

V9HTYPE

SOF Reaction Time Data Documentation

This documentation is for the summary reaction time data from the PVT devices. Some participants who consented to the measure on the RT form do not have data, which could be due to a PVT malfunction, software problem reading file, etc. 3 variables were created to indicate those with useable Reaction time data (**V9RTFLAG**), reason for no data (**V9RTRENO**) and reasons why participant refused Reaction time data (**V9RTREF**)

General Information about the PVT device and Cleaning

The PVT-192 device, (Ambulatory Monitoring, Inc, Ardsley, NY) was used to estimate reaction time. Participants who returned for the visit 9 clinic visit were invited to attempt the measure. During a 3 minute performance trial, participants were asked to attend closely to a stimulus window and to press the response button using the dominant hand as soon as the red number appeared. Participants were further instructed to keep the response times as short as possible throughout the task and not to press the button before the stimulus appeared. The data was stored on the PVT device and downloaded using the software provided.

PVT data were then transferred to the San Francisco Coordinating Center (San Francisco, CA) for centralized processing. Centralized training and certification was required for clinic staff gathering PVT data. REACT software was used to access the data. (reference: Action-W User's Guide, Version 2.0. Ambulatory Monitoring, Inc. Ardsley NY.)

The data for the participants were reviewed for any anomalies to may suggest a malfunction in the device or the way the measure was being conducted.

General PVT Summary data

The following five PVT performance outcomes, extracted from each 3 minute test, are generally used in analyses:

- 1) Response speed defined as mean 1/RT (seconds -1) during the 3 minute testing period, variable name: **V9RRTAVG**
- 2) The mean of the reciprocal of the fastest 10% RTs (seconds -1), variable name: **V9RFMEAN**
- 3) The mean of the reciprocal of the slowest 10% RTs (seconds -1), variable name: **V9RSMEAN**
- 4) Total number of lapses (RTs \geq 500ms) subjected to Tukey transform ($\sqrt{x} + \sqrt{(x+1)}$), variable name: **V9RTLPSQ**
- 5) Total number of responses errors (responses when no stimulus was present), variable name: **V9FTF100**

Details of each of the above variables is given below

Reaction time variables for the CORRECT responses to the stimulus

The reciprocal of the reaction time measure is recommended to provide normal distribution of the variables. The non reciprocal variables for mean and standard deviation of reaction time are also present in the dataset.

Higher scores on the 1/RT, FASTEST 10%, SLOWEST 10% indicate better performance

Mean of Reciprocal RT (1/RT) (1/s) (V9RRTAVG):

Each reaction time point for the participant (during the 3 minutes of the trial) is inverted, and then the mean of this value for each person is computed for only those who had a correct response. The average is multiplied by 1000. $1000 * (\text{mean (reciprocals of RT)})$

Mean of the fastest 10% of 1/RT (1/s) (V9RFMEAN):

$1000 * (\text{mean (reciprocals of top 10\% of the fastest response)})$. The mean of the reciprocal of the fastest 10% RTs (seconds-1) for those who had a correct response to the stimulus.

Mean of the slowest 10% of 1/RT (1/s) (V9RSMEAN):

$1000 * (\text{mean (reciprocals of top 10\% of the slowest response)})$: The mean of the reciprocal of the fastest 10% RTs (seconds-1) for those who had a correct response to the stimulus.

Standard Deviation of Reaction time from correct responses by participant

These measures can be used as a measure of performance variability of the intra-individual Reaction Time of correct responses to the stimulus.

Standard Deviation of reciprocal of Reaction time (1/RT) (1/s) to correct responses to the stimulus (V9RRTSTD)

Standard Deviation of the fastest 10% of the reciprocal of reaction time (1/s) (V9RFSTD)

Standard Deviation of the slowest 10% of the reciprocal of reaction time (1/s) (V9RSSTD)

The following variables are measures of performance accuracy and indicative of reduced behavioral alertness respectively

False responses < 100 milliseconds: This is a measure of the number of responses errors < 1.7 seconds when no stimulus was present. (V9FTF100)

Number of times RT \geq 500ms: This is a measure of number of lapses. It measures the number of times the reaction time to the stimulus was greater than 8.3 seconds. (V9RTLAP5)

V9RTLAP5 has also been Tukey-transformed for normality: $\text{SQRT}(\# \text{ of times RT } \geq 500\text{ms}) + \text{SQRT}(\# \text{ of times RT } \geq 500\text{ms} + 1)$. This transformed variable name is V9RTLPSQ and should be used in all analyses

Higher scores on LAPSES, and FALSE RT indicate poorer performance.

Additional Variables for use:

Number of correct responses: This is the number of times the participant responded to the stimulus by clicking the right key based the dominant hand used for the measure. (V9GOODR)

References:

1. E. Sforza et al. Performance vigilance task and sleepiness in patients with sleep disordered Breathing. Eur Respir J 2004; 24: 279–285
2. Sylvia Loh et al. The validity of psychomotor vigilance tasks of less than 10-minute duration. Behavior Research Methods, Instruments, & Computers 2004, 36 (2), 339-346.