

# World Wide Web-based Subjective Preference Test for designing a Javanese Gamelan Performance Hall

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## 1. Introduction

The internet and especially web-based technologies have been changing people's working paradigm dramatically during the last few years. Web sites become a major tool for many applications, including audio applications and online research survey. Web-based audio streaming and files compression technology have made remote listening and transferring data more and more faster and easier. These tools and the fact that audio applications become a standard in most of the latest personal computer (PC), make an online audio survey feasible to be carried out beyond space, time and distance boundaries.

A World Wide Web (WWW) – based subjective preference test has been developed as a supporting tool to determine the preferred acoustic parameters of an enclosed hall for a Javanese gamelan performance. Some sound files of Javanese *gamelan*[1, 2, 3] music have been produced using auralization technique, and saved in a real media file format. These files were then uploaded to a WWW address to be viable for listeners from all over the world who have an *internet* connection on their personal computer (PC). To participate in this online test, listeners were requested to listen to all the sound files using a headphone through their audio card in their PC, and gave judgement to the samples they heard, then wrote down their preference on the given online feedback form. The test has been carried out using the Rank Order method.

Result of the online test on the preference of the reverberation time (RT) will be presented and discussed in this paper. A similar result from normal subjective preference tests in an anechoic chamber is provided as a comparison.

## 2. Data Collection

### 2.1 Sample preparation

Studio recording of Javanese *Gamelan* music pieces - *gendhing* from the *closing* part of *Kebogiro Glendeng*, with minimum  $\tau_0 = 27.59$  ms ( $2T = 2$  s, interval 100 ms), was used in the subjective preference test, both the WWW-based and in anechoic chamber. The duration of the stimulus was 6 s. All the samples in all the subjective preference tests were derived from this sample. These were achieved by auralization technique, which is convolved the sample with room impulse responses of a simulated room using ODEON package software. The auralization results were then compressed into a real media (.rm) format to save file size and make it easier to be downloaded by the listeners (users). The audio files were then uploaded into a websites (<http://www.aee.salford.ac.uk/sarwono>), which is also contains additional information about the test and online feedback form. A result[4, 5] from a common subjective preference test in anechoic chamber is used as comparison.

## 2.2 Method

The subjective preference tests were carried out in a normal room where listeners listening the samples through a headphone from their PC sound card. The simulated sound field for the test included the most extreme cases of each simulated parameters, for example a very long RT. The values of the simulated parameters were chosen according to the minimum effective duration of ACF of the samples in an attempt to determine its relationship with the preferred values of the simulated parameter.

Seventeen listeners were completed the test. All the listeners were adult people with several nationalities, inclusive all genders and varied in age from 20 – 50 years old. Some of the listeners are familiar with the gamelan music while some others don't. They had no known of hearing problems. The subjective preference test has been carried out using the rank order method. In this method, listeners are asked to rank several stimuli starting from the most preferred to the least preferred. They may listen to each stimulus as many as they wish before they rank the stimuli. Listeners were not allowed to give equal rank to each stimulus. After finished their preference, they sent the result to the researcher by completed an online feedback form, which was developed using e-mail based feedback. The feedback form is also includes the information of listeners name, age, gender, and familiarity to the music.

## 3. Results and Discussion

Only the subjective test of the RT preference is presented in this paper. There were 6 different audio files with RT values of 0, 150, 450, 1000, 2600, and 4300 ms, respectively, uploaded into the websites and judged by the listeners. There were 17 listeners completed the test. It consists of 13 males and 4 females, 5 Indonesians and 12 non-Indonesians (Europeans and Americans), with 12 of them familiar with the music (players, listeners, academicians, ethnomusicologists). Their preference is shown in Figure 1. It can be seen that they preferred RT value of 450 ms to listen to the gamelan in an enclosed hall. This result agrees with the similar test carried out in anechoic chamber [Figure 2]. Although the presented stimuli were slightly different, with the most preferred RT value of 600 ms, the trend-lines of both preferences are similar.

While analysing the listener background, it was found that there are no significant differences of their preference. From Figure 3, it can be seen that the preference of Indonesian and non-Indonesian listeners are similar. Some differences occurred on the RT values of 0 and 1000 ms. Figure 4 shown the preference of male and female listeners. Although their preferences slightly different, both still shared their most preferred values, which is 450 ms. Males listeners tend to give higher preference on a low RT values (under 450 ms) rather than the females, while for the higher RT values the vice versa result arose. The preferences of listeners who are familiar with the music and those who do not familiar with also have no significant different as shown in Figure 5. This last result offers a huge advantage for the future works for choosing the listeners, both for an online test and anechoic test.

## 4. Conclusion

It has been shown that WWW-based subjective preference test of RT values for listening to a Javanese *gamelan* music in an enclosed halls is successfully carried out. The result shown no significant difference with a similar test conducted in anechoic chamber. It has also shown that there are no such significant effects to the preference whether the listeners male or female, Indonesian or non-Indonesian and familiar or not familiar to the music.

## Acknowledgement

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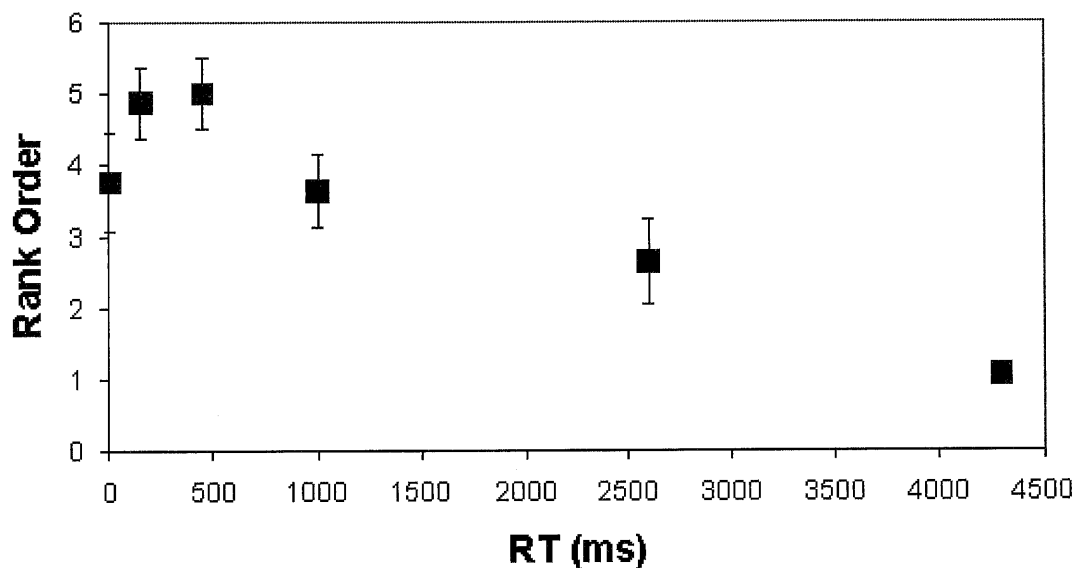


Figure 1. RT Preference for listening to *gamelan* from WWW-based test

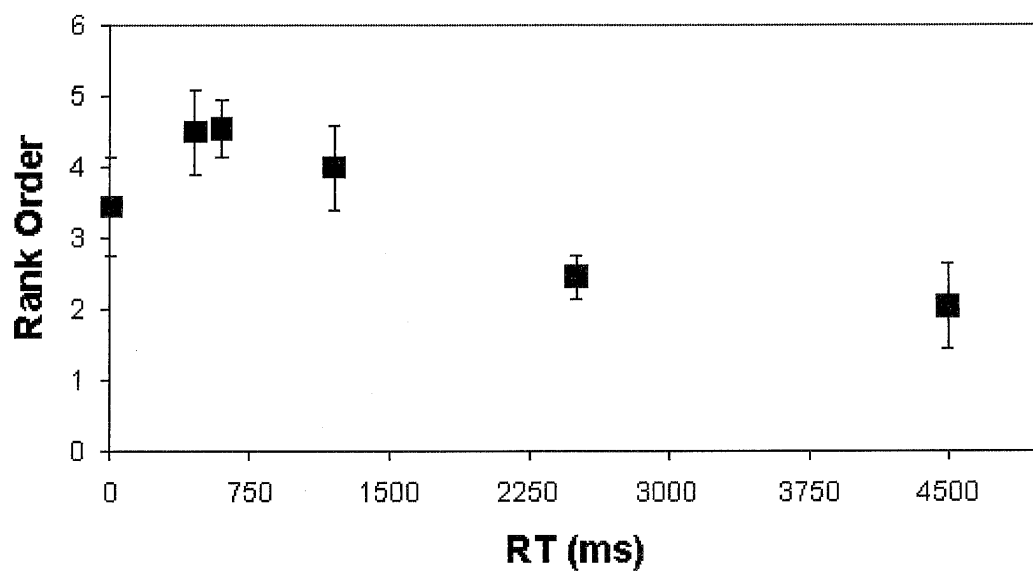


Figure 2. RT Preference for listening to *gamelan* from anechoic test

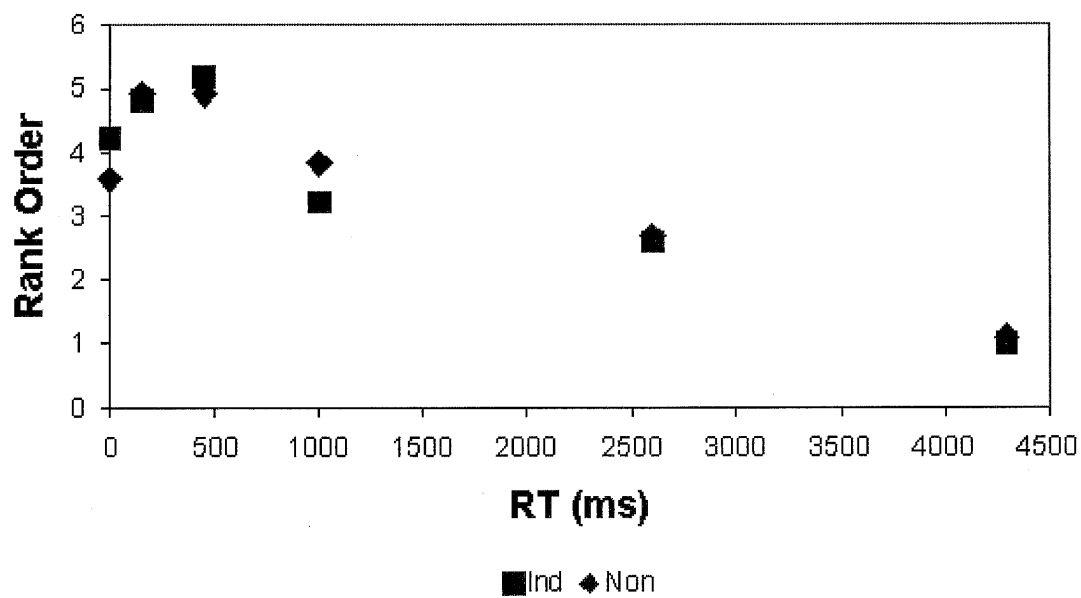


Figure 3. RT Preference of Indonesian and non-Indonesian listeners

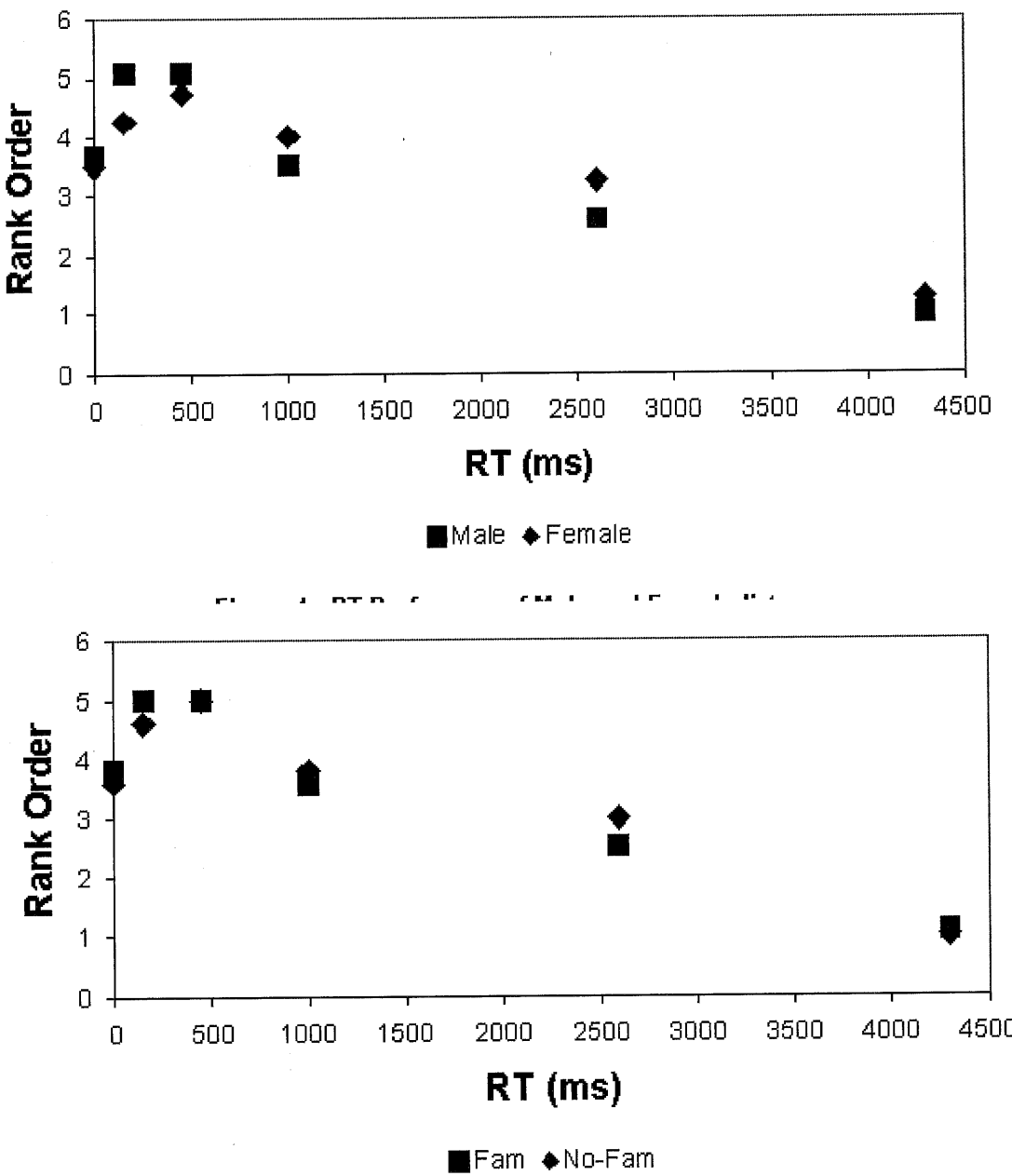


Figure 5. RT Preference of listeners who familiar and who don't

