

Abstract

Background: Current diagnostics for Multiple Sclerosis (MS) and depression in MS (MSD) are generally acknowledged to be inconclusive and lacking in specificity. It has been demonstrated that the voice significantly differs in health and illness. We aimed to discover whether MS voices and MSD voices could be distinguished from each other and healthy control voices (HC), in order to determine whether there is a common neural mechanism that allows us to distinguish between health and illness in the voice.

Methods: The voice recordings of 81 native French, females saying vowels (27 HC voices, 27 MS voices and 27 MSD voices) were rated based on their pleasantness and wellbeing on a numerical scale from 1-7 by a pilot group of 12 study participants. Participants were fMRI scanned during this process and data (both rating and fMRI) were subsequently analysed.

Results: No significant differences were found between condition groups (HC, MS and MSD) for pleasantness or wellbeing ratings. Regarding fMRI results - a range of areas of activation were observed when listening to control voices compared with baseline (34 areas), compared to only 3 areas for MS vs baseline and 2 for MSD vs baseline. Noteworthy regions of activation include the inferior frontal gyrus (IFG), anterior insula, cingulate gyrus, and a range of sub-lobar areas. When the three conditions were directly compared with each other (MS vs HC, MSD vs HC, MSD vs MS), no significant areas of activation were observed.

Conclusion: The absence of a significant difference in the rating results were inconsistent with the literature and our hypothesis. The brain regions showing significant activation in this study were partially consistent with our hypothesis, and are likely to be involved in voice perception. Despite this, the study provides no direct evidence of a neural network to distinguish health or illness from the voice. However, it does suggest the presence of some different neural processing, as evidenced by the activation pattern disparity when comparing control as opposed to MS groups with baseline. This suggests, that if the study was redesigned to account for its limitations, there would be cause to conduct a similar study again to explore this processing further.