EXPERIMENTAL SETUP #1: Participant-Centered Variables as Primary Trigger (e.g. “looking”)

Input:

* IBI file (time, RR)
* IBI start time
* Event file (event, time)
* Event file start time

Sample questions:

* What proportion of looking time is spent in each HR phase?
* What is the average depth of sustained attention?
* What HR phases corresponds to each event in the behavioral file?

Output:

* CSV that includes HR attention phase for each EVENT and each IBI in the original file
* Graphical interface

Data Processing Pipeline:

|  |  |  |
| --- | --- | --- |
|  | Physiological Data | Behavioral Data |
| Collection | Participant wears heart monitor that transmits timestamped heart activity to laptop via Bluetooth | Participant views task on monitor |
| Pre-Processing | Original physio files (.csv) are segmented to correspond to task start and stop times, cleaned for artifacts and outputted as clean .ibi files for further processing  CSV files originally have three columns: time, RR (ms), and Heart Rate (bpm).  .IBI files have one column: RR (ms).  For current project, the user stores the start time for the initial IBI separately to later synchronize the IBI and behavioral file. In the sample file, the first IBI of the spliced file occurs at 71680ms | Behavioral files are coded in software program (e.g. Noldus Observer) and exported as a .CSV  For current project, the coders add a “calledtime” code to behavioral file that marks the heart monitor time for later synchronization. |
| Synchronizing and Merging Files | In the sample file, the “calledtime”=67 and is marked at 23.9664, which means that when the behavioral video file is at time=23.9664s, the physio monitor is at 67s.  A new file is created (“BioBehavioral”) that includes the behavioral data linked with the clean physio data. The first time in this file is 71680, and the first RR (IBI) is 413.  The three columns of this file relevant to the study are “Behavior” “Event\_Type” “timems” and “RR” | |
| Algorithm | The heart-defined attention algorithm is used to determine which phase of attention the participant is in for each IBI  When the participant look is “on” take MEDIAN of the five IBIs preceding the look as “baseline”  Four HR phases:   * Orienting: period between look “on” and sustained attn * Sustained Attention: IBI is greater than baseline * Attention Termination: IBI reaches baseline | |