

**9<sup>TH</sup> ANNUAL N**

# **AUDITORY AND VISUAL WORKING MEMORY DIFFERENCES IN MUSICIANS AND NON-MUSICIANS**

Mary Aldugom<sup>1</sup>  
North Park University

David Bennett, Ph.D.  
Psychology Department, North Park University

## **ABSTRACT**

Several longitudinal studies have shown that children's auditory memory significantly improves after being placed in extended music programs (Roden, Kreutz, & Bongard, 2012; Dege, Wehrum, Stark, & Schwarzer, 2011). Studies have also shown that a significant correlation exists between years of formal music training and several sequential working memory tasks (Bailey & Penhune, 2010). A possible explanation of these findings relate to the importance of tonal manipulation in musicians. Musicians must learn techniques to recall tones and melodies in the correct order that is presented to them. This research study is designed to look into the differences in visual auditory and working memory in musicians and non-musicians. I predict musicians will perform better on working memory tasks that are sequential in nature compared to those that are not. Furthermore, musicians will perform better specifically on auditory working memory tasks than the non-musician participants.

To assess if musicians have superior serial auditory and visual working memory compared to non-musicians, three different working memory tasks of two modalities (3 x 2 experimental design) will be administered to Psychology and School of Music students in the Spring of 2015. The working memory tasks will be obtained from the third edition of the Wechsler Adult Intelligence Scale (WAIS-III). The Forward Digit Span, Backward Digit Span, and Arithmetic subtests from the Working Memory Index (WMI) will be utilized in this study. The materials from these subtests will be divided into two groups to form our auditory and visual memory task conditions. Participants will be asked to complete an auditory and visual Forward Digit Span task, an auditory and visual Backward Digit Span task, and an auditory and visual mental Arithmetic task. The auditory working memory tasks will be verbally administered while the visual working memory task will be presented to subjects through a presentation on a screen. Responses will not be timed, however correct responses will be recorded.

This study is still in progress, and results are still pending. However, I hypothesize that musicians will be superior to non-musicians in the serial immediate auditory memory tasks. With the extent of training musicians receive in remembering tones and notes in specific orders, I believe that musicians are able to recall serial information better than non-musicians.

If the results were to show that musicians have a superior serial auditory memory than non-

Future research could delve into the specifics of musicianship and the factors that impact auditory memory the way that it does. This would help researchers in the field to have a better understanding of what it is about musicianship that opens these doors to obtaining a superior aspect of cognition. Not only would rese

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# **SURVEILLANCE FOR *ANAPLASMA PHAGOCYTOPHILUM* IN THE CHICAGOLAND AREA**

Rebecca Byrne<sup>3</sup> and Kirstin Lee  
North Park University

Matthew Schau, Ph.D. and Drew Rhol, Ph.D.  
Biology Department, North Park University

## **ABSTRACT**

Our research focused on a gram-negative bacterium carried by *Ixodes scapularis* (the black-legged deer tick) called *Anaplasma phagocytophilum* (Minnesota Department of Health 2014).







are to be like the 'living stone' and remain active and growing in their spirituality as a chosen person of God. The rest of scripture continues to support this call for Christians to follow Christ's life and also continues to state that for some Christ will prove a stumbling block. This serves to strengthen our faith in Christ and encourage us to live a messianic life, one that lives in light of Christ's living. Lastly, through Luther and history's interpretation of Luther it is possible to see that this text is important in establishing that a life in Christ is built upon Christ and that opportunity to live that life is open to all. As a part of this life we are all called to give testimony and preach the Gospel and live a messianic life but through this we all come to salvation and to Christ.

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chloride.<sup>2</sup> Our approach proposes to form the basic system in one operation thru the condensation-aromatization of S-benzylisothiuronium chloride (SBT) derivatives<sup>3</sup> with

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## GETTING TO KNOW EDWARD: NARRATIVITY IN BRAHMS *Op. 10* AND *Op. 75*

Erin Cronin<sup>7</sup>  
North Park University

Helen Hudgens, Ph.D.  
School of Music, North Park University

### ABSTRACT

Johannes Brahms first came into contact with the folk ballad “Edward” through Johann Gottfried Herder’s collection of folk songs, *Volkslieder* in 1854. Brahms immediately composed a corresponding piano piece based on the folk ballad as his *Op. 10*, No. 1 and later returned to the poem again in 1877, this time setting it as an art song duet for tenor and contralto in his *Op. 75*. Very little has been published concerning the comparative analysis of these two works, particularly in the examination of narrativity.

This analysis takes the narrative as a point of departure and shows how a developing understanding of the characters undergirds Brahms’ musical discourse in both and demonstrates how Brahms utilized characterization as the foundation for his interpretation of the *Edward* ballad, an interpretation that remained consistent many years later in his *Op. 75*. Through a close examination of the two main themes within the compositions, this research examines the ways in which Brahms’ depicts the characters of Edward and his mother as individually and distinctly deceptive, the uneven power dynamic that defines their relationship, and the character development within the compositions that directly mirrors the literary ballad. A deeper understanding of ways that Brahms utilized tonality, texture, and meter in his *Op. 10* and *Op. 75* not only sheds light on the way in which he interpreted the poem, but furthermore draws into question the abilities and limitations of instrumental music to communicate narrative effectively.

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<sup>7</sup> Presenter and corresponding author. Email: [ekcronin@northpark.edu](mailto:ekcronin@northpark.edu)







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Ahmed Massad <sup>10</sup>  
North Park University

Isabel Larraza, Ph.D.  
Chemistry Department, North Park University

### ABSTRACT

Many  $\alpha$ -hydrazino esters are found in potent biologically active compounds. For instance, they are known to be components of pharmaceutical agents like *carbidopa*,<sup>1</sup> a drug used in the

2) The innovative preparation of optically active acyl-hydrazones using chiral starting materials, like proline hydrazide, and then effect an stereoselective reduction in the second step.<sup>5</sup>

3) Effect both reactions in one step, i.e. develop a “one-pot” procedure by doing a reductive amination of methyl pyruvate with different carbazates. Likewise, this reaction has not been attempted before.<sup>6</sup> A successful implementation of this one-pot strategy would comply with green principles number 1 and 2: “Prevention of Waste” and “Atom Economy.”<sup>7</sup>

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Emily Mordan<sup>12</sup>  
North Park University

Anne Vasquez, Ph.D.  
Chemistry Department, North Park University

### ABSTRACT

A major concern in industrial chemistry is the management of potentially dangerous waste in the environment. One class of pollutants, called endocrine disruptors, is a class of compounds that are structurally similar to hormones. These compounds can alter normal endocrine function of animals exposed to them.<sup>1-5</sup> This project is a study of the interactions between the suspected endocrine disruptors alkylphenols (Figure 1), and the soil component humic acid<sup>6,7</sup> (Figure 2) to understand how alkylphenols bind to soil using vibrational spectroscopy. Long chain alkylphenols have been shown to bind tightly to soil while other types of endocrine disruptors bind reversibly.<sup>8-9</sup> The strength of endocrine disruptor-soil binding largely determines the bioavailability of the endocrine disruptor. Thus it is important to understand how different endocrine disruptors bind to soil to aid in the development of environmental remediation methods. Here, alkylphenols with different chain lengths are exposed to humic acid, and vibrational spectroscopy is used to determine how alkylphenol chain length impacts the binding to humic acid. Further, unexpected changes in the vibrational spectra of alkylphenols in different solvents are investigated to determine how solvent impacts alkylphenol structure, as these structural changes may impact the interpretation of vibrational spectra of these compounds.

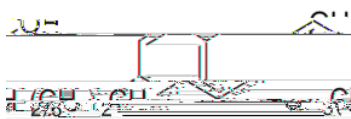


Figure 1.

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<sup>12</sup> Presenter and corresponding author. Email: [ehmordan@northpark.edu](mailto:ehmordan@northpark.edu)

Figure 2.

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## RESULTS

For physical changes, pre-assessment cardiorespiratory fitness, as measured by a step test, differed significantly by gender. Male participants demonstrated superior cardiorespiratory health by maintaining a lower increased heart rate ( $M_m=11.02$ ) in comparison to females ( $M_f=23.97$ ). Post course results did not show a significant change ( $M_m=11.00$ ,  $M_f=21.30$ ). The difference between the change scores within gender approached significance.

For psychological changes, there were no significant pre-assessment, post-assessment, or change score differences. Further data collection is ongoing.

## CONCLUSION

Data collected and analyzed thus far include approximately one-third of the projected overall data pool. Preliminary results show that significant changes occurred within some physical changes. Additional data collection will occur during early 2015, which will provide further support and representation of subject data.

This research study aimed to evaluate how gender moderates physical and psychological changes following an eight week college course on stress and health. There are significant findings between genders in some physical changes. These findings add to literature that gender differences exist in certain health markers, but fail to confirm some data that examine health differences across all ages of adulthood.

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