

Exercise and Motivational Music Improves Memory in Lectures

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Introduction

It is suggested that long-term exercise benefits short-term and working memory (Sibley and Beilock, 2007). However, due to a lack of research regarding acute, muscular endurance-based bouts of exercise, it is important to examine whether short-term, motor exercise influences short-term and working memory with the support of motivational music.

Purpose

The purpose of this study was to examine whether acute, muscular endurance, motor exercise, and motivational music would facilitate short-term and working memory in collegiate students.

Methods

There were two groups: a control group and an experimental group. Before the class break, the control group was given the Digit Span Test. However, the experimental group was instructed to perform 20-25 body weight squats for 60 seconds. After the 60 seconds, the participants were given the Digit Span Task. After a few weeks, the subjects repeated the task(s) as they switched groups (i.e. control group to experimental, and vice versa).

(a)

DIGITS FORWARDS					
Item	First trial	✓ or X	Second trial	✓ or X	Total
A	43		16		
B	792		847		
C	5941		7253		
D	93872		75396		
E	152649		216748		
F	3745261		4925316		
G	82973546		69174253		
H	246937185		371625948		
				Forwards score:	

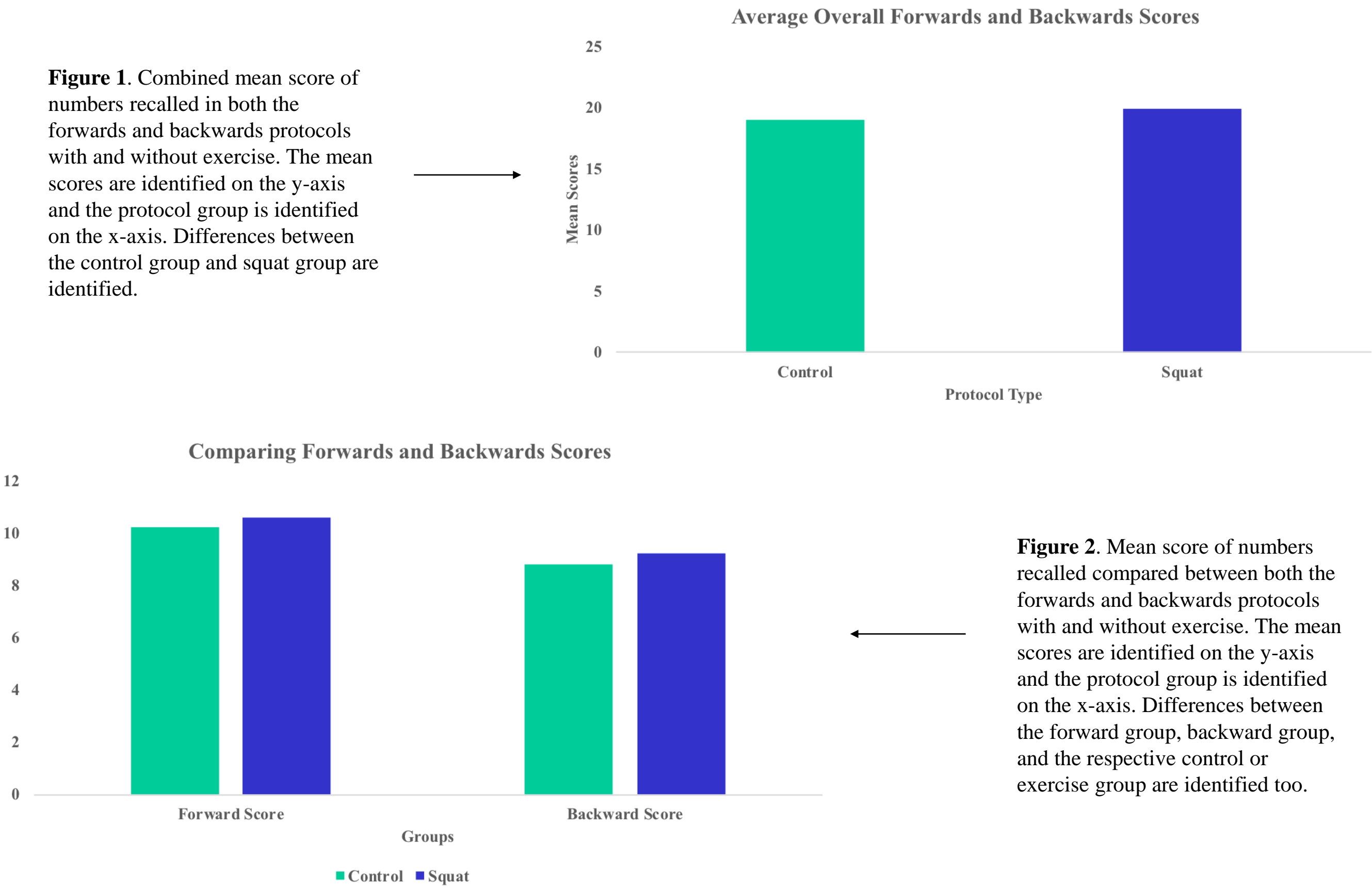
DIGITS BACKWARDS					
Item	Trial one	✓ or X	Trial two	✓ or X	Total
A	83		29		
B	475		615		
C	2619		3852		
D	28736		59413		
E	624719		276391		
F	4183627		1586937		
G	52624197		94617385		
				Backwards score:	

Results

Forward Score: Exercise and motivational music does enhance short-term and working memory. The forward score protocol did exemplify a difference; however, this difference was not statistically significant.

Backward Score: Exercise and motivational music does enhance short-term and working memory. In fact, one of the four groups illustrated a significant difference ($p < 0.04$).

Forward and Backwards Score: Exercise and motivational music does enhance short-term and working memory. Both the forward and backwards scores combined illustrated a difference; however, the difference was not significant.



Acknowledgments

This research was partially supported by Ken Anderson from Douglas College, New Westminster, Canada.

Discussion

- Hillman et al. (2003) suggest acute exercise increases efficiency of effortful cognitive processes.
 - Thus, we had seen an increased score in the backwards protocol compared to the forwards protocol.
- The professors' teaching styles and the participants' learning styles may have differed; thus, their level of stimulation may have differed too.
 - If a participant was already engaged, they would likely exemplify little to no improvement.
 - However, if a participant was not engaged, they would likely exemplify larger improvements.
 - Ex. Engaging courses vs. Lecture-heavy courses.
- The duration of the exercise protocol may have been too short; thus, our participants were unable to reap the most benefits.
 - Likewise, the task may have been too easy; thus, our participants were not optimally challenged.

Conclusion

- Exercise and motivational music increased short-term and working memory; however, this increase did not reach the threshold for significance.
- Future studies may want to identify effects of acute bouts of muscular endurance-based exercise on a more cognitively taxing recall task.

References

Hillman, C. H., Snook, E. M., & Jerome, G. J. (2003). Acute cardiovascular exercise and executive control function. *International Journal of Psychophysiology*, 48(3), 307-314. Doi: 10.1016/s0167-8760(03)00080-1

Sibley, B. A., & Beilock, S. L. (2007). Exercise and Working Memory: An Individual Differences Investigation. *Journal of Sport & Exercise Psychology*, 29(6), 783-791.