

User Guide

# Psychophysiological Stress Profile Protocol

This user guide has been created to educate and inform the reader about the Psychophysiological Stress Profile Protocol.

For more information about NeXus, our BioTrace+ software, please visit our website or contact us.

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## Introduction

The Psychophysiological Stress Profile Protocol User Guide provides a step-by-step review of how to use the protocol and how to exporting the data to the Stress Profile Template. This protocol and template has been developed in cooperation with Inna Khazan, PhD, BCB.

## Required equipment

Depending on the chosen setup, the following is required to perform the Psychophysiological Stress Profile Protocol:

- NeXus-10 or NeXus-32
- Skin Conductance Sensor
- Skin Conductance electrodes (Ag/AgCl)
- Temperature Sensor
- Blood Volume Pulse Sensor
- Respiration Sensor
- EXG Sensor
- Pre-gelled EMG electrodes\*

\*High quality electrodes like the Meditrace or ARBO electrodes are recommended to ensure good signal quality.

## Stress test measurement setup






*Before the actual measurement can start, the equipment has to be connected. Detailed information on setting up the NeXus can be found in the NeXus User Manual or Quick Start.*

Connect the sensors to the right NeXus inputs. Make sure the red dot of the connector is facing downward with the NeXus-4 or NeXus-10 or upward with the NeXus-32. Detailed information about sensor placement and preparation can be found in the measurement setup user guides.








Connect the EXG Ground to the Ground (Gnd) of the NeXus.

### NeXus-10

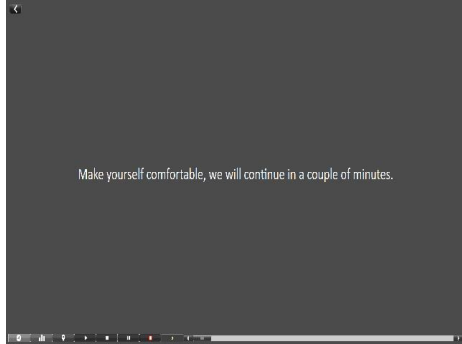
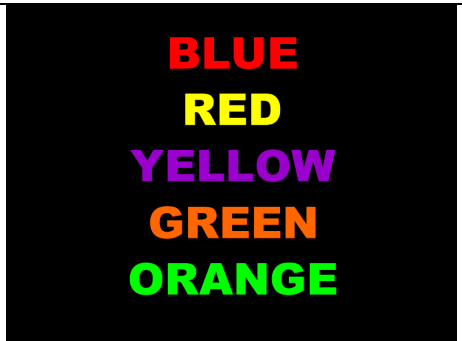
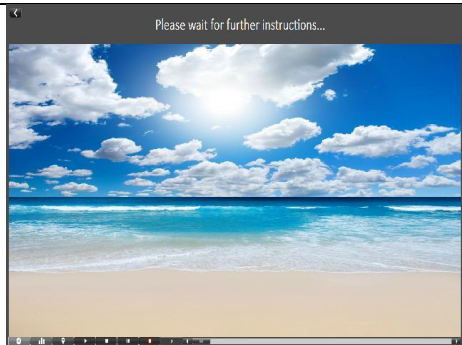
<b>C&amp;D</b>		EMG (EXG sensor)
<b>E</b>		Skin Conductance
<b>F</b>		Temperature
<b>G</b>		Blood Volume Pulse
<b>H</b>		Respiration

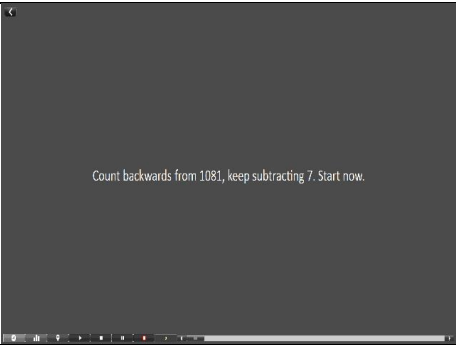

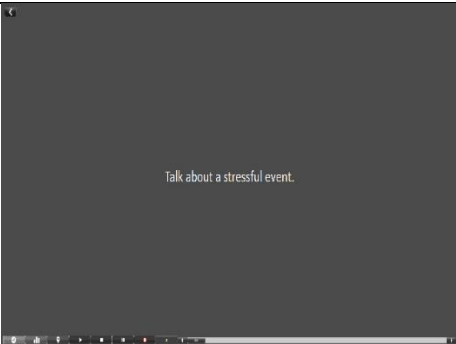
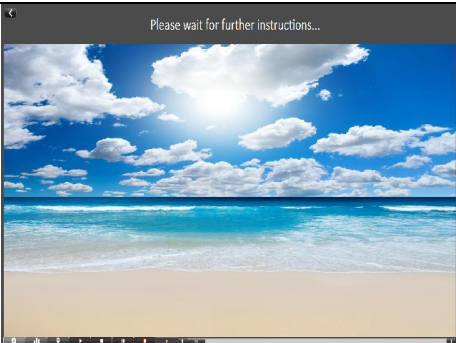
### NeXus-32


<b>27&amp;28</b>		EMG (EXG sensor)
<b>29</b>		Skin Conductance
<b>30</b>		Blood Volume Pulse
<b>31</b>		Respiration
<b>32</b>		Temperature

## Using the Psychophysiological Stress Profile Protocol

The protocol will go through the following sequence.

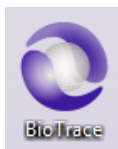
Screen	Duration	Segment	
Cue Baseline: <i>We will start of with a baseline. Wait for further instructions.</i>	5 seconds		
Baseline: <i>Make yourself comfortable, we will continue in a couple of minutes</i>	120 seconds	Baseline	
Cue Stressor Stroop: <i>Next you will see a series of words written in different colors. Please don't say the words, just name the color of each word</i>	10 seconds		
Stressor Stroop	120 seconds	Stressor	
Cue Recovery: <i>Please wait for further instructions.</i>	5 seconds		
Recovery: <i>Please wait for further instructions...</i>	120 seconds	Recovery	
Cue Stressor Math: <i>Next, you will be presented with a math test</i>	10 seconds		

Stressor Math: <i>Count backwards from 1081, keep subtracting 7. Start now.</i>	120 seconds	Stressor	
Cue Recovery: <i>Please wait for further instructions.</i>	5 seconds		
Recovery: <i>Please wait for further instructions...</i>	120 seconds	Recovery	
Cue Stressor Talk: <i>Next you will have a short conversation with your therapist</i>	10 seconds		
Stressor Talk: <i>Talk about a stressful event</i>	120 seconds	Stressor	
Cue Recovery: <i>Please wait for further instructions.</i>	5 seconds		
Recovery: <i>Please wait for further instructions...</i>	120 seconds	Recovery	

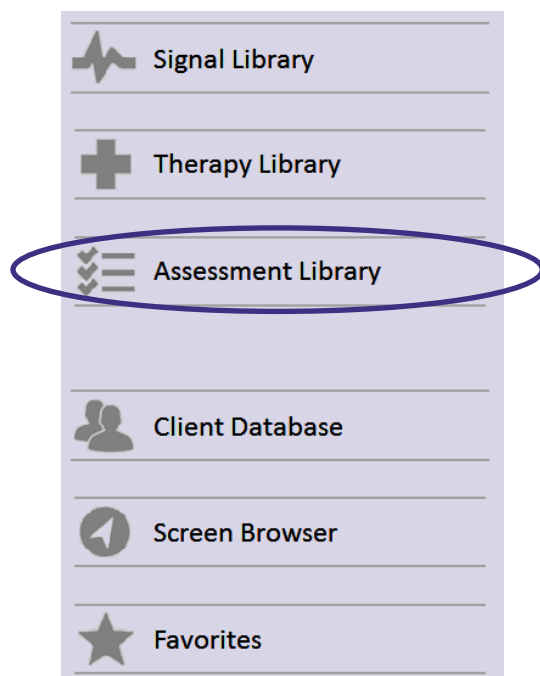
End: <i>Thank you</i>			
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Each segment will automatically be color coded in the session overview.

Open BioTrace+.



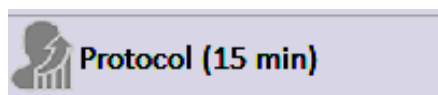
Select **Assessment Library**.



Select **Stress tests**.

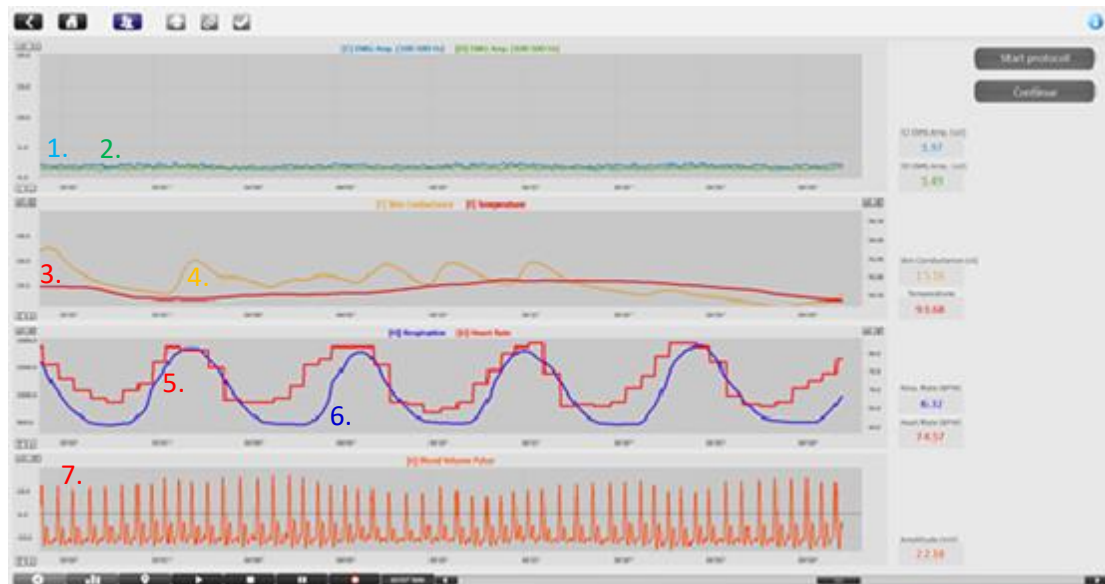


Select **Protocol (15 minutes)**.





The therapist screen will be opened.



The following is displayed in the therapist screen: EMG (1); EMG (2); Temperature (3); Skin Conductance (4); Heart Rate (5); Breathing pattern (6); Blood Volume Pulse (7).

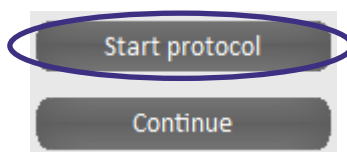
Turn on the NeXus device.


Start a recording.



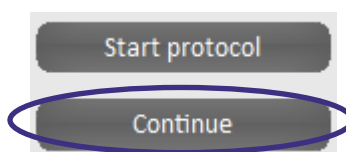
Visually inspect the recorded signal to identify and prevent artifacts.

The actual protocol is started by clicking the 'Start protocol' button in the right top corner.



A dual monitor setup is recommended. Press the Windows logo key  +P for extending display to dual monitor setup. The protocol will be opened automatically on the second monitor. When using a single monitor setup the protocol will be opened on the first screen.

Optionally use the 'Continue' button to proceed to the next screen in the protocol.



## Analysis and export to Psychophysiological Stress Profile Template

Data can be reviewed in the *Session Overview* by clicking the following button in the Session Control Bar. Statistics of the *Session Overview* can be copied to the Psychophysiological Stress Profile Template.



Right-click the *Session Overview* screen and choose 'Select channels for overview'. Make sure to select the 12 channels below and click 'OK'.

### NeXus-10:

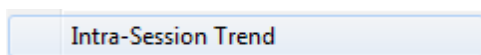
5:Sensor-E:SC/GSR  
 6:Sensor-F:Temp.  
 7:Sensor-G:BVP  
 8:Sensor-H:RSP  
 14:[C] EMG Amp. (100-500 Hz)  
 19:[D] EMG Amp. (100-500 Hz)  
 22:[G] BVP Amp.  
 23:[G] Heart Rate  
 24:[G] HRV Amp.  
 25:[G] HRV-LF Power (0,04-0,16 Hz)  
 26:[G] HRV-HF Power (0,16-0,4 Hz)  
 33:[H] Respiration Rate

### NeXus-32:

29:Sensor-E:SC/GSR  
 30:Sensor-F:BVP  
 31:Sensor-G:RSP  
 32:Sensor-H:Temp.  
 150:[27] EMG Amp. (100-500 Hz)  
 155:[28] EMG Amp. (100-500 Hz)  
 158:[30] BVP Amp.  
 159:[30] Heart Rate  
 160:[30] HRV Amp.  
 161:[30] HRV-LF Power (0,04-0,16Hz)  
 162:[30] HRV-HF Power (0,16-0,4 Hz)  
 169:[31] Respiration Rate

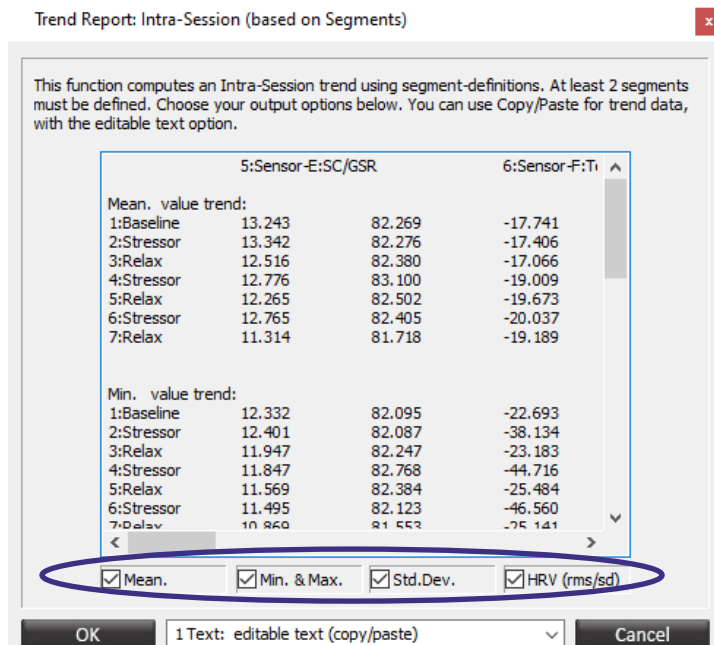
*The selected channels and the Session Overview screen can be saved by clicking 'File' > 'Save Screen' on top of your screen.*

Right-click the *Session Overview* screen and choose 'Intra-session trend'.

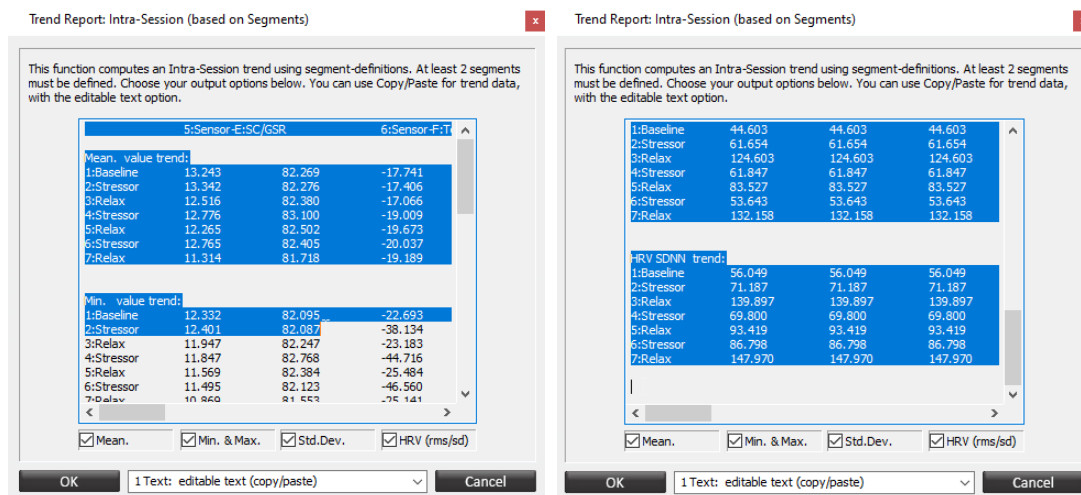


The *Trend Report* screen will appear.

Select the 'Mean', 'Min. & Max.', 'Std.Dev.' and 'HRV' output options for all statistics.

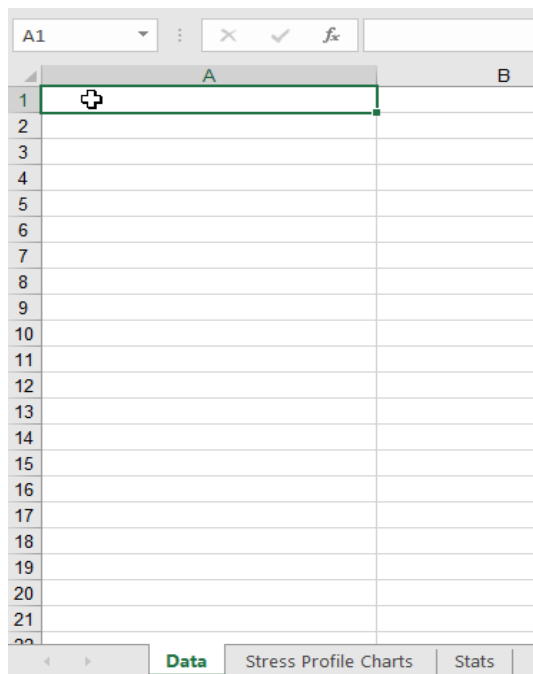


Select all data in the Trend Report by dragging the left mouse button.



Right click on the selected data and choose 'Copy'.

Open the Psychophysiological Stress Profile Template and right click on the first cell (A1) in the 'Data' tab.



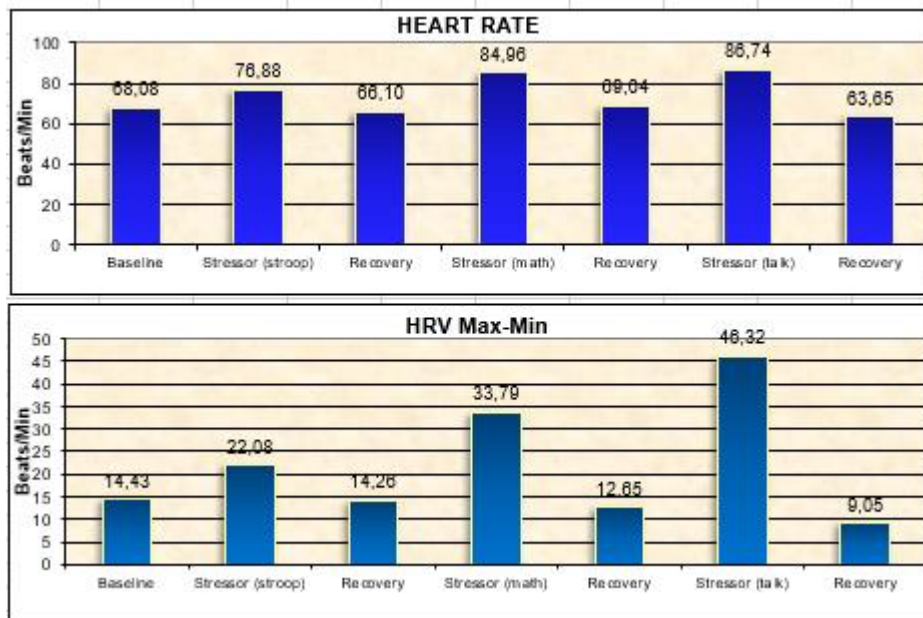
Choose 'Paste' to copy all statistics to the Psychophysiological Stress Profile Template.

	A	B	C	D
1		5:Sensor-E:SC/GSR	6:Sensor-F:Temp.	7:Sensor-G:Temp.
2				
3	Mean. value trend:			
4	1:Baseline	13.243	82.269	
5	2:Stressor	13.342	82.276	
6	3:Relax	12.516	82.380	
7	4:Stressor	12.776	83.100	
8	5:Relax	12.265	82.502	
9	6:Stressor	12.765	82.405	
10	7:Relax	11.314	81.718	
11				
12				
13	Min. value trend:			
14	1:Baseline	12.332	82.095	
15	2:Stressor	12.401	82.087	
16	3:Relax	11.947	82.247	
17	4:Stressor	11.847	82.768	
18	5:Relax	11.569	82.384	
19	6:Stressor	11.495	82.123	
20	7:Relax	10.869	81.553	
21				

The bottom navigation bar shows four tabs: 'Data' (highlighted in green), 'Stress Profile Charts', 'Stats', and a '+' icon.

Under the second tab 'Stress Profile Charts' tab, the mean statistics will be displayed in bar graphs.





Under the third tab 'Stats' the mean statistics will be displayed in tables.

	Baseline	Stressor (stroop)	Recovery	Stressor (math)	Recovery	Stressor (talk)	Recovery
<b>HR</b>							
Average	68,08	76,88	66,10	84,96	69,04	86,74	63,65
<b>SDNN</b>							
Average	71,19	139,90	69,80	93,42	86,80	147,97	56,05
<b>Breathing Rate (EPM)</b>							
Average	10,38	11,15	10,42	10,27	10,93	13,30	11,34
<b>HF</b>							
%HF	72,52	30,04	67,68	25,47	64,12	38,47	62,01
<b>LF</b>							
%LF	51,43	59,47	57,60	73,21	40,45	49,99	43,83
<b>HRV Max-Min</b>							
Average	14,43	22,08	14,26	33,79	12,65	46,32	9,05
<b>Skin Conductance</b>							
Average	13,24	13,34	12,52	12,78	12,27	12,77	11,31
<b>Temperature</b>							
Average	82,27	82,28	82,38	83,10	82,50	82,41	81,72
<b>EMG A _ Left Trap</b>							
Average	6,73	4,36	2,32	5,49	2,26	7,40	2,62
<b>EMG B _ Right Trap</b>							
Average	18,08	10,24	7,01	14,23	14,44	12,22	6,48