



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2019 PROJECT SUMMARY**

<b>Name(s)</b> <b>Luke Anderson</b>	<b>Project Number</b> <b>S0401</b>
<b>Project Title</b> <b>Lights, Camera, Action-Reaction: Sympathetic Nervous System Response to Action Movies across the Decades</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> I compared older and newer horror movies, seeking to ascertain whether newer movies led to greater changes in vital signs.</p> <p><b>Methods</b> Movie clips viewed were derived from the 1960s, 1990s, and 2010s. I recorded a real-time EKG along with the participant's heart rate, blood pressure, pupillary response, oxygen saturation, visual reactions, and respiratory rate. Measurements were taken before, during, and after viewing of each film.</p> <p><b>Results</b> The average change in baseline heart rate was ten beats-per-minute (BPM) for modern movies of the 2010s. By contrast, this change in heart rate was only 2.5 BPM for older movies of the 1960s. I performed an analysis of variance test, (ANOVA) on various data sets to yield a P-value of statistical significance. The absolute change (?) in heart rate had a supporting P-value of 0.003, whereas the percent (%) change in heart rate was noted as a trend rather than as a statistically significant parameter.</p> <p><b>Conclusions</b> I conclude that modern horror movies elicit a fight or flight response, characterized by incipient tachycardia (heart rate elevation). While vicariously identifying with victimized movie characters, I believe viewers enter into a survival mode, mediated by stress hormones such as epinephrine, norepinephrine, and cortisol. Moreover, increasingly graphic film techniques, reflecting cinematic and societal change, have resulted in a shock value that challenges not only our minds, but our very cardiovascular survival. One might ask if future horror movies, within decades, might be expected to result in cardiovascular decompensation, or even death. These are questions worthy of further study. Is your life worth a good scare?</p>	
<b>Summary Statement</b> By use of real time vital signs monitoring, I have found the physical manifestations of the "fight or flight" response are more pronounced in viewers of modern horror movies than as seen in viewers of older films of a more measured era.	
<b>Help Received</b> My teacher, Victoria Acquistapace, helped me to apply and develop my project. My teacher's friend, Dr. Homburger helped to strengthen my statistical testing and data collection.	