## Introduction

Previous research investigating working memory functions between musicians and non-musicians has demonstrated differences related to music experience in auditory reaction tasks. This body of research suggests music experience may be related to faster reaction times to auditory stimuli. In addition to recording reaction times by clicking a mouse while listening to a tonal odd-ball, participants in the current study performed six subtests of the TOMAL-II, a standardized measure of working memory ability, documenting experience in auditory reaction tasks. This body of research suggests music experience in individuals with greater amounts of music experience (Musacchia, Sams, & Kraus, 2007). Furthermore, we partially replicated research suggesting individuals with greater amounts of music experience record higher scores on tasks related to spatial processing and executive functioning (George & Coch, 2011).

### Methods

- **Participants:** 18 neurologically healthy individuals. 6 Musicians (M age = 29.67, SD = 5.62) and 12 Non-Musicians (M age = 22.29, SD = 1.40). Musician’s were defined as those that met criteria of at least 7 years of consistent practice in the same musical modality up to the time of the study and currently play in a group or take lessons.
- **Stimuli:** Auditory odd-ball detection task (see Figure 1)
- **Behavioral Measures:** TOMAL-II and Reaction time to deviant auditory stimulus recorded from a mouse click reaction.
- **TOMAL-II Measures:** Working memory performance on 6 subtests, Digits Forward (DF) and Letters Forward (LF) subtests targeting phonological memory, Abstract Visual Memory (AVM) and Memory for Location (MFL) subtests targeting visuospatial memory, and the Digits Backward (DB) and Letters Backward (LB) subtests targeting executive working memory.

### Results

- MANOVA on the combined 7 dependent variables (Abstract Visual Memory, Memory for Location, Digits Forward, Letters Forward, Digits Backward, Letters Backward and Reaction Time) showed a statistically significant interaction of Music Status and Gender [F(1,16) = 3.513, p < .05, partial eta^2 = .24].
- Follow-up ANOVA tests indicated statistical significance for an interaction of Music Status and Gender on Digits Backward [F(1,16) = 8.392, p < .05, partial eta^2 = .34] as well as Reaction Time [F(1,16) = 5.079, p < .05, partial eta^2 = .24].
- Main effect of Music Status indicated Musicians scored significantly higher on tests of Memory for Location [F(1,16) = 9.44, p < .05, partial eta^2 = .37], Digits Backward [F(1,16) = 5.03, p < .05, partial eta^2 = .24], and Letters Backward [F(1,16) = 6.89, p < .05, partial eta^2 = .30].

### Discussion

Data demonstrates reaction time differences appear to be modulated by both music experience as well as gender differences. A trend toward statistical significance existed in the test of reaction times between musicians and non-musicians. Therefore, significant results for reaction time may be reached with greater amounts of participants and by using a more subtle auditory difference for the odd-ball stimulus. The current study adds support for research demonstrating improved processing of pitch information in individuals with greater amounts of music experience (Musacchia, Sams, & Kraus, 2007). Furthermore, we partially replicated research suggesting individuals with greater amounts of music experience record higher scores on tasks related to spatial processing and executive functioning (George & Coch, 2011).

### References
