# ABSTRACT

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| **TITLE:** | Can Spending Time in the Outdoors Reduce Stress? |
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**ABSTRACT:** The purpose of this study was to investigate if salivary cortisol levels decrease, indicating lower stress levels, when humans are in an outdoor environment compared to an indoor environment. Salivary Cortisol is routinely used as a biomarker of psychological stress and related mental or physical diseases. Most studies consider salivary cortisol levels a reliable measure of hypothalamus-pituitary-adrenal axis (HPAA) adaption to stress (Hellhammer, Wust, Kudielka, 2009). To examine the differences in stress levels this study used a Salimetrics expanded range high sensitivity salivary cortisol enzyme immunoassay kit. Participants were from two Fort Lewis college classes, a testing and statistics class for the indoor group and a top rope climbing class for the outdoor group. There were 14 students from each class. The participants were given a cup of water to rinse their mouths out to alleviate any foreign particles in the saliva. Then they tilted their head forward to let the saliva collect and pool in the mouth, and drooled the saliva into a test tube. The collected test tubes were placed in a cooler and then immediately put into a freezer. Each saliva sample was placed into 2 wells on the plate that was part of the Salimetrics expanded range high sensitivity salivary cortisol enzyme immunoassay kit. Getting the average from the two wells validates the cortisol score for each participant. Standards and controls (high and low) provided in the assay kit were put into wells to use as a guide. The wells were incubated then put into a plate reader to get the calculations. Unfortunately the assay kit didn't work, producing all blank results. The saliva samples were re-frozen for future use. The researcher re-thawed the saliva samples and used a new assay kit, following the same steps stated above. The only difference was that the new assay kit had only enough room to put each sample into 1 well, reducing validity. A regression equation was used to find the Optical Density (OD) and cortisol scores for the unknowns, participants' saliva. The results showed that stress levels were significantly lower ($p = .008$) in the outdoor class. These findings were further supported by the results of a classmate's (Erika Behler) study that used the Perceived Stress Scale to measure stress levels with the same population at the same time ($p = .002$). In conclusion, the students in the outdoor class had lower cortisol levels (and perceived stress levels in companion study) indicating that they may be less stressed in an outdoor classroom setting in comparison to the traditional inside lecture classroom setting.