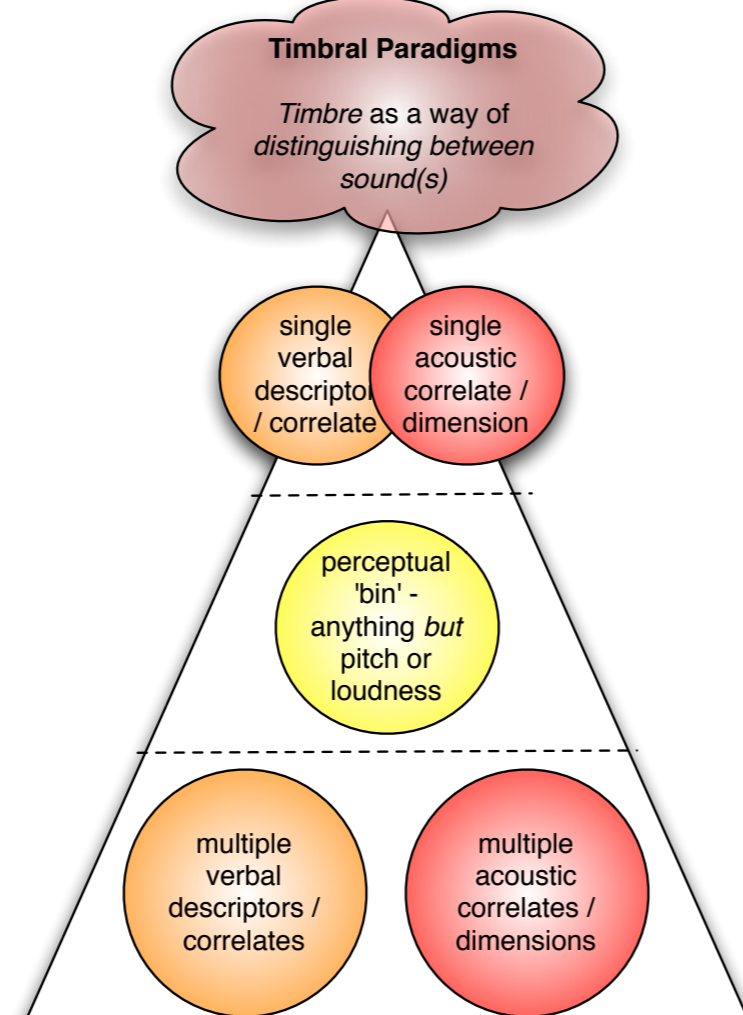


# Evaluating Timbre in Location Recordings

Duncan Williams, Faculty of Music (Wolfson College)

## Introduction

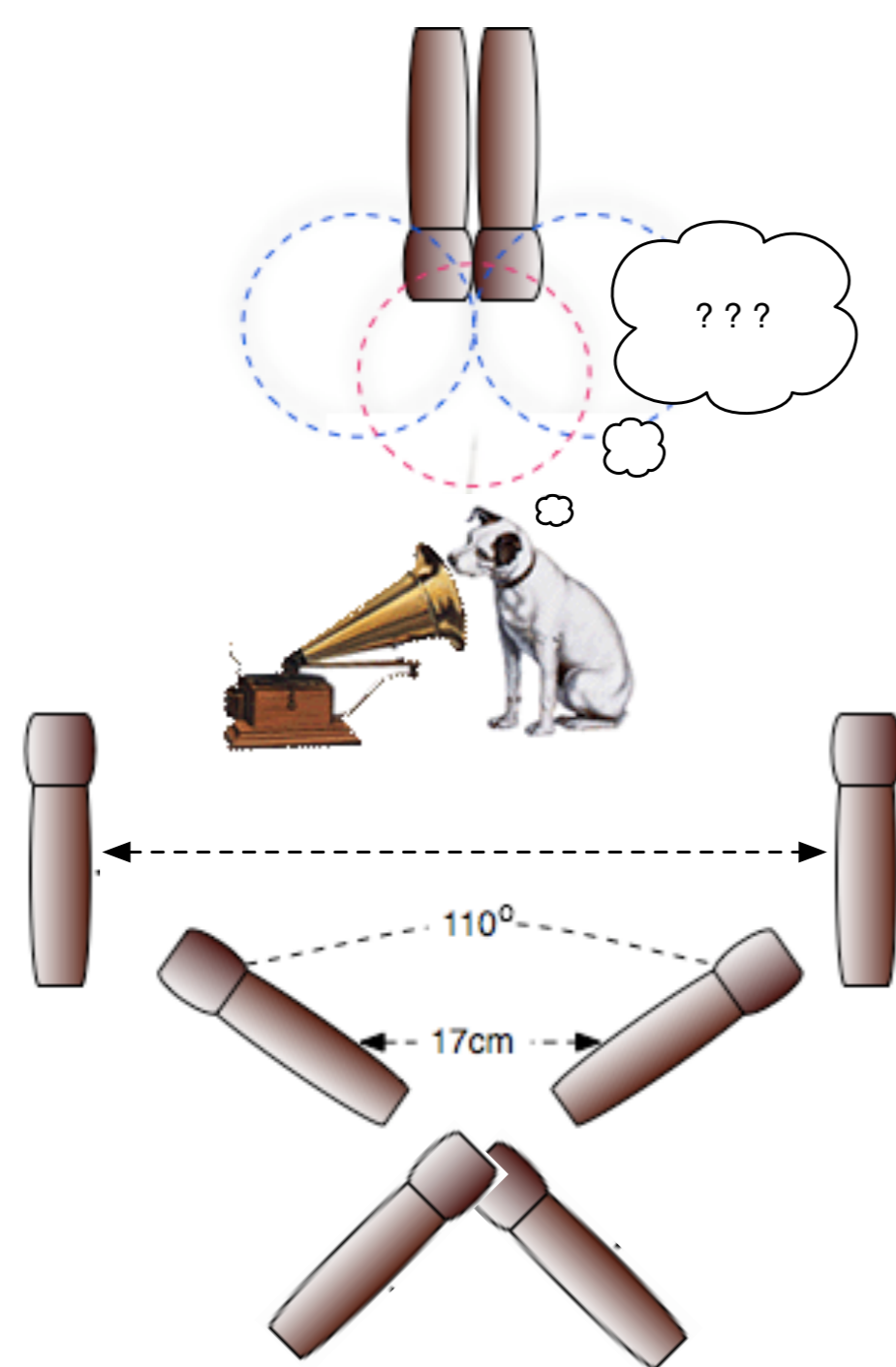
The aim is to quantify attributes within an adopted timbral paradigm, with both meaningful descriptors and multidimensional acoustic correlates



**To manipulate timbre we have to measure it first**

## ... but how?

Microphone techniques selected by literature review (ORTF, M/S, A/B, X/Y) and operated simultaneously to create stereophonic test stimuli from the same source

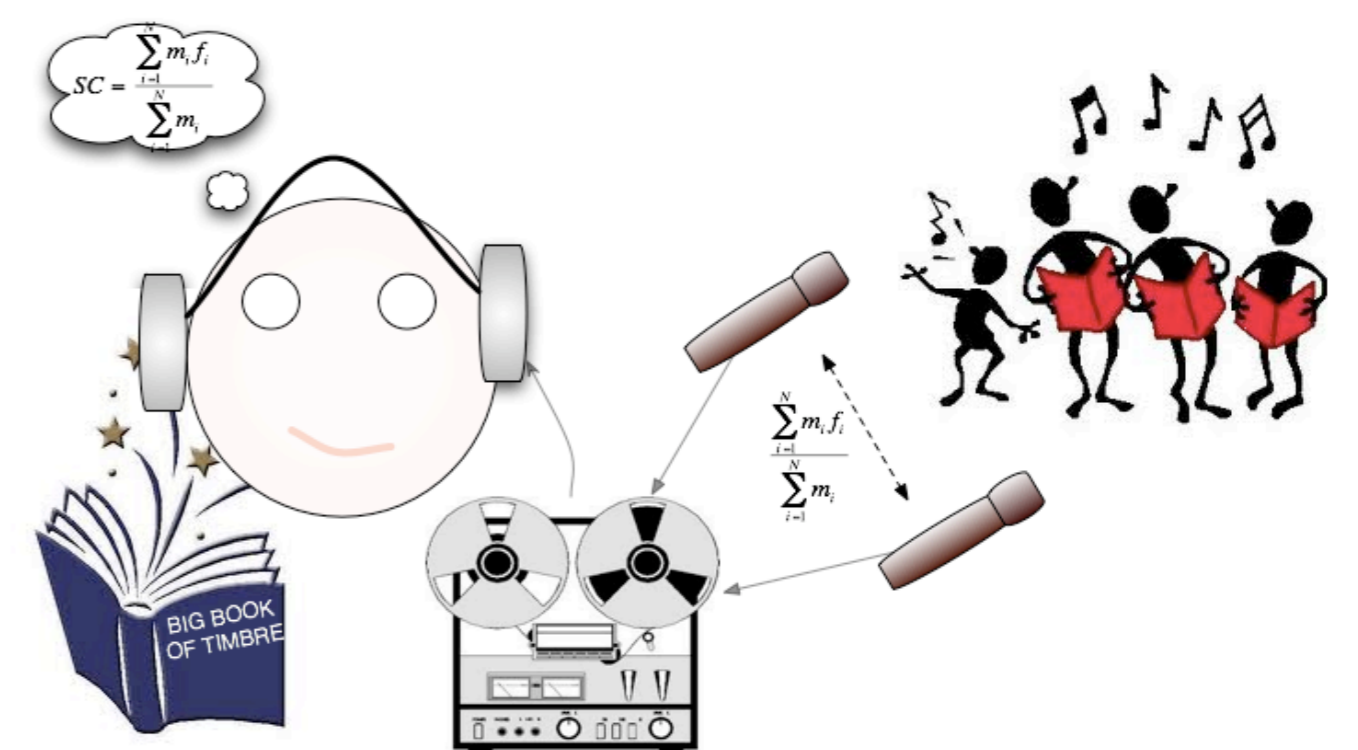


**Stimuli were evaluated in two distinct experiments; i) pairwise dissimilarity and ii) verbal elicitation**

## ... So, now what?

Statistical evidence and acoustic analysis indicated that width, clarity, and thin/thickness can be adjusted by means of basic microphone technique

(within the boundaries of the stimulus source and location used)



## Ideas for further work include:

- Record and evaluate additional source types
- Illustrate hierarchy of timbral attributes
- Carry out perceptual evaluation of **most common / least overlapping attributes** in variety of source types
- Determine metrics** for most common / least overlapping attributes

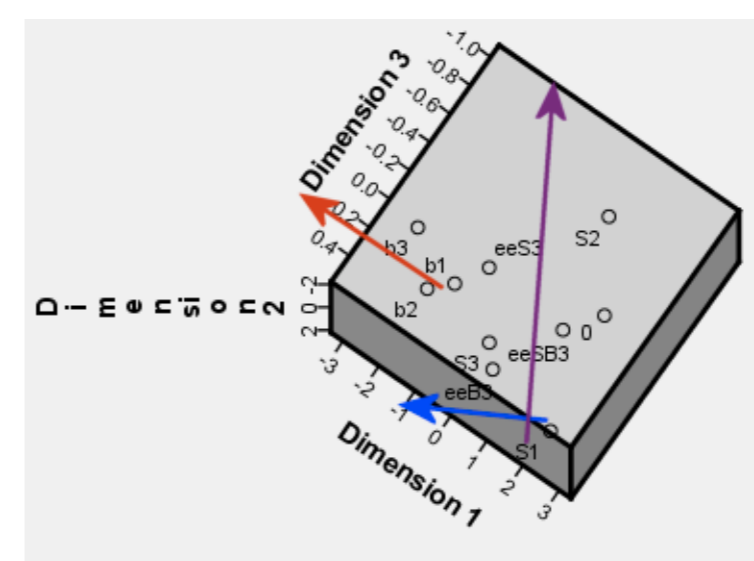
## Did it work?

Multidimensional Scaling analysis of pairwise responses (MDS) shows movement in a 'timbre space'

Statistical indicators used were:

- s-stress < 0.1
- RSQ decrease < 0.05
- overall RSQ > 0.95

Together, these indicated best fit/number of dim  $\approx 3$



Verbal protocol analysis indicated *width*, *clear/bright*, and *thin* as probable labels for each of the directions

Acoustic analysis showed clear correlates for these variations in spectral envelope and phase (head related transfer function / inter-aural cross correlations)

## References

1. ASA, American Standard Acoustical Terminology 45 'Timbre' (1960)
2. S. Pellman, 'The Colour of Sound' (1994)
3. J.F. Schouten, 'The Perception of Timbre', (1968)
4. D. Wessel, 'Low Dimensional Control of Musical Timbre' CMJ, 3:45-52 (1999)
5. J.M. Grey 'Multidimensional Perceptual Scaling of Musical Timbre' JASA 61(5):1270-77 (1977)