



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Therese A. Santiago	Project Number J1221
Project Title The Effects of Exercise on Sleep Quality	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine if an increased amount of physical activity affects sleep quality. I hypothesized that increased calories burned will improve sleep quality with increased length of sleep and decreased movement. Studies have shown that exercise helps improve sleep quality in adults, while some have shown that exercise has no clear effect on sleep quality. However, there are only a few studies done on adolescents. To my knowledge, there have been no previous studies establishing the correlation between the amount of calories burned as a determinant of physical activity and sleep quality.</p> <p>Methods/Materials After signed consent from the parents, subjects were asked to wear the BodyMedia FIT# armband (by BodyMedia, Inc. Pittsburg, PA) on their left upper arm for 4 days and nights, except during bath. They were instructed to increase their activity level for 2 of the days. The other 2 days, they were asked to have minimal activity. After the test, they answered a questionnaire regarding the type and length of the exercise and perceived sleep quality. Data from the armband was downloaded through the BodyMedia website included the following: calories burned/day, sleep efficiency, movement in sleep and sleep duration. The highest and lowest values for the amount of calories burned per day were analyzed.</p> <p>Results There were 25 participants whose ages ranged from 11- 16 years old (mean age 13). 62% of the subjects had increased sleep efficiency with less exercise. 57% of the subjects had decreased sleep movement and increased duration of sleep with less exercise. 71% of the participants felt like they slept better with more exercise.</p> <p>Conclusions/Discussion The results of this study did not show improved sleep quality with increased exercise. This is opposite of my hypothesis: increased activity will improve sleep quality. However, this is consistent with some published articles in adult population that failed to show clear effects of exercise on sleep. The survey filled out by the participants showed subjective improvement in the sleep of 71% of the subjects with increased exercise, despite the recorded sleep quality. The perceived improvement of sleep after exercise could be attributed to the well feeling associated with exercise. Sleep is important in keeping adolescents healthy. It is important to establish with certainty how exercise can affect sleep.</p>	
Summary Statement This test shows that there may be no clear effect of exercise on sleep quality.	
Help Received My parents helped arrange my board.	