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

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We use this protocol and it's working

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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.

Guidelines

Detailed guidelines on the implementation and execution of the Trier Social Stress Test are available here:

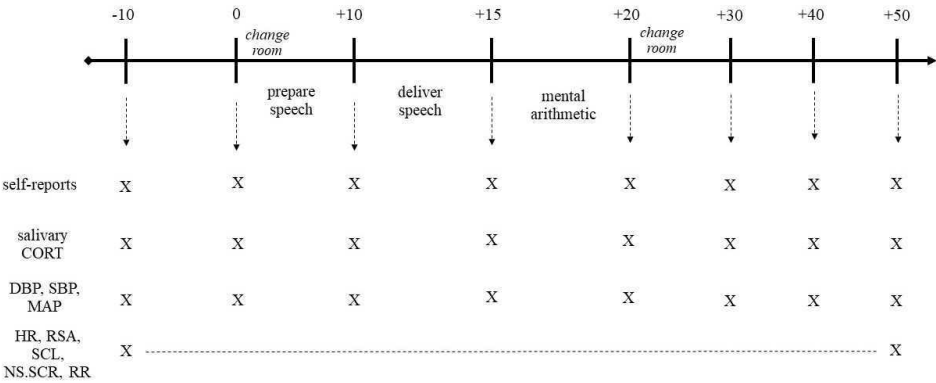
Kirschbaum, C., Pirke, K. M., & Hellhammer, D. H. (1993). The 'Trier Social Stress Test': A tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, 28(2), 76–81.

<https://doi.org/10.1159/000119004>

Linares, N. F., Charron, V., Ouimet, A. J., Labelle, P. R., & Plamondon, H. (2020). A systematic review of the Trier Social Stress Test methodology: Issues in promoting study comparison and replicable research. *Neurobiology of Stress*, 13(5), 100–235. <https://doi.org/10.1016/j.ynstr.2020.100235>

Materials

Self-report and physiological assessments during the Trier Social Stress Test (TSST) in the laboratory



Note. Room changes immediately after assessments 0 and +20. Self reports include assessments of affect and dissociation. CORT = cortisol, HR = heart rate, RSA = respiratory sinus arrhythmia (high-frequency heart rate variability), DBP = diastolic blood pressure, SBP = systolic blood pressure, MAP = mean arterial pressure, SCL = skin conductance level, NS.SCR = nonspecific skin conductance response, RR = respiratory rate. DBP, SBP, MAP, SCL, NS.SCR, and RR are assessed continuously.

This figure provides an overview of the eight distinct assessments throughout the laboratory session.

	A	B	C
	1022 - 13		
	1022		
	1009	710	411
	996	697	398
	983	684	385
	970	671	242
	957	658	229
	944	645	216
	931	632	203
	918	619	190
	905	606	177
	892	593	164
	879	580	151
	866	567	138
	853	554	125

	A	B	C
	840	541	112
	827	528	99
	814	515	86
	801	502	73
	788	489	60
	775	476	47
	762	463	34
	749	450	21
	736	437	8
	723	424	0

This list is used during the second part of the Trier Social Stress Test ("mental arithmetic task").

	1022 - 7		
	1022		
	1015	749	483 217
	1008	742	476 210
	1001	735	469 203
	994	728	462 196
	987	721	455 189
	980	714	448 182
	973	707	441 175
	966	700	434 168
	959	693	427 161
	952	686	420 154
	945	679	413 147
	938	672	406 140
	931	665	399 133

	924	658	392	126
	917	651	385	119
	910	644	378	112
	903	637	371	105
	896	630	364	98
	889	623	357	91
	882	616	350	84
	875	609	343	77
	868	602	336	70
	861	595	329	63
	854	588	322	56
	847	581	315	49
	840	574	308	42
	833	567	301	35
	826	560	294	28
	819	553	287	21
	812	546	280	14
	805	539	273	7
	798	532	266	0
	791	525	259	
	784	518	252	
	777	511	245	
	770	504	238	
	763	497	231	
	756	490	224	

This list is used during the second part of the Trier Social Stress Test ("mental arithmetic task") in cases where the participant has substantial arithmetic difficulties.



Most Important Prompts.docx

This document lists the most important prompts for the Trier Social Stress Test (in German).

Safety warnings

- ! The Trier Social Stress Test is known to produce a moderate stress response in most participants including temporary increases in negative affective states and physiological reactivity. In participants with a history of trauma, the Trier Social Stress Test may result in temporary increased levels of dissociative states.

Before start

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.

Before the TSST

- 1 Before the TSST, the investigator shows and explains to the subject the devices for the assessment of heart rate (Vivalink ECG Patch), electrodermal activity (Empatica Smartwatch), and blood pressure (iHealth BP Cuff). The subject is instructed to put the devices on. The investigator makes sure that the devices are functioning as intended and that data transmission is running.
- 2 It is explained to the participant that saliva samples will be taken during the laboratory session and that the samples will be used to measure cortisol levels.
- 3 The investigator then instructs the participant to use the m-path experience sampling application on the participant's smartphone to enroll in a survey repeatedly assessing affective and dissociative states. The participant is informed that the accuracy of the information is very important for the research project, and that questions are to be answered as it is in the current moment.
- 4 Measurement (-10). Assessment of affective and dissociative states via m-path application. The investigator instructs the participant to sit down and take a saliva sample (product: Sarstedt Salivette Cortisol). Meanwhile, first blood pressure measurement in sitting position on the non-dominant arm.

10m

 00:10:00 before next measurement

- 5 Measurement (0). Assessment of affective and dissociative states via m-path application. The investigator instructs the participant to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.



TSST - Prepare Speech

18m 15s

- 6 The investigator brings the participant to a separate room. One female and one male (active and passive stressors) already sit in the room. They are instructed to maintain serious mood, not to speak, laugh or the like, possibly answer the greeting of the subject with a curt "hello", and not to avoid eye contact.
- 7 The investigator reads the following instructions to the participant:
Your task now is to give a speech to this committee for an application. You're about to have 5 minutes here to prepare for this speech. You can take notes on this, but you must not use them during the speech. Imagine that you have applied for a job that fits your previous career and that you have been invited to interview there, or that you are applying for a promotion that means more money, more responsibility and more

interesting tasks for you. You are expected to give a free speech. You are required to explain to the committee in 5 minutes why you believe you are the best candidate for this position. To do this, stand behind the microphone after your preparation time so that your voice is recorded. Note that you will also be recorded by the camera. The devices are used for later voice and behavior analysis. Committee members are trained in behavioral observation and will take notes during the speech. Don't be alarmed by this. You should try to make the best impression possible and embody the applicant's role as best you can during the speech. The committee reserves the right to ask further questions if any ambiguity arises. After your speech, which should last five minutes, the committee will give you a second task, which will also be explained by the committee. This will again take 5 minutes. Do you have any questions?

- 8 The investigator, the active, and the passive stressor leave the room.

5m

 00:05:00 prepare speech

- 9 The active and passive stressor enter the room and sit down.



Active stressor: **"Your preparation time is over. Please pause and take the next measurement"**

Measurement (+10). Assessment of affective and dissociative states via m-path application. The participant is instructed to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.

TSST - Deliver Speech

18m 15s

- 10 Active stressor: **"Now come forward. (Pause) Stand behind the microphone on the floor marker (cross) and begin your presentation when the recording equipment is turned on."**

5m

Passive stressor: turn on camera / recorder, start stopwatch.

Active stressor: **"Please start your presentation now."**

 00:05:00 deliver speech

- 10.1 During the presentation, the active and passive stressors are instructed to seek and maintain eye contact with the subject, alternate taking notes and looking up to the subject, remain silent for at least 15 seconds during pauses in the subject's speech, not to respond to questions from the subject, but point to the task and that everything else will be clarified after the test, let the subject speak freely for as long as possible, and to

make sure that the subject talks about her personality, and does not present professional qualifications or the like.

10.2 If necessary, the active stressor intervenes:

"We already have your resume/credentials, please continue to tell us about your personal attributes."

"Please talk about your negative qualities".

10.3 After 3 minutes the active stressor may ask:

"Why do you think you, of all people, are particularly suited for this ...?"

"Why are you more suitable than other applicants?"

"What qualities of yours tend to make you unsuitable for the job?"

"What leadership qualities do you possess?"

"Describe for us any other ... , that you have done or could do."

"How do you feel about teamwork?"

"Where do you see your position on a team?"

"Think about your last failure. How did you handle it?"

If these questions are too difficult, the active stressor may ask:

"Explain how your hobbies relate to"

"What other interests do you have?"

"Describe for us a normal day in your life."

"Explain why it is important for you to perform."

"What do you think of the statement: 'A bird in the hand is worth two in the bush'?"

"Do you consider yourself a person who cares about his independence?"

"Do you think it's important to develop throughout your life?"

"How do you feel about friends?"

10.4 The minimum speaking time is 3 minutes. The active and passive stressors are instructed to ignore objections. If necessary, the active stressor will repeatedly ask the participant to continue speaking.

"You still have time. Go ahead."

"Your speech time is not over yet."

11 After 5 minutes, the active stressor says: **"That should be enough here for now. We will explain the second task to you in a moment."**

12 Active stressor: **"Please pause and take the next measurement"**



Measurement (+15). Assessment of affective and dissociative states via m-path application. The participant is instructed to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.

TSST - Arithmetic Task

18m 15s

- 13 Active stressor: **"We will now explain the second task to you. This is an arithmetic task. You are to calculate backwards to zero in steps of 13 as quickly and correctly as possible. You will start at 1022. If you miscalculate, we will point this out to you and you will start again at 1022. Do you have any more questions? Please start now."**

5m

Passive stressor: restart stopwatch.

 00:05:00 arithmetic task

- 13.1 If the participant miscalculates:

Active stressor: **"Stop. 1022."**

Active stressor: **"Error. 1022."**

- 13.2 The minimum speaking time is 5 minutes. The active and passive stressors are instructed to ignore objections. If necessary, the active stressor will repeatedly ask the participant to continue or restart the task.

Active stressor: **"Start over at 1022."**

- 13.3 If the participants looks at the ceiling or elsewhere in the room:

Active stressor: **"Look at the camera, please!"**

(when asked, say that looking to the camera is necessary for sufficient video recording)

- 13.4 If the participants speaks quietly:

Active stressor: **"Please speak up!"**

(when asked, say that speaking loudly is necessary for sufficient audio recording)

- 13.5 In case of severe arithmetic difficulties, reinforcement by affirmative nodding. If necessary the task will be modified:

Active stressor: **"We'll change the task a little bit. Now calculate backwards in steps of 7. Start again at 1022."**

If this still is too difficult, ask to add 7s.

- 14 After 5 minutes, the active stressor says: **"Thank you very much. The interview is now over. Please take a seat and wait for the interviewer."**

Passive stressor: Switch off audio and video recorders.

15 Active stressor: "Please pause and take the next measurement"

10m

Measurement (+20). Assessment of affective and dissociative states via m-path application. The participant is instructed to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.

The committee leaves the room and the investigator enters the room.

 00:10:00 before next measurement**After the TSST**

18m 15s

16 The investigator brings the participant to a separate room.

17 The investigator instructs the participant: **"Please take the next measurement"**

10m

Measurement (+30). Assessment of affective and dissociative states via m-path application. The investigator instructs the participant to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.

 00:10:00 before next measurement

18 The investigator instructs the participant: **"Please take the next measurement"**

10m

Measurement (+40). Assessment of affective and dissociative states via m-path application. The investigator instructs the participant to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.

 00:10:00 before next measurement

19 The investigator instructs the participant: **"Please take the last measurement"**



Measurement (+50). Assessment of affective and dissociative states via m-path application. The investigator instructs the participant to take a saliva sample (product: Sarstedt Salivette Cortisol). Blood pressure measurement in sitting position on the non-dominant arm.