Experiment HP-21: Vacation and Relaxation

Equipment Required

PC or Mac Computer

IXTA, USB cable, power supply

*ROAM ECG electrodes

*PPG-320 Pulse

*TM-100 Temperature Sensor

*RM-220 Nasal Cannula

Note: adding or removing sensors for this experiment is left open-ended. As many parameters as you would like at can be measured.

Sensor Setup

1. Locate the PPG-320 pulse/temperature sensor and plug it into the PT port.
    - Place the pulse sensor on the volar surface of the subject's thumb.
    - **Note:** If also recording Blood Pressure, make sure the pulse sensor in on the same limb.
2. Locate the ROAM-ECG.
3. Place the electrodes on the chest as shown.

Figure HP-21-S1: PPG-320 pulse sensor and ROAM. Temperature will be plugged into channel A6.

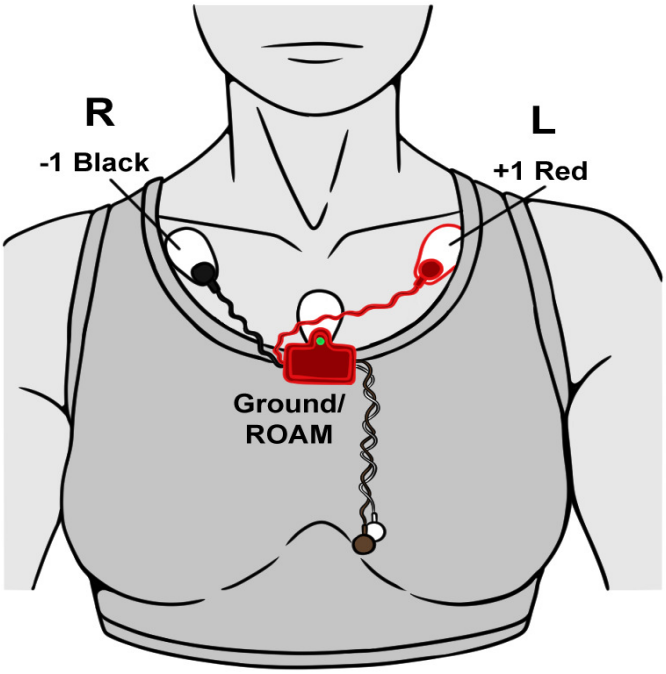

Figure HP-21-S2: Placement of the ECG electrodes.

4. Locate the RM-220 nasal cannula and plug the connector into channel A1 on the IXTA unit.
    - Position the cannula so the prongs are just resting under the subject's nose, very close to the nostrils. Wrap the tubing behind the subject's ears, as shown above.
    - If the subjects are sitting during these exercises, they should sit erect so that the muscles involved in pulmonary ventilation are able to move with few restrictions.
    - Stop the experiment if the subject feels dizzy or nauseated.

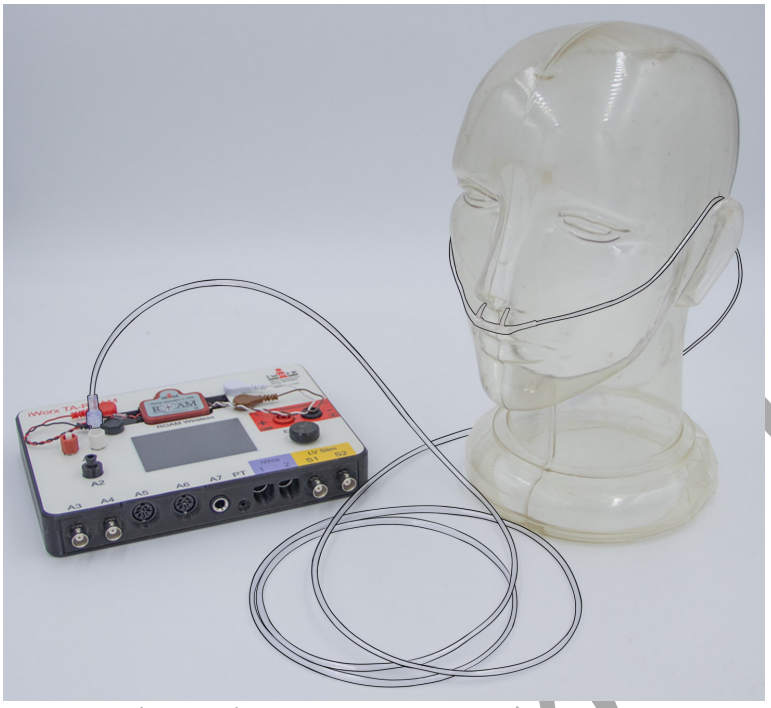

Figure HP-21-S3: RM-220 nasal cannula.

Experiment HP-21: Vacation and Relaxation

This lab is meant to test whether "taking a vacation" can actually reduce the physiological manifestations of stress on your body. The lab provides you with a set of stressful images and a set of relaxation images that you may see while on vacation. Compare what happens in the body when looking at these two sets of images.

This lab can also be "hypothesis-driven" lab where students will come up with other things that may place the body under "stress," such as: taking a test, watching a stressful movie. Then compare the physiological parameters of the stressful situation to that of a something known to make the body relax. This can include: reducing heart rate, changing skin conductance, altering body temperature and/or breathing rate.

The settings file for this lab is currently set up to record: ECG, Pulse, Respiration, Skin Temperature, Heart Rate and Breathing Rate. Parameters can be added or removed based on what the goal of the hypothesis is.

Sample Exercise: Measuring Heart Rate, Respiration Rate and Skin Temperature while Looking at Stressful and Relaxing Imagery

Aim: To measure the subject's heart rate, respiration rate and skin temperature while looking at stress producing and relaxing imagery.

Approximate Time: 30 minutes or more

Procedure

1. The subject should rest their hand with the sensors attached comfortably. The electrodes should be free from any extraneous pressure and the electrode cables should be hanging freely. Instruct the subject not to move the hand during the recording process; movement may introduce artifacts into the recording.
2. Click on the Record button. Enter the subject's name in the Mark box and click the mark button.
3. Click Stop to halt the recording.
4. Select Save As in the File menu, type a name for the file. Click on the Save button to save the data file.
5. Click the "Stress" macro on the toolbar to start the stressful imagery.
6. Click Record and have the subject watch the 20 images that will show on the screen. Continue recording until all the images have been shown. If the subject has not shown any changes on any of the channels, repeat the sequence of images. Do not repeat the sequence more than once.
7.

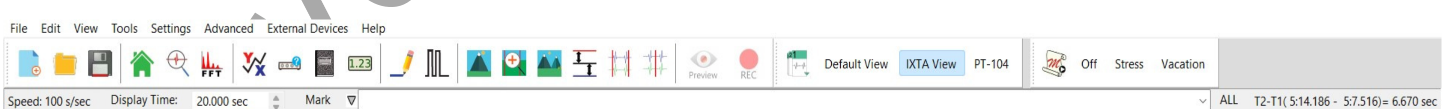

Figure HP-21-L1: Macros selection menu.

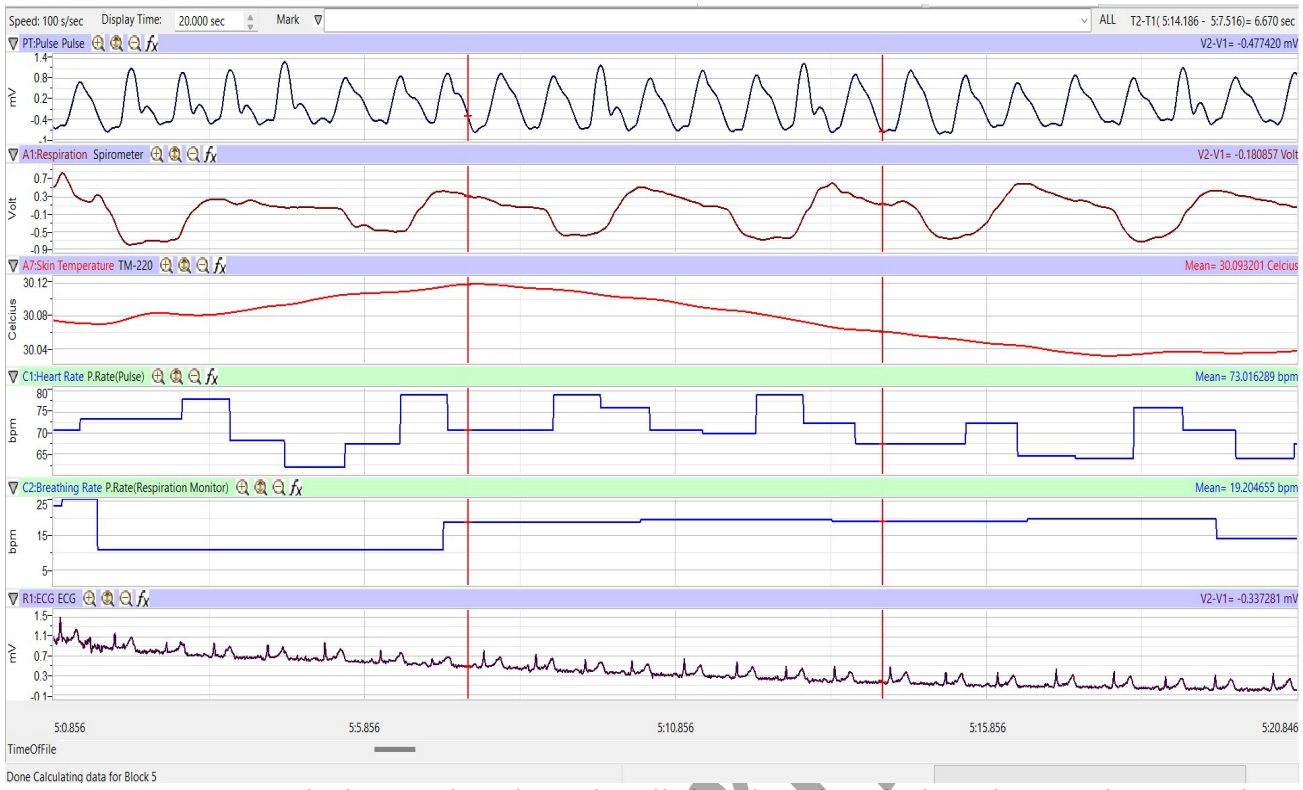

Figure HP-21-L2: Sample data. Other channels will show based on the hypothesis and settings chosen for the lab/research project.

7. Click on the Save button to save the data file.
8. Click the "Vacation" macro on the toolbar to start the vacation/relaxation imagery.
9. Click Record and have the subject watch the 20 images that will show on the screen. Continue recording until all the images have been shown. If the subject has not shown any changes on any of the channels, repeat the sequence of images. Do not repeat the sequence more than once.
10. Repeat this exercise on other subjects in your lab group if time allows.

Data Analysis

1. Scroll through the data file and locate the recording of the subject's baseline heart rate, breathing rate, and/or temperature.
2. Use the Display Time icons to adjust the Display Time of the Main window to display the one minute recording of the subject's baseline data on the Main window. This section of data can also be selected by:
    - Placing the cursors on either side of the one minute recording of the subject's baseline data, and

- Clicking the Zoom between Cursors button on the LabScribe toolbar to expand or contract the one minute recording to the width of the Main window.

3. On the right hand margin of the heart rate, breathing rate, and/or temperature channels, the mathematical function, Mean, should appear.

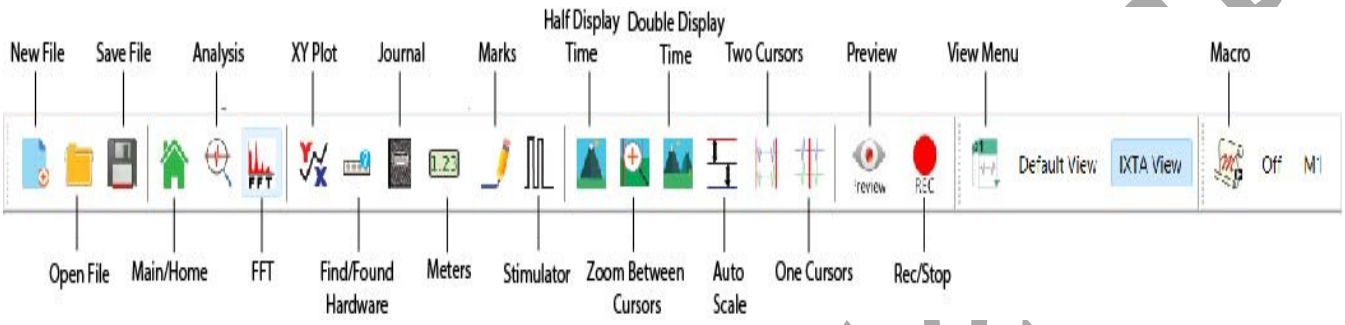

Figure HP-21-L2: The LabScribe toolbar.

4. Move the cursors to the section of data where the subject's "stress" was recorded. Position the cursors to have at least 1 minute of data on screen.
5. Once the cursors are placed in the correct positions for determining the mean baseline data in the one minute recording, the values can be recorded in the on-line notebook of LabScribe by typing the name and value of the parameter directly into the Journal.
6. The Mean value for the heart rate, breathing rate and temperature while "stressed" will be shown in the right hand margin of the channels. Repeat this procedure for the full time the subject was shown the images.
7. Move the cursors to the section of data where the subject's "relaxation" was recorded. Position the cursors to have at least 1 minute of data on screen.
8. The Mean value for the heart rate, breathing rate and temperature while "vacationing" will be shown in the right hand margin of the channels. Repeat this procedure for the full time the subject was shown the images.
9. Enter the data in Table 1.
10. If other data, such as Pulse and Heart Rate are being recorded, the data can be selected and analyzed in the same way.

Table HP-21-L1: Baseline, Stress and Relaxation Data for Heart Rate, Resp Rate and Skin Temperature

	Baseline			"Stress"			"Vacation"		
Subject Name	Mean Heart Rate (bpm)	Mean Resp Rate (bpm)	Mean Temp (deg C)	Mean Heart Rate (bpm)	Mean Resp Rate (bpm)	Mean Temp (deg C)	Mean Heart Rate (bpm)	Mean Resp Rate (bpm)	Mean Temp (deg C)