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# Comparing MVPA, Energy Expenditure, RPE, and Enjoyment of a U12 Boys Soccer team during a non-competition (“friendly”) game vs. a competition (“league”) game.



**EXERCISE SCIENCE**  
SACRED HEART UNIVERSITY

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**EXERCISE SCIENCE**  
SACRED HEART UNIVERSITY

## ABSTRACT

Forty-four million children participate in organized sports in the United States<sup>1</sup>. Studies show that organized sports place more emphasis on competition, however, friendly sporting events are still considered highly active<sup>1</sup>. The research is unclear whether differences exist in energy expenditure and athlete enjoyment between “friendly” and “league” competitions. **PURPOSE:** The purpose of this study was to compare moderate-to-vigorous physical activity (MVPA), energy expenditure, RPE, and enjoyment of a U12 boys’ soccer team during a non-competition (“friendly”) game vs. a competition (“league”) game. **METHODS:** Twelve male subjects were recruited from the U12 Shelton, CT, youth soccer team. Parental consent was granted prior to participation. Accelerometers were used to measure MVPA intensities and energy expenditure during both games. RPE scales ranging from 6 to 20 and enjoyment scales consisting of 16 sections were filled out. Paired sample t-tests were used to compare the percentage of time spent in MVPA intensities, RPE scores, and enjoyment scale scores during the league game and friendly game. **RESULTS:** Significant differences were observed in the percentage of time spent in sedentary activity ( $p < 0.042$ ) and vigorous activity ( $p < 0.002$ ) between the two games. Significant differences were observed in the comparison of the 12 enjoyment scales ( $p < 0.047$ ) between the two games. **CONCLUSIONS:** Higher MVPA and energy expenditure were associated with the friendly game. Higher RPE and more enjoyment were associated with the league game. Further research is needed to understand the competitive nature of the sport and how that impacts enjoyment and physical exertion.



## Purpose

The purpose of this experiment is to determine which game (friendly game vs. league game) will result in the greatest MVPA, energy expenditure, RPE, and enjoyment. This study may prompt future research regarding the involvement of children in youth sports as well as the correlation between youth sports and competitiveness.

## PARTICIPANTS

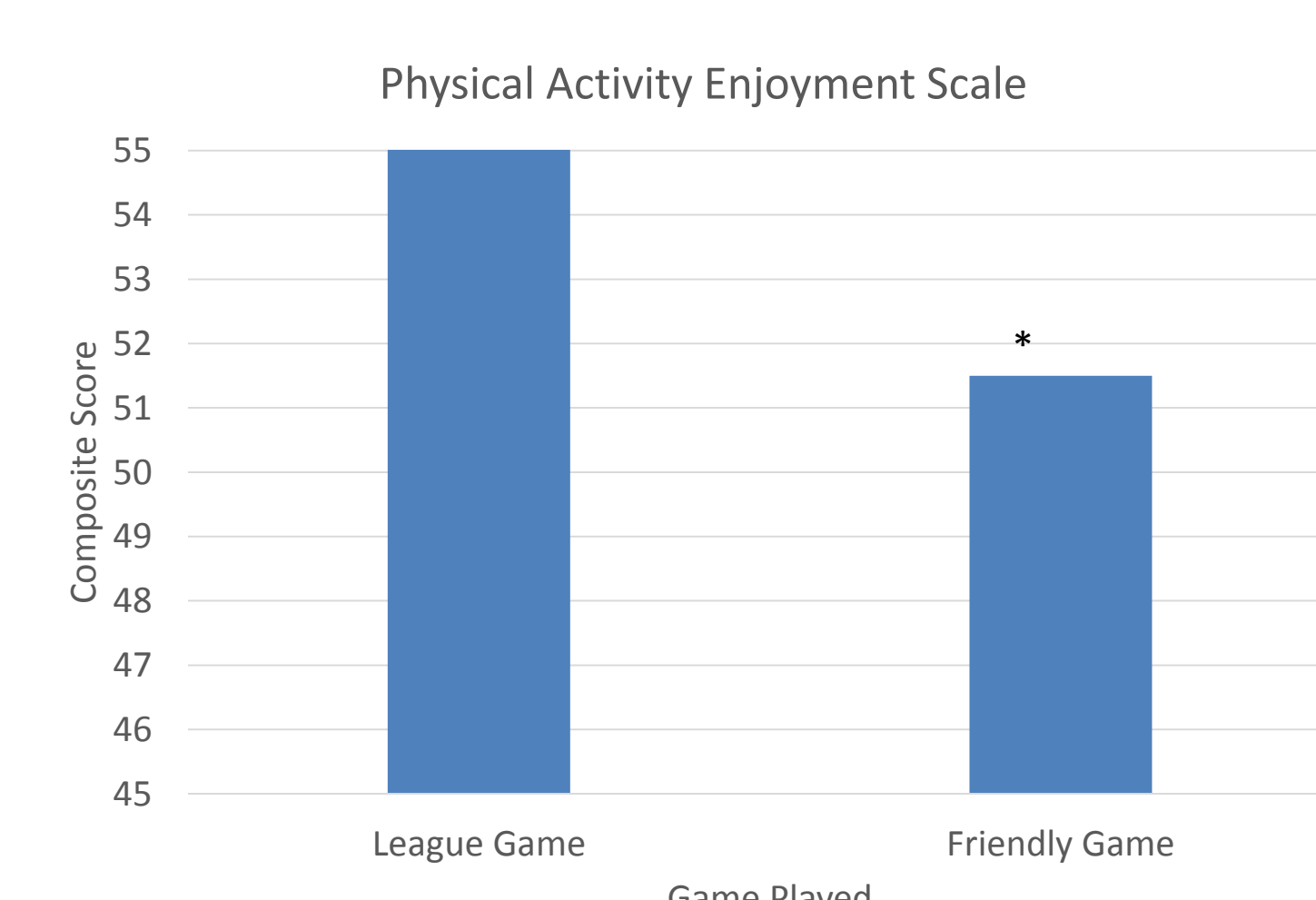
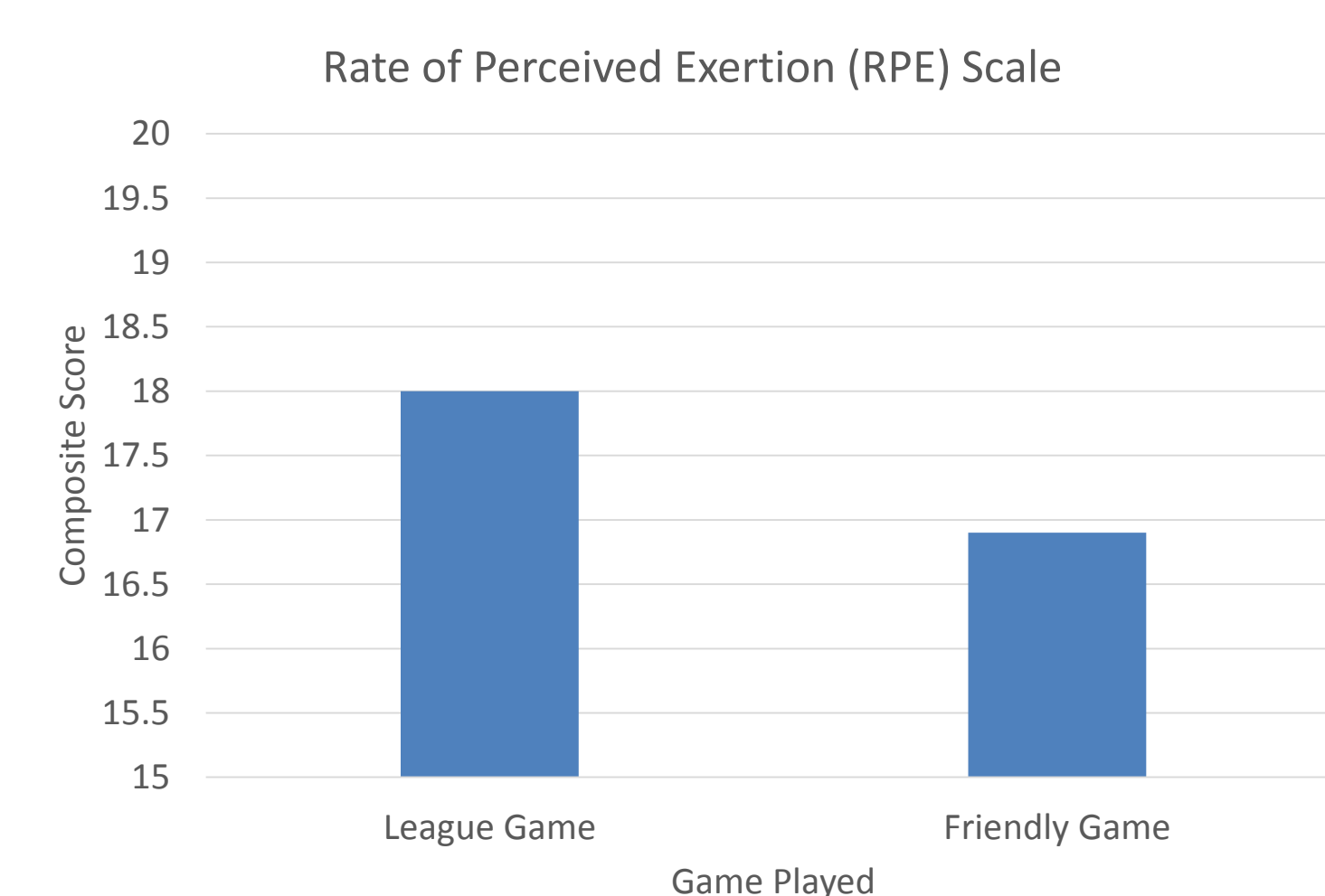
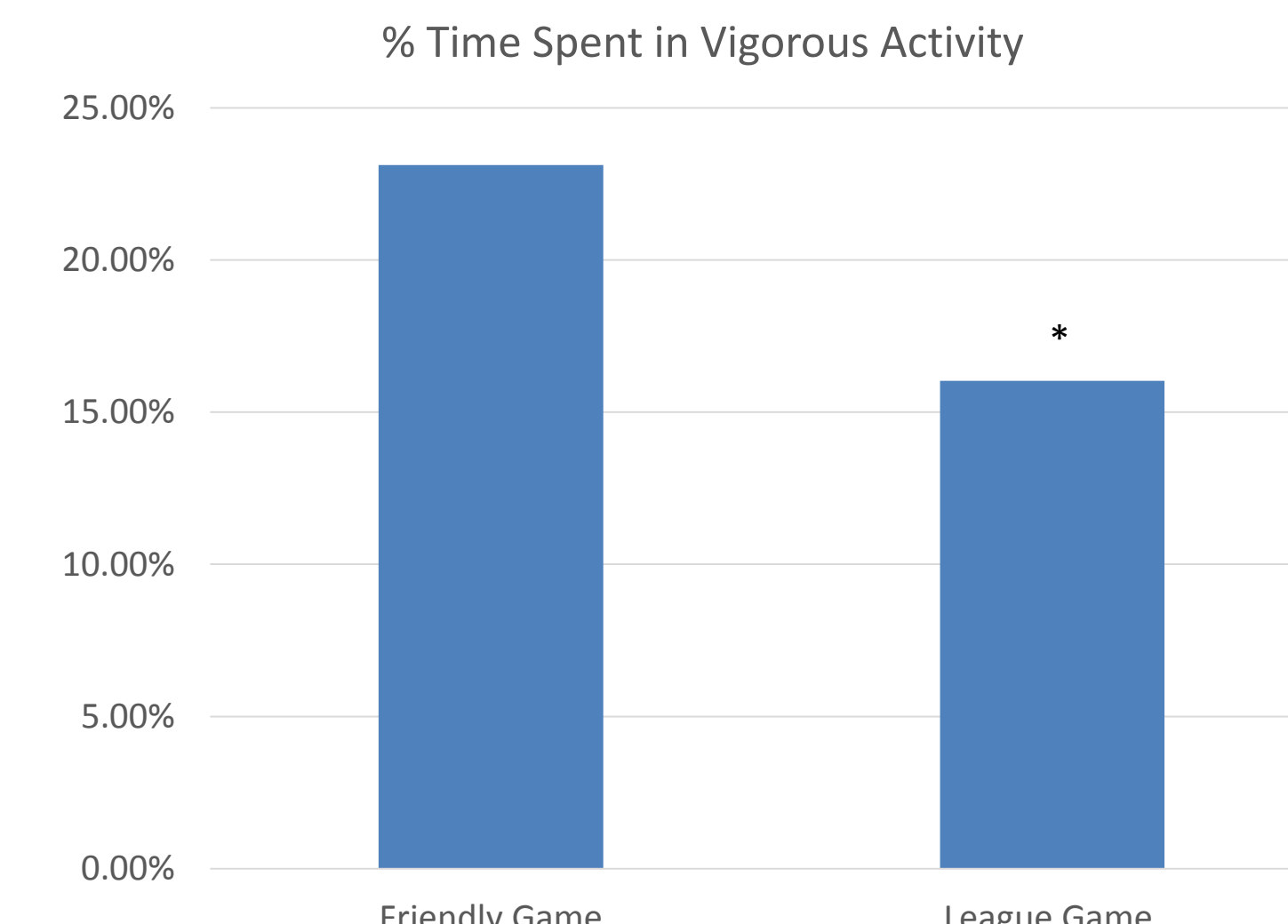
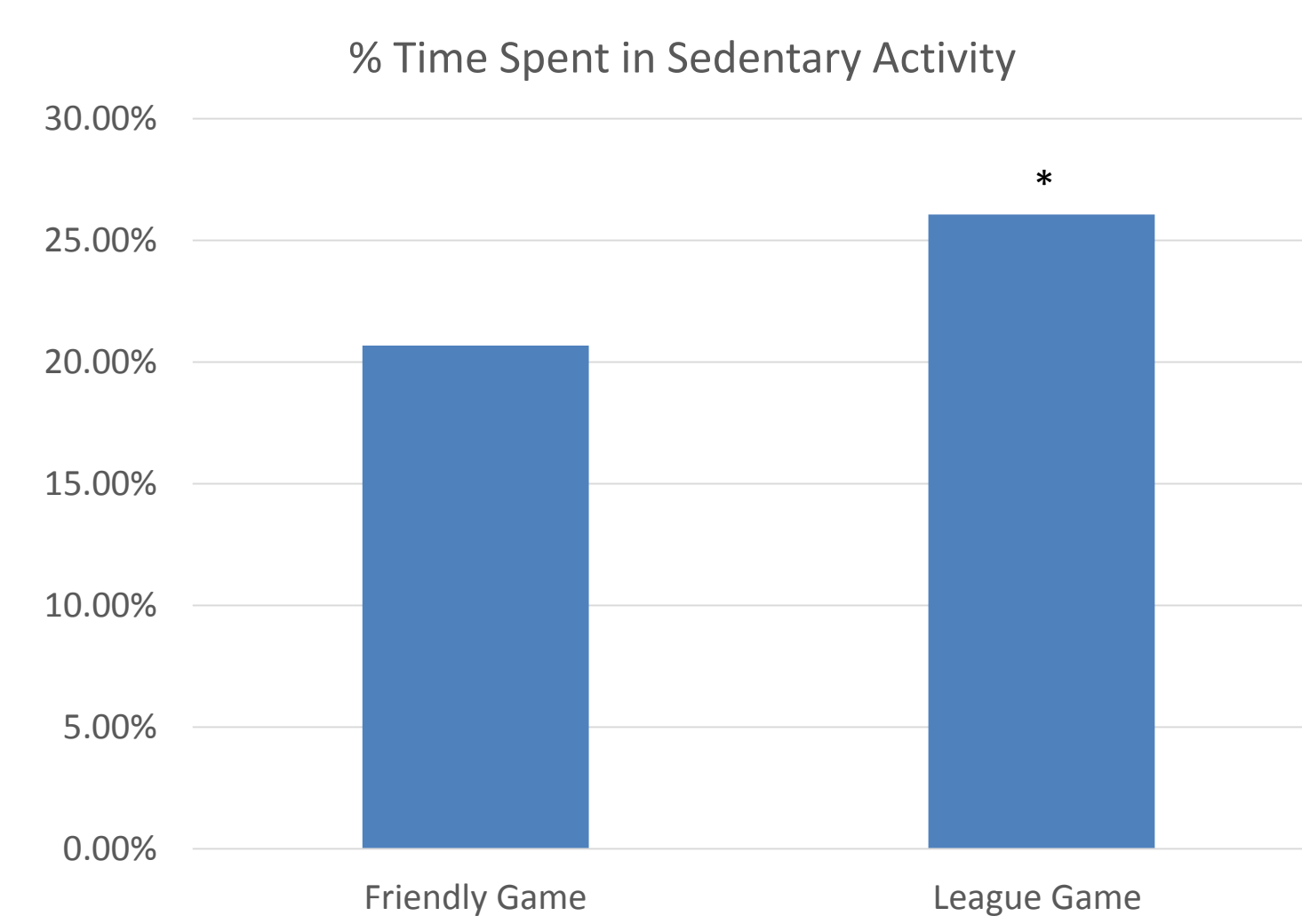
Twelve boy subjects were recruited from the U-12 Shelton Boys Youth Soccer team. Each of the subjects needed parental consent in order to proceed with the study. Parents filled out a parental consent form and returned them. Approval was needed by the coach to allow the subjects to wear the accelerometers during the games. Prior to starting the study, the boys were notified of what they were participating in and they all agreed they wanted to play a role in the study.

## METHODS

For both the friendly game and the league game, the boys wore accelerometers on their right hip which collected data on energy expenditure and the percentage of time spent in each of the MVPA categories (sedentary, light, moderate, and vigorous). This device is a reliable tool used to measure physical activity intensities and energy expenditure in children. The memory of each accelerometer stores all information used for comparative purposes throughout this study. Previous studies using accelerometers have found that children were significantly more active during unstructured activities than during structured activities<sup>2</sup>. After each game, the boys completed the physical activity enjoyment scales and RPE scales. Composite scores for both scales were determined in order to compare the data. For the physical activity enjoyment scales, all 12 boys were involved in the scoring. For the rate of perceived exertion scales, only 11 boys were involved in the scoring because one boy forgot to fill his scale out, eliminating him from this aspect of the study. Paired sample t-tests were conducted using an excel spreadsheet in order to compare all data.

## RESULTS

For the friendly game, the average amount of time spent in sedentary activity was 20.68%. For the league game, the average amount of time spent in sedentary activity was 26.06%. For the friendly game, the average amount of time spent in vigorous activity was 23.12%. For the league game, the average amount of time spent in vigorous activity was 16.03%. Significant differences were observed in the percentage of time spent in sedentary activity ( $p < 0.042$ ) and vigorous activity ( $p < 0.002$ ) between the two games. Significant differences were observed in the comparison of the 12 enjoyment scales ( $p < 0.047$ ) between the two games.



\* = Significance found between the categories

## DISCUSSION

Statistics show significance in the percentage of time spent in vigorous activity ( $p < 0.002$ ). The boys lost the friendly game (7-1) by a greater amount than the league game (5-2). This significance shows that their work rate varied according to how much better the opponent was. Therefore, they worked harder in the friendly game to compete with a better team. Statistics show significance in the percentage of time spent in sedentary activity ( $p < 0.042$ ). The percentage of time spent in sedentary activity was much higher for the league game (26.06%) than the friendly game (20.68%). These results make sense since the boys spent far more time in vigorous activity for the friendly game (23.12%) than the league game (16.03%). The average RPE score for the friendly game was 16.9 and the average RPE score for the league game was 18. Although there was no significance found when comparing the RPE scores, the league game showed a trend towards an elevated higher overall RPE. The boys lost the league game but still seemed to exert a lot of energy possibly due to the game being more evenly matched. The average enjoyment for the league game was 55.8 and the average enjoyment for the friendly game was 51.5. These averages show that overall the boys enjoyed the league game more than the friendly game. Significance here helped conclude that there was less enjoyment during the friendly game because the boys lost by a greater amount and therefore did not enjoy the game as much.

## TAKE HOME MESSAGES

- Higher MVPA and energy expenditure were associated with the friendly game. Higher RPE and more enjoyment were associated with the league game.
- The higher velocity presented in the league game is correlated with losing by a larger amount.
- There is a correlation between winning and enjoyment. Even though the league game may have felt harder for the boys based on the RPE, they seemed to enjoy it more, as it felt more evenly matched and possibly as if they had more small successes on the field.

## REFERENCES

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2. Trost SG, Rosenkranz RR, Dziewaltowski D. Physical Activity Levels among Children Attending After-School Programs: *Med Sci Sports Exerc.* 2008;40(4):622-629. doi:10.1249/MSS.0b013e318161eaa5.