Address Challenges in Reproducing Electrodermal Activity (EDA) Data.

FA23 PSYCH 490.009 Final Project Presentation

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What is EDA?

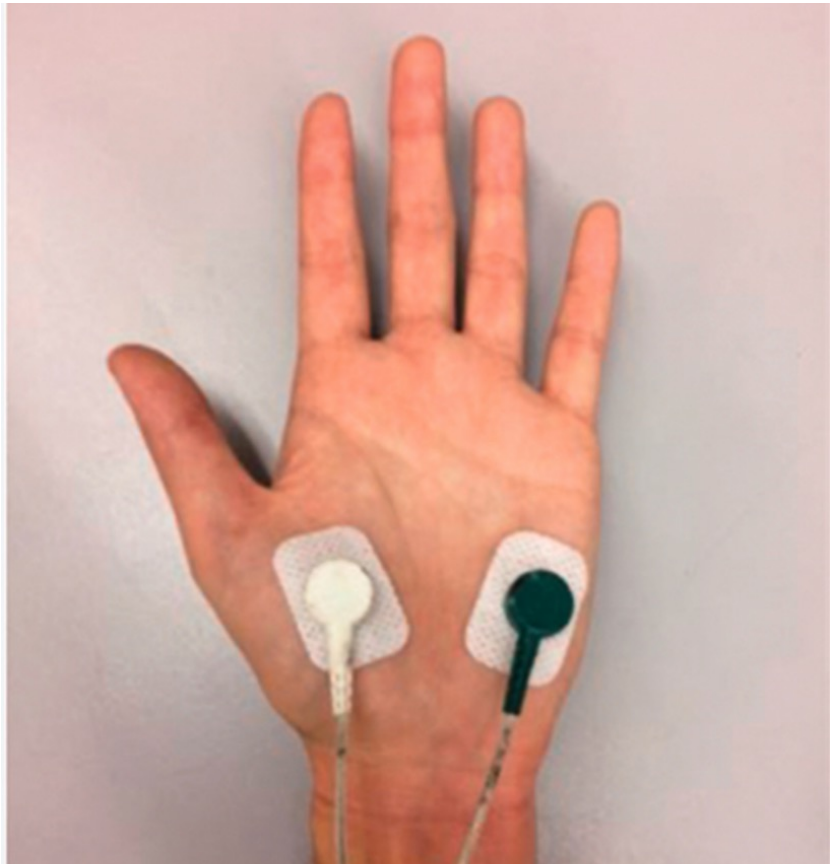
Electrodermal activity (EDA) refers to small changes in electrical activity of the skin, usually occurring 1–3s following the onset of a stimulus (Scarpa & Raine, 1997).

- Early in 19th century

- Past names: galvanic skin response (GSR), electrodermal response (EDR), psychogalvanic reflex (PGR), skin conductance response (SCR), sympathetic skin response (SSR) and skin conductance level (SCL). response (SCR), sympathetic skin response (SSR) and skin conductance level (SCL).

Mechanisms of EDA

- Input, Information Process, Output as Model
  - Stimulation -> CNS -> PNS (Autonomic) -> Sweat Gland -> Electrical Conductance
- The Sympathetic Nervous System (SNS)
  - Mobilize Body Resources to respond to stressful or challenging situations.
- Usually Coupled with Other Techniques
  - Breathe
  - Heart Rate Variability (HRV)



Who use EDA?

- Emotion Research
- Stress and Anxiety Studies
- Affective computing and interactions (My case)
- Pain Perception
- Biofeedback in PNS
- Marketing and Consumer Behavior
- Clinically: Anxiety-related Disorder/ Traumatic experience

Paradigms Example of EDA

- Trier Social Stress Test (TSST)
- Iowa Gambling Task (IGT)
- Lie Detector Tests (Polygraph Examinations) *
- Human-Computer Inyteraction
- Sleep Arousal Assessment
- Exposure Therapy

Practical Examples (TSST)

VERSION 3

JUL 04, 2023

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WORKS FOR ME 1

Inducing Psychosocial Stress in the Laboratory: A Study Protocol for the Trier Social Stress Test (TSST) V.3

DOI
dx.doi.org/10.17504/protocols.io.e6nvwj85zlmk/v3

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COMMENTS 0

BOOKMARK

RUN

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MORE

STEPS GUIDELINES WARNINGS REFERENCES FORKS METADATA MATERIALS METRICS

ABSTRACT

This protocol details about a laboratory session aiming at inducing psychosocial stress in the laboratory using the Trier Social Stress Test (TSST). During the laboratory session participants report affect and dissociative states eight times. Heart rate, electrodermal activity, and respiratory rate are assessed continuously. Blood pressure is measured eight times and eight salivary samples are taken to determine cortisol levels.

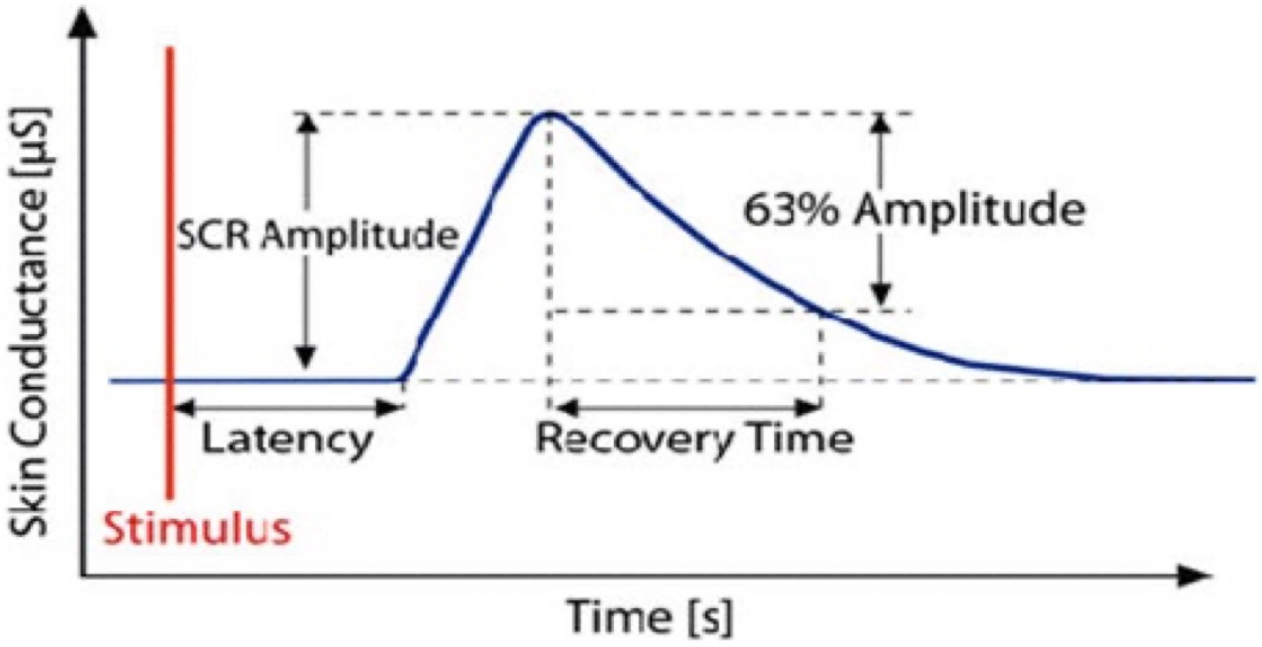
BEFORE STARTING

Participants should have at least 60 minutes resting time upon arriving at the laboratory before the laboratory session begins to stabilize physiological responses, which may vary across participants. Participants are asked to abstain from brushing or flossing their teeth, smoking, using substances, drinking alcohol or caffeinated beverages, engaging in physical exercise, and eating during this time.

Basic Property of EDA

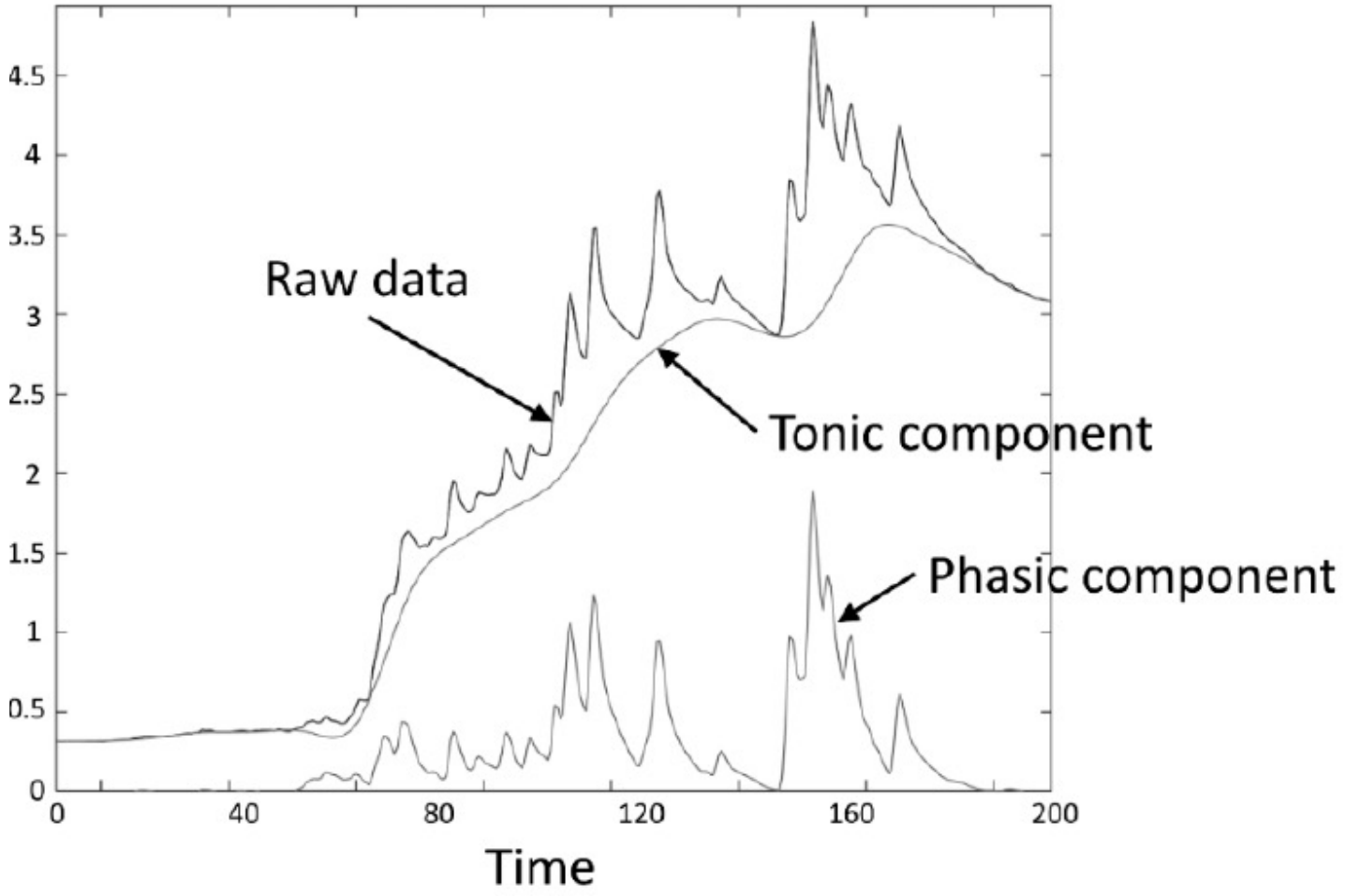
- Skin Conductance Response (SCR)
- Latency
- Amplitude

Draw from Usha Desai, Akshaya D. Shetty (2021).



Basic Property of EDA

- Tonic: Non-Specific Skin Conductance Response.
- Phasic: Event-related Skin Conductance Response.
- Draw from Posada-Quintero, H. F., & Chon, K. H. (2020).



Common Influencing factors

- Technique:
  - Electrode wear
  - Electrode material (flexible or rigid, contains gel or not)
  - Electrode size
  - Type of current (DC or AC)
  - Measured loci (number of sweat glands)
- Environment:
  - Air temperature, humidity
- Other
  - Drugs, exercise, respiration, age, water content of skin.

Laboratory Settings VS. Natural Settings

Controlled:

Technique

Environment

Water content of skin

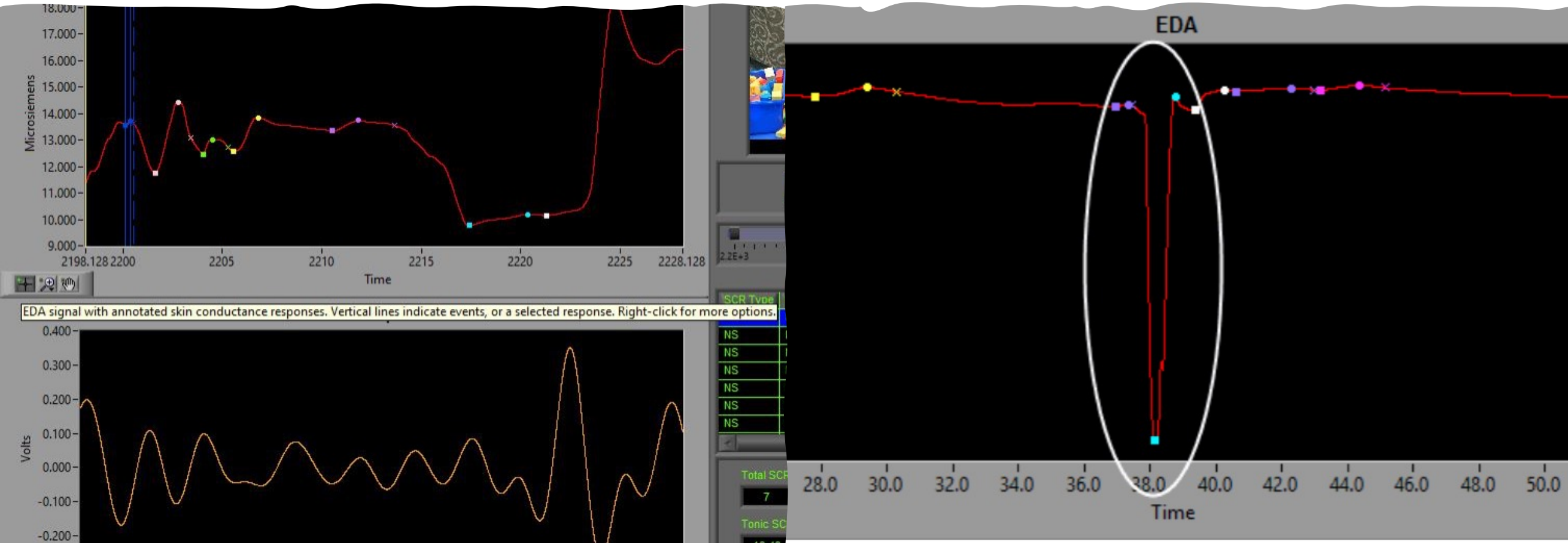
Drugs

Exercise Status

Uncontrolled:

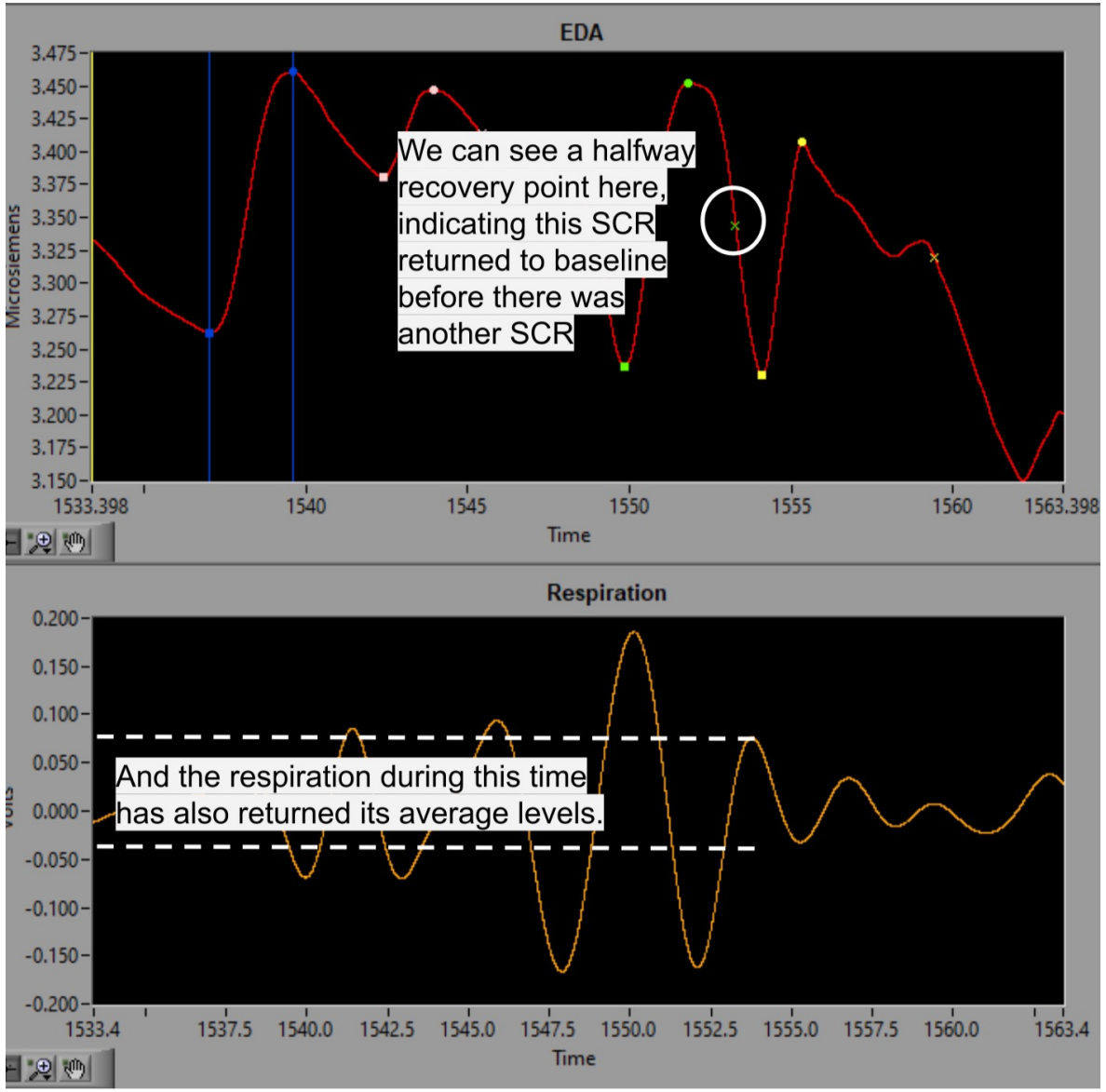
- Respiration
- Connection
- Miscellaneous
- Deleting falsely marked troughs/peaks (usually at beginning of segments)
- Participant (significantly) pressing electrode

Artifacts: Pressing on Sensor



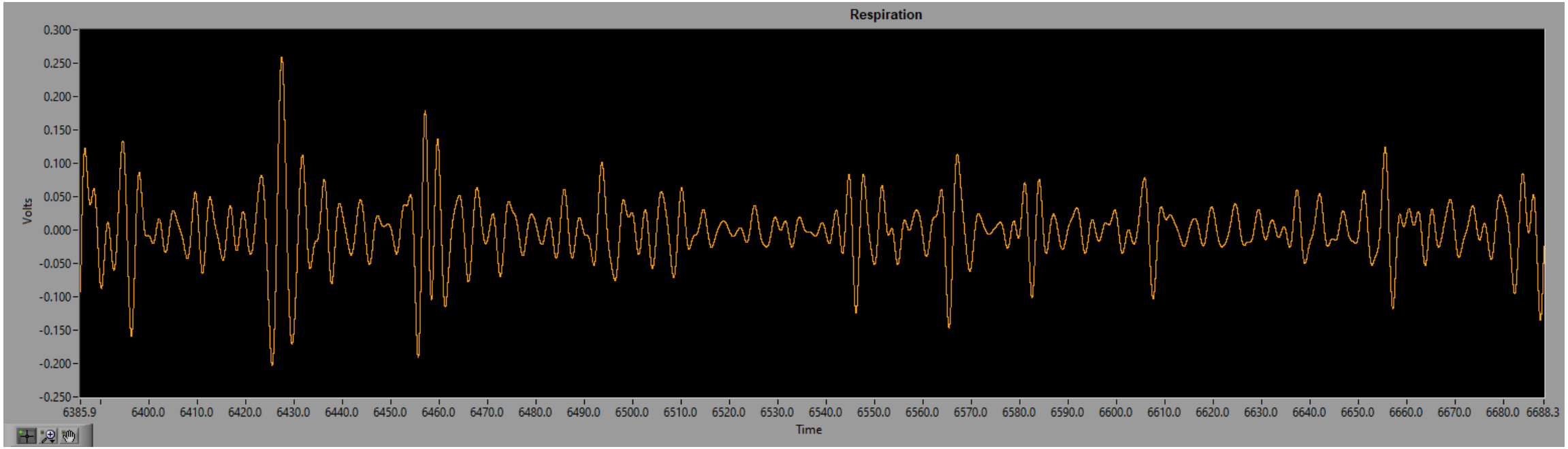
Artifacts: Respiration

- Increasing SNS activity.
- Stretch on Skin



Cognitive Bias (1)

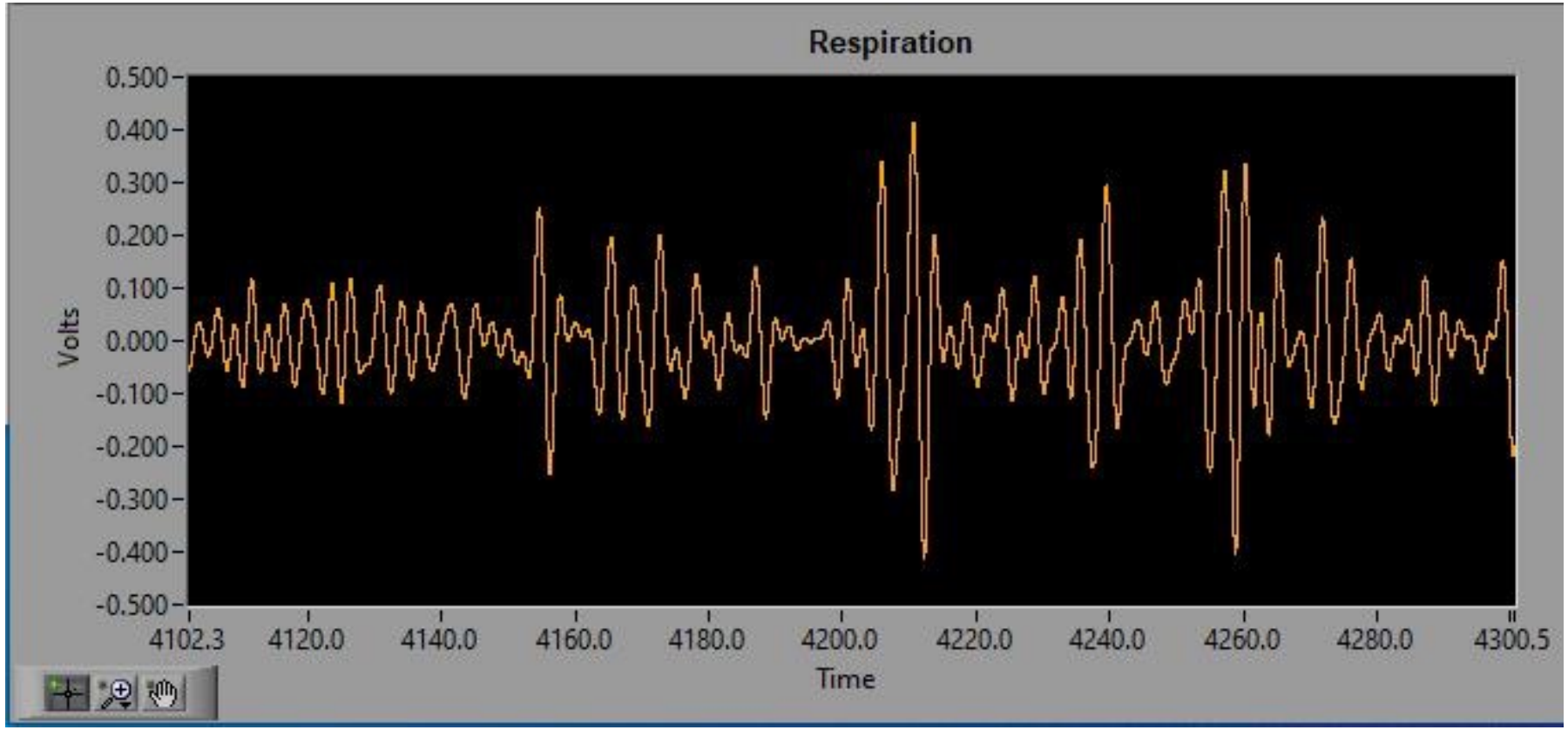
- What is the Average Respiration Rate?
  - A. 0.05 uS.
  - B. 0.1 uS.
  - C. Other

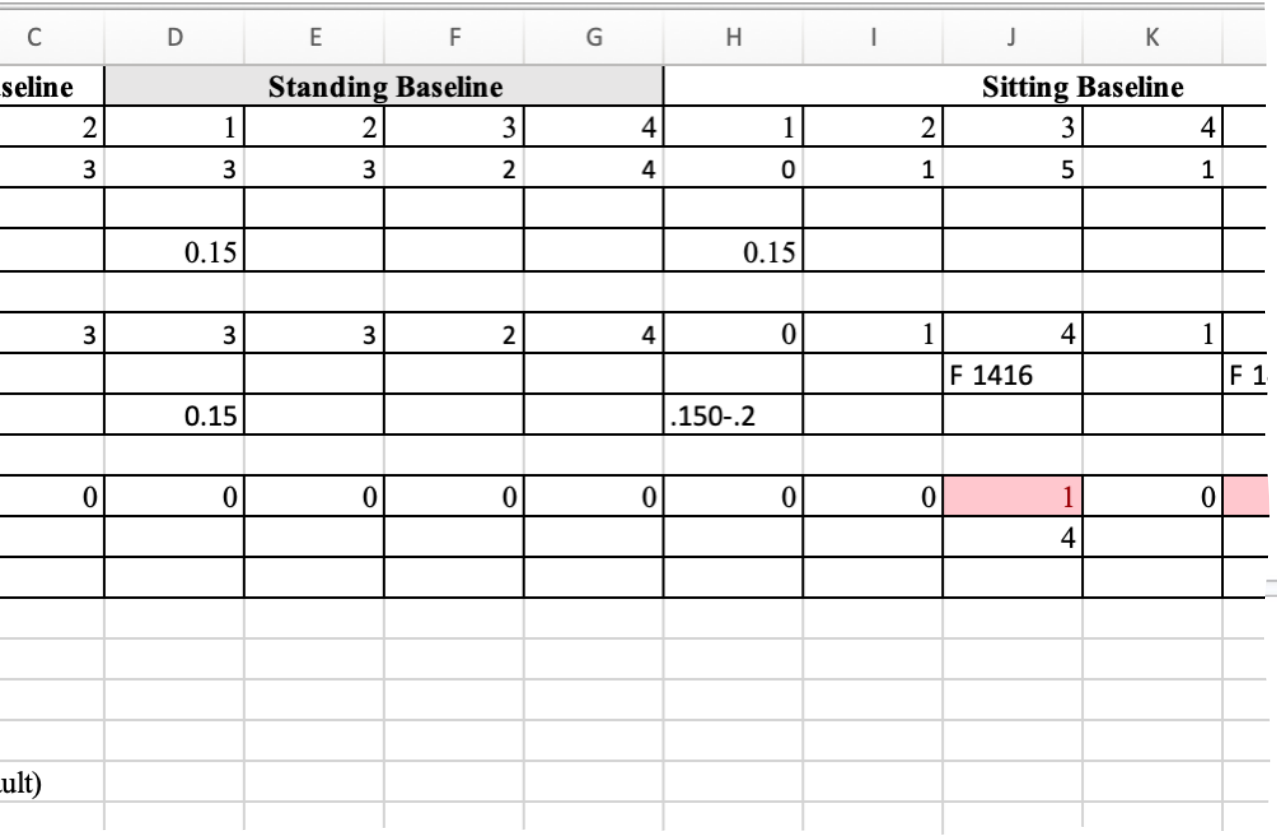


Cognitive Bias (2)

What is the Average Respiration Rate?

-Sometimes it is difficult to reach an agreement.





C	D	E	F	G	H	I	J	K	
seline	Standing Baseline				Sitting Baseline				
2	1	2	3	4	1	2	3	4	
3	3	3	2	4	0	1	5	1	
	0.15				0.15				
3	3	3	2	4	0	1	4	1	
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0	0	0	0	0	0	0	1	0	
							4		
ult)									

Editing System

There are only a few type of edits that we make, but many decision points which can cause discrepancies. Thus, we will use this system to document edits that are being made so that we can more easily review our edits with other editors.

Please use the following **Abbreviation/Coding system** for marking edits

S	Spline
R	Respiration
P	Participant (significantly) pressing electrodes

F	Deleting falsely marked troughs/peaks

Effort Towards Open Science

Many-Analyst Approach

Multiple Independent Analyses that leads to

1. Diverse Perspetives
2. Reducing Bias
3. Collaboration and Transparency

Same Raw data, but interpreted by different manuals and editors

Preliminary result in our practice: 15 of 45 files are double-edited