reverberation and background noise.

Furthermore, studies of acoustic indicators of vocal health are usually cross-sectional, assessing acoustic parameters at a single time point for comparison with healthy and disordered data. Clinical voice assessment is usually based on acoustic thresholds for “healthy” vs. “pathological” voices. Less is known about longitudinal fluctuation of acoustic parameters in healthy or disordered populations, although there are suggestions that within-speaker changes may be more useful indicators of vocal pathology than population norms, and there is evidence that intra-individual variations of e.g. vocal load and psychological stress are correlated with acoustic parameters.

This project aims to address the questions described above by developing an extensive database of longitudinal voice recordings (around 5000 recordings from 100-120 participants) via a purpose-built smartphone app for iOS and Android devices. At the current stage, samples are collected from people with typical voices who do not report voice problems. Age and gender of participants is matched against vocally demanding professions and field recordings are alternated with studio recordings to analyse the influence of important environment variables.

The app prompts and records the user’s voice and submits recordings to a secure server, together with questionnaire data collected by the same app. We recognize that self-perceptions of voice quality and throat sensations may be important supplementary indicators of vocal health, so the questionnaire elicits self report data alongside the previously mentioned speaker and environment covariates.

Recordings are scheduled over a period of 12-16 weeks, following a pattern designed to maximise vocal load variation (e.g. scheduling morning, lunch and evening recordings on work days and weekends). Individual users receive reminders about upcoming recordings via push notifications. A background questionnaire collects information on profession, lifestyle variables (e.g. smoking, usual liquid and alcohol intake, medication, voice related activities) and personality type.

The presentation will provide an overview of the study, including smartphone app design, database structure and preliminary analysis results.