

## Introduction

Audio signal processing is used in the daily lives of most Americans. It is found in cell phones, music speakers, advanced hearing aids, and radios. The purpose of this research is to create an interface to test different digital speech processing algorithms. In order for a certain algorithm to be considered better than another, it must be tested by human listeners. The interface allows researchers to compare their algorithms against the standards in order to improve the quality of speech.

## Software Tool

- Matlab 6.5 platform
- Developed using GUID Environment
- Used attributes such as radio buttons
- Created callback functions for attributes
- Utilized *soundsc* to play speech files
- Employed debugging tools in Matlab

## Methods

### Double Sided Tests

- ◆ Comparison Category Rating Test
  - Listeners choose better or worse

### Single Sided Tests

- ◆ CMOS Subjective Listening Test
  - Listeners grade improvement
- ◆ DMOS Subjective Listening Test
  - Listeners grade degradation

## Double Sided Tests

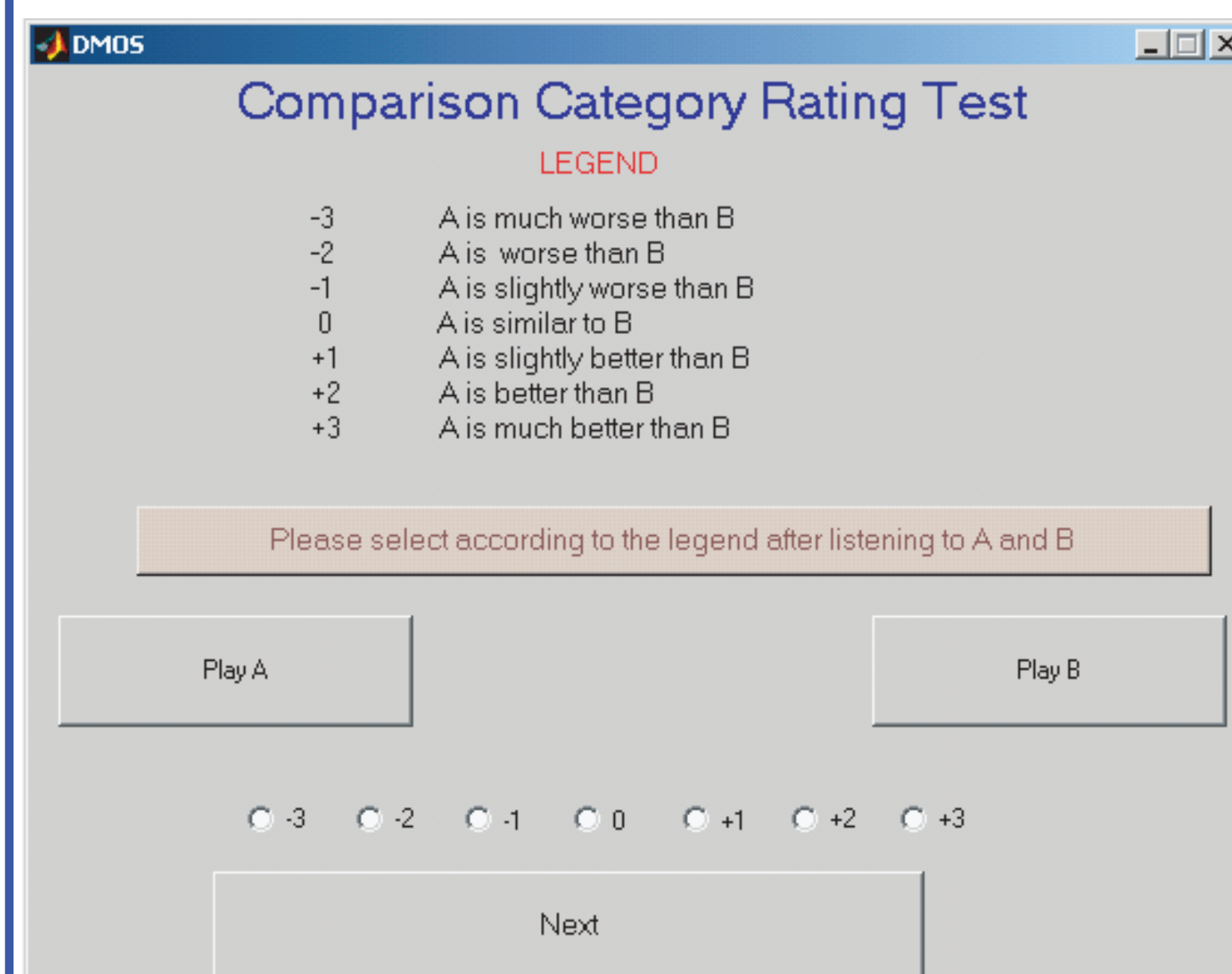


Figure 1. CCR Test where listeners grade on a scale from -3 to +3.

## Single Sided Tests

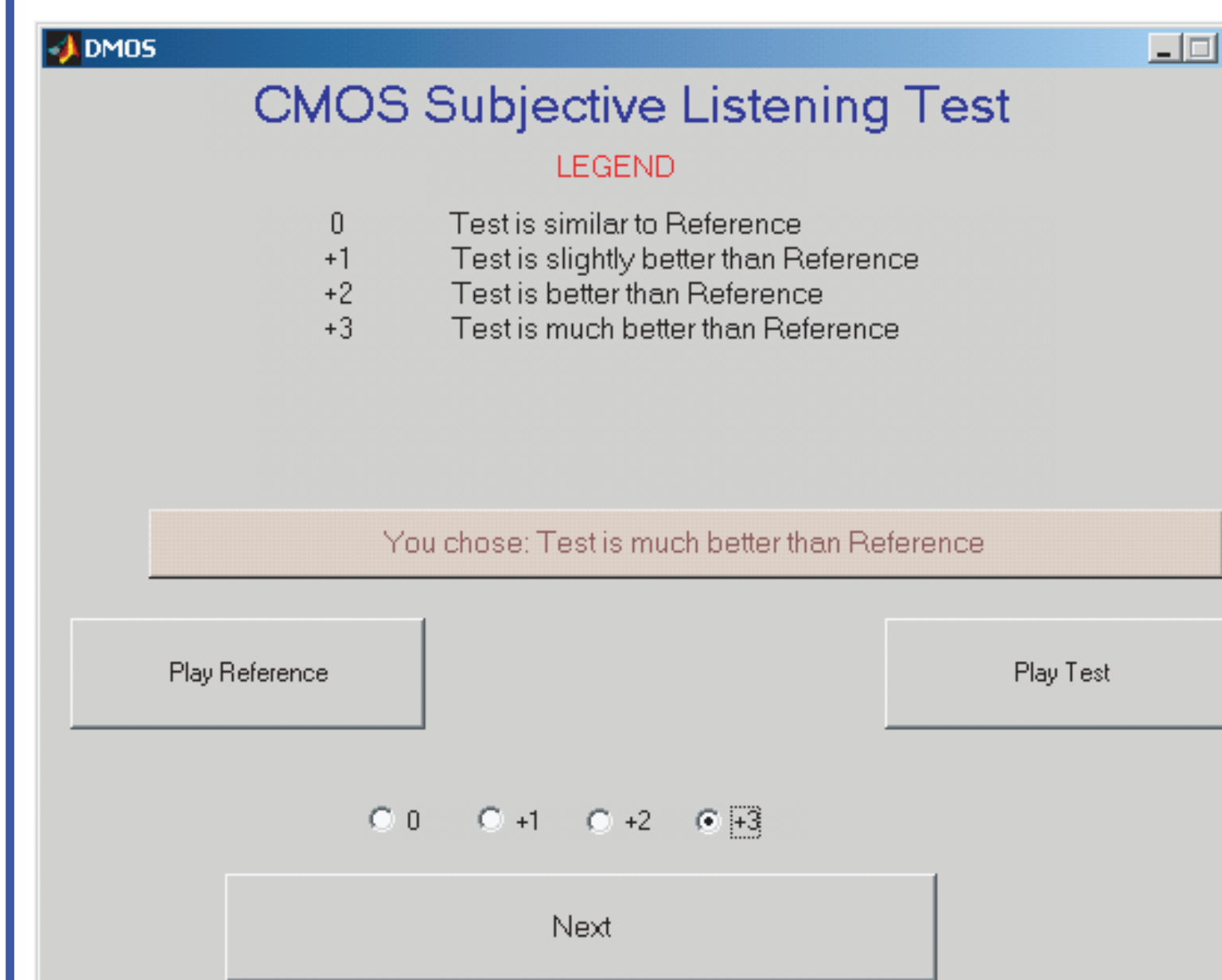


Figure 2. Comparison Mean Opinion Score Test.

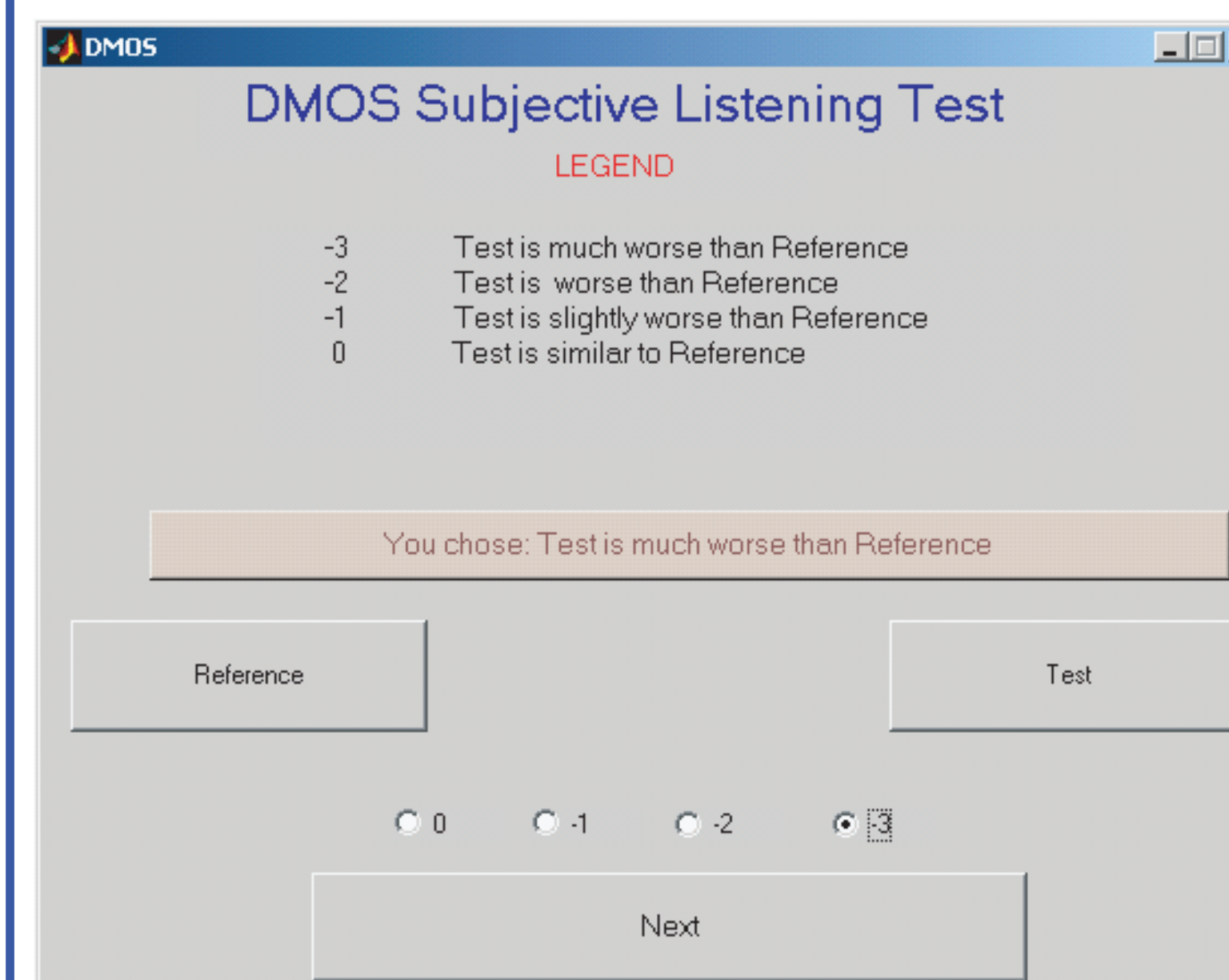


Figure 3. Degradation Mean Opinion Score Test.

## Test Administration

- Tests used to evaluate speech enhancement algorithms developed in CSIP
- 15 Listeners were each asked to evaluate 20 pairs of speech records
- Scores were averaged over speech records and listeners
- Statistical significance of the test evaluated using T-test.

## Future Work

- Web-based administration of test
- Target demographics using various speech files (children, adults, etc.)
- Create new interfaces for measuring the intelligibility of speech (DRT Test)
- Can be administered for medical applications (i.e. hearing impaired)