SPREMNI DOPIS

Kontaktni podatki vlagatelja z nazivom:

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Naslov raziskave:

SLO: ***Učinki vročinskega vala na zdravje in produktivnost delavcev***
ANG: Effects of a heat-wave on workers' health and productivity

Šifra raziskave:

ARRS temeljni podoktorski projekt: Z7-9412 (vodja: dr. Urša Ciuha)

Opredelitev raziskave:

Raziskovalni projekt

Plačnik raziskave:

Raziskava se izvaja v okviru ARRS raziskovalnega programa P2-0076 in Obzorje 2020 projekta Heat Shield (št. 284438)

Ime raziskovalca, odgovornega za varnost oseb v raziskavi:

Prof. dr. Polona Jaki Mekjavic, dr. med.

Seznam priloženih dokumentov: (list of attached documents/ table of contents)

1. KRATEK ŽIVLJENJEPIS RAZISKOVALCA
2. NAČRT RAZISKAVE
3. INFORMACIJA O DENARNEM NADOMESTILU
4. OPIS SKRBI ZA VARNOST IN KORISTI V RAZISKAVO VKLJUČENIH LJUDI
5. PRIKAZ STROŠKOV RAZISKAVE
6. POVZETEK NAČRTA RAZISKAVE
7. POJASNILA O RAZISKAVI
8. OBRAZEC IZJAVE O ZAVESTNI IN SVOBODNI PRIVOLITVI OSEBE V RAZISKAVI
9. IZJAVA PREDLAGATELJA ALI ODGOVORNE OSEBE
10. IZJAVA VODSTVA
11. IZJAVA STROKOVNEGA PREDSTOJNIKA

Podpis vlagatelja: 

Ljubljana, August 24, 2020

3. Kratek življenjepis raziskovalca

ABOUT ME

Leonidas G. Ioannou is an environmental exercise physiologist. He is a postdoctoral assistant at Jožef Stefan Institute and his research focuses on the effects of different environmental factors on human health and performance. During the last five years he participated in several European and international funded projects where he had the opportunity to collect physiological data across many countries around the globe, leading to the development of national and international legislations. Furthermore, he previously collaborated with prestigious organizations, including the World Health Organization and the International Labour Organization, on projects aiming to enhance human health and wellbeing.

SOCIAL MEDIA

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WORK

May 2015 – Dec 2015 — **Researcher**
CETRI Ltd, Cyprus
- Environmental exercise physiology

Oct 2016 – May 2017 — **Researcher**
Biomechanical Solutions, Greece
- Environmental exercise physiology

Apr 2016 – Mar 2017 — **Researcher**
University of Porto, Portugal
- Development of a smart helmet for cyclists

Jan 2017 – May 2018 — **Researcher**
CETRI Ltd, Cyprus
- Environmental exercise physiology

June 2018 – Jan 2020 — **Researcher**
University of Thessaly, Greece
- Environmental exercise physiology

EDUCATION

Sep 2010 – Jun 2014 — **BSc in Physical Education & Sport Science**
University of Thessaly, Greece
- Maximazing human performance

Sep 2014 – Feb 2016 — **MSc in Exersice and Health**
University of Thessaly, Greece
- Human physiology in extreme environmental conditions

Feb 2016 – Jan 2020 — **PhD studies**
University of Thessaly, Greece
- Effects of heat on behavioral and physiological mechanisms of the human thermoregulatory system during rest, exercise, and work.

Nov 2016 – Jan 2020 — **PhD studies**
University of Copenhagen, Denmark
- Effects of heat on behavioral and physiological mechanisms of the human thermoregulatory system during rest, exercise, and work.

Feb 2020 – Present — **Postdoctoral studies**
Jožef Stefan Institute, Slovenia
- Environmental exercise physiology

COLLABORATION WITH INTERNATIONAL ORGANIZATIONS

1. December, 2018 - Present: Collaborate with World Health Organization on a systematic review on the prevalence of occupational exposure to ultraviolet radiation.
2. April, 2019: Desk review of research on heat stress. International Labour Organization; United Nations (Contract Number: 40255529 / 0).
3. June, 2019 – September, 2019: Field research to test and strengthen heat stress mitigation strategies. International Labour Organization; United Nations (Contract Number: 40262271 / 1).

INVITED TALKS

1. Ioannou L.G., Take a Break – Planned vs Irregular Breaks, 7th International Conference on the Physiology and Pharmacology of Temperature Regulation, 7-12/10/2018, Split, Croatia.

INVITED CHAIR

1. Firefighters: The 17th International Conference on Environmental Ergonomics, 12-18 November 2017, Kobe, Japan.
2. Heat exposure: International Conference on Environmental Ergonomics, 7-12 July 2019, Amsterdam, Netherland.

SYMPOSIUM

1. Flouris A.D., **Ioannou L.G.**, Notley S., Kenny G., Nybo L. (2019). Inter-individual factors and screening criteria for occupational heat strain, International Conference on Environmental Ergonomics, July 7-12, Amsterdam, Netherland; p: 122.
2. Notley S., Flouris A.D., **Ioannou L.G.**, Nybo L., Kenny G. (2019). Interactive effects of aging and other individual factors on occupational heat strain, International Conference on Environmental Ergonomics, July 7-12, Amsterdam, Netherland; p: 124.
3. **Ioannou L.G.**, Notley S., Kenny G., Nybo L., Flouris A.D. (2019). How well do thermal Indices Quantify the Magnitude of Occupational Heat Strain?, International Conference on Environmental Ergonomics, July 7-12, Amsterdam, Netherland; p: 123.
4. Kenny G., Flouris A.D., **Ioannou L.G.**, Nybo L., Notley S. (2019) Managing occupational heat stress in a diverse working population, International Conference on Environmental Ergonomics, July 7-12, Amsterdam, Netherland; p: 121.

TECHNICAL REPORTS

1. Flouris A.D., Tsoutsoubi L., **Ioannou L.G.**, Vliora M., Dallas C.N., Mantzios K., Gkiata P., Nintou E., Amorim T., Sdraka D., Nybo L., D3.1: Report on solutions to mitigate heat stress of tourism sector workers, European Union, HEAT-SHIELD (No 668786), Ref. Ares(2018) 5588919 - 31/10/2018.
2. Mekjavic I.B., Gliha M., Tobita K., Stefan U.C.J., Kajfež-Bogataj L., Pogačar T., Nybo L., Piil J.F., Morris N., Flouris A.D., **Ioannou L.G.**, D3.3: Report on solutions to mitigate heat stress for workers of the manufacturing sector, European Union, HEAT-SHIELD (No 668786), Ref. Ares(2018)5587494 - 31/10/2018.
3. Flouris A.D., **Ioannou L.G.**, Mayor S.T., Hernandez R.C.S., D3.5: Report on solutions to mitigate heat stress of construction sector workers, European Union, HEAT-SHIELD (No 668786), Ref. Ares(2018)5592109 – 31/10/2018.
4. Morris N.B., Kjellstrom T., **Ioannou L.G.**, Gao C., Morabito M., Messeri A., Levi M., Baldasseroni A., Havenith G., Foster J., Smallcombe J., Nybo L., Flouris A.D., D3.6: Report on solutions to mitigate heat stress for workers of the agricultural sector, European Union, HEAT-SHIELD (No 668786), Ref. Ares(2018)5592539 - 31/10/2018.

1. manufacturing, transport and tourism), European Union, HEAT-SHIELD (No 6687786), Ref. Ares(2019)1383153 – 28/02/2019.
2. Flouris A.D. & **Ioannou L.G.** (2019). A review of global research on occupational heat stress and mitigation strategies: Considerations for Qatar. Technical Report FL/2019/04 for the Int. Labour Organization.

PEER REVIEWED PAPERS

1. Tsoutsoubi L., Loules G., **Ioannou L.G.**, Paschalis S., Kokaridas D., Patsiaouras A. (2014). Assessment of student altitudes to the integration of students with disabilities: a case study. PEPFA
2. **Ioannou L.G.**, Patsiaouras A., Tsoutsoubi L., Karakatsani A., Soulas D. (2014). Comparing the Coach-Athlete Relationship between Greece and Cyprus. Inquiries in Sport & Physical Education.
3. Amorim T., **Ioannou L.G.**, Spapi F., Flouris A.D. (2017). Association between Extreme Cold Weather Temperatures and Mortality in Greece. J Geriatr Med Gerontol 3:029. DOI: *10.23937/2469-5858/1510029*
4. **Ioannou L.G.**, Tsoutsoubi L., Samoutis G., Bogataj LK., Kenny G.P., Nybo L., Kjellstrom T., Flouris A.D. (2017). Time-motion analysis as a novel approach for evaluating the impact of environmental heat exposure on labor loss in agriculture workers. Temperature, 4:3, 330-340, DOI: *10.1080/23328940.2017.1338210*
5. **Ioannou L.G.**, Tsoutsoubi L., Amorim T., Samoutis G., Flouris A.D. (2018). Links between Night- Time Thermoneutral Zone and Mortality from Circulatory Causes in the Elderly Population of Cyprus. J Geriatr Med Gerontol 4:040, DOI: *10.23937/2469-5858/1510040*
6. **Ioannou L.G.**, Tsoutsoubi L., Nybo L.; Tsianos G.I., Flouris A.D. (2018). Habitual Heat Exposure and Acclimatization Associated with Athletic Performance in the Multistage Marathon des Sables. Journal of Human Performance in Extreme Environments, 14:01, DOI: *10.7771/2327-2937.1107*
7. Flouris A.D., McGinn R., Poirier M.P., Louie J.C., **Ioannou L.G.**, Tsoutsoubi L., Sigal R.J., Boulay P., Hardcastle S.G., Kenny G.P. (2018). Screening criteria for increased susceptibility to heat stress during work or leisure in hot environments in healthy individuals aged 31–70 years. Temperature, 5:1, 86-99, DOI: *10.1080/23328940.2017.1381800*
8. Tsoutsoubi L., **Ioannou L.G.**, Amorim T., Tsianos G.I., Flouris A.D. (2018). Effects of Aging on Performance during the Marathon Des Sables: Focus on Athletes Aged 53-80 Years. J Geriatr Med Gerontol 4:045, DOI: *10.23937/2469-5858/1510045*
9. Piil J.F., Lundbye-Jensen J., Christiansen L., **Ioannou L.G.**, Tsoutsoubi L., Dallas C.N., Mantztios K., Flouris A.D., Nybo L. (2018). High prevalence of hypohydration in occupations with heat stress—Perspectives for performance in combined cognitive and motor tasks. PLoS ONE, 13(10): e0205321, DOI: *10.1371/journal.pone.0205321*
10. Flouris A.D., Dinas P.C., **Ioannou L.G.**, Nybo L., Havenith G., Kenny G.P., Kjellstrom T. (2018). Workers' health and productivity under occupational heat strain: a systematic review and meta-analysis. The Lancet Planetary Health, 2:12, e509-e547, DOI: *10.1016/S2542-5196(18)30237-7*
11. **Ioannou L.G.**, Tsoutsoubi L., Mantzios K., Flouris A.D. (2019). A free software to predict heat strain according to the ISO 7933: 2018. Industrial health, 57, 711-720, DOI: *10.2486/indhealth.2018-0216*
12. Piil J.F., Christiansen L., Morris N.B., Mikkelsen C.J., **Ioannou L.G.**, Flouris A.D., Lundbye-Jensen J., Nybo L. (2020). Direct exposure of the head to solar heat radiation impairs motor-cognitive performance. Scientific Reports, 10:1, 1-10, DOI: *10.1038/s41598-020-64768-w*
13. Dinas P.C., Krase A., Nintou E., Georgakopoulos A., Granzotto M., Metaxas M., Karachaliou E., Rossato M., Vettor R., Georgoulias P., Mayor T.S., Koutsikos J., Athanasiou K., **Ioannou L.G.**, Gkiata P., Carrillo A.E., Koutedakis Y., Metsios G.S., Jamurtas A.Z., Chatziioannou S., Flouris A.D. (2020). Human white-fat thermogenesis:

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA FINANCE

UPRAVA REPUBLIKE SLOVENIJE ZA JAVNA PLAČILA

POTRDILO O BREMENITVI PODRAČUNA

Naziv polja	
RRN povezovalna referenca	
Referenčna oznaka BS	
Poravnalni sistem	
Datum izvršitve naloga	02.09.2020
Čas izvršitve naloga	11:34:41

Znesek nakazila in valuta	400,00 EUR
Znesek nakazila in originalna valuta	400,00 EUR
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Referenca v dobro	11 27111-7141009-33470236
Namen plačila	PRISTOJBINA LEONIDAS IOANNOU
Vrsta stroškov	

*Podatek o upravičencu je navedel proračunski uporabnik

POTRDILO O BREMENITVI PODRAČUNA je izpisano iz spletne aplikacije UJPnet, 02.09.2020 14:04

REPUBLIKA SLOVENIJA * URAD UJP * UPRAVA REPUBLIKE SLOVENIJE ZA JAVNA PLAČILA * MINISTRSTVO ZA FINANCE

Podpis odgovorne osebe UJP:

mag. Aleksandra Miklavčič
generalna direktorica

Abstract in Slovene

Uvod: Podnebne spremembe in vedno višje temperature bodo poslabšale pogoje na delovnem mestu za več milijard delavcev. Številne prestižne organizacije, vključno s Svetovno zdravstveno organizacijo (WHO), so pred kratkim sprožile pobudo, katere cilj je identificirati najboljše razpoložljive prakse ter poiskati rešitev za ublažitev vročinskega stresa na delovnem mestu. Čeprav je to nedvomno korak v pravo smer, trenutno ne obstaja še nobena študija, ki bi preučila dolgoročni vpliv toplotnih valov na psihofizični napor, ki ga delavci izkusijo med in po izpostavitvi vročinskemu stresu na delovnem mestu.

Namen raziskave: Pričujoča študija bo preučila učinke vročinskega vala na psihofizični napor, ki so mu delavci izpostavljeni med in po vročinskem valu. Cilj raziskave je izboljšanje zdravstvenega stanja delavcev ter ohranitev delovne zmogljivosti in produktivnosti, kljub predvideni povišani pogostosti vročinskih valov, ki bodo nastali kot posledica podnebnih sprememb.

Metode: Študija bo potekala v Olimpijskem športnem centru Planica (Rateče, Slovenija), v njej pa bo sodelovalo 10 zdravih moških preiskovancev. Celotna študija bo trajala 10 dni, razdeljena pa bo na 4 dele: spoznavni dan, 3 dni pred vročinskim valom, 3 dni simuliranega vročinskega vala ter 3 dni po vročinskem valu. Prvi dan bodo preiskovanci prispeli v Planico, se namestili po sobah ter se seznanili z opremo. Okolje tri dni pred in tri dni po simuliranem vročinskem valu bo termonevtralno (18,7 do 23,9 °C), v treh dneh simuliranega vročinskega vala pa bodo preiskovanci izpostavljeni povišanemu vročinskemu stresu (26,0 do 34,7 °C). Preiskovanci bodo vsak dan opravili simulirano osemurno delovno izmeno (dve uri nizkointenzivnega dela in še šest ur simuliranega dela na računalniku). Temu bo sledil osemurni počitek ter osemurni spanec. Preiskovanci bodo čez dan opravili več različnih kognitivnih, fizičnih, fizioloških in delovnih testov. Sprememba telesne sestave in hidracijskega stanja bo ocenjena na podlagi antropometričnih meritev ter vzorca krvi, ki bodo opravljeni pred in po študiji. Psihološki parametri bodo ocenjeni večkrat na dan z uporabo subjektivnih lestvic.

Background

Currently, nearly one-third of the world's population is regularly exposed to climate conditions that exceed human thermoregulatory capacity leading to major increases in morbidity and mortality(*1-3*). Even if aggressive heat mitigation measures are adopted, one-half of the world's population will be exposed to such conditions by 2100 (*1*) and a number of studies report that the resulting occupational heat strain (OH-strain) will directly threaten workers' health, with corollary negative impacts on productivity, poverty, and socio-economic inequality (*4-7*). The OH-strain refers to physiological consequences of occupational heat stress (OH-stress) and it massively influences the ability to live healthy and productive lives, as nearly one million "work life years" will be lost by 2030 due to occupational heat stroke fatalities, and 70 million "work life years" will be lost due to reduced labour productivity (*8, 9*). Although these figures might seem extreme, it is beyond any doubt that occupational fatalities are more likely to occur during work under high OH-stress (*10*). For this reason, warning systems for high heat stress have been recently piloted in some countries (*11*), but they are designed for the general population without taking into account for interindividual differences and the metabolic demands required in occupational settings. This, of course, is of great importance since recent studies identified that people who perform manual tasks are characterized by different susceptibility to heat stress (*12*), and this may lead to increased cardiovascular and respiratory mortality (*13*).

Considering that climate change will aggravate the workplace conditions for billions of workers (*1*), initiatives to mitigate OH-strain have been recently launched by, among others, the World Health Organization (*14*), the World Meteorological Association, and the European Commission (www.heat-shield.eu) (*15*) aiming to develop solutions and identify the best practices available. Although, this is undoubtedly a step in the right direction, there are no studies investigating the impact of heat waves on the psychophysical strain experienced by workers during and after their exposure to OH-stress. Therefore, **the current study will examine the effects of a heat-wave on the psychophysical strain experienced by workers during and after their exposure to a heat wave**, aiming to improve their health and to preserve their labor capacity and productivity despite the projected climate-change-induced increased frequency of heat waves.

Health history questionnaire

Methods

Participants

The study involves monitoring ten healthy individuals during a ten-day experiment (Fig 1). The criteria for participation in the study will be, (i) subjectively healthy, (ii) blood pressure within normal range, (iii) not being pregnant, (iv) not using beta blockers, diuretics or prescribed medicine against musculoskeletal disorders or anxiety/depression, (v) being acclimatized in temperate environment. Prior to their participation in the study, all volunteers will be tested for Covid-19 if they meet the governmental criteria for testing (see attached questionnaire at the end of this section). Thereafter, written informed consent will be obtained from all volunteers after detailed explanation of all the procedures involved.

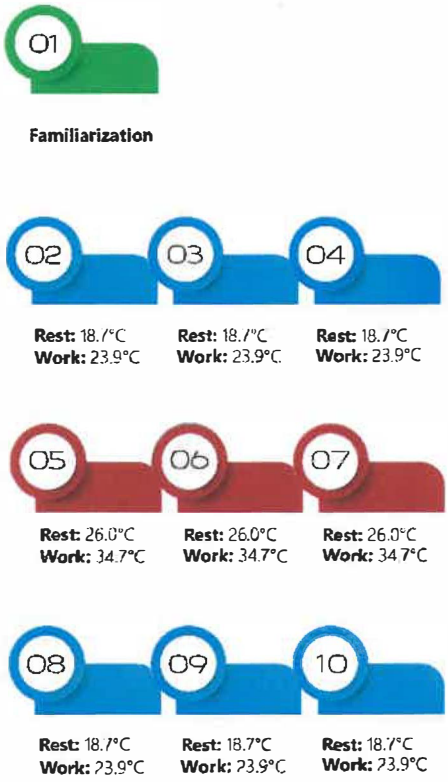


Figure 1 | *Timeline of our protocol. Day 1 (green) represents the familiarization day, days 2-4 and 8-10 (blue) correspond to the pre- and post- heat-wave period, respectively. Days 5-7 (red) represent the simulated heat-wave period. The heat-stress is expressed as ambient temperature in degrees Celsius.*

Procedures

All participants will be monitored on a 24h basis at the Olympic Sport Center of Planica. The experiment is consisting of a familiarization day followed by three more periods (pre-, during-, and post- heat-wave) of three days each (Fig. 1). Specifically, pre- and post- heat wave workplace environment will be thermoneutral (average temperature: ~21.3 °C), while during heat-wave the volunteers will be exposed to elevated heat stress (average temperature: ~30.3 °C). The aforementioned environmental conditions simulate the heat wave of 2003 in Paris, which is similar to the heat stress experienced by Slovene workers during a heat-wave (*16*). It is important to note that, our findings (using historical data obtained from www.wunderground.com) indicate that the environmental temperature for the aforementioned Paris heat-wave varied considerably throughout the day. Therefore, our experiments will be characterized by a two-level heat stress during each day as presented in Figure 3.

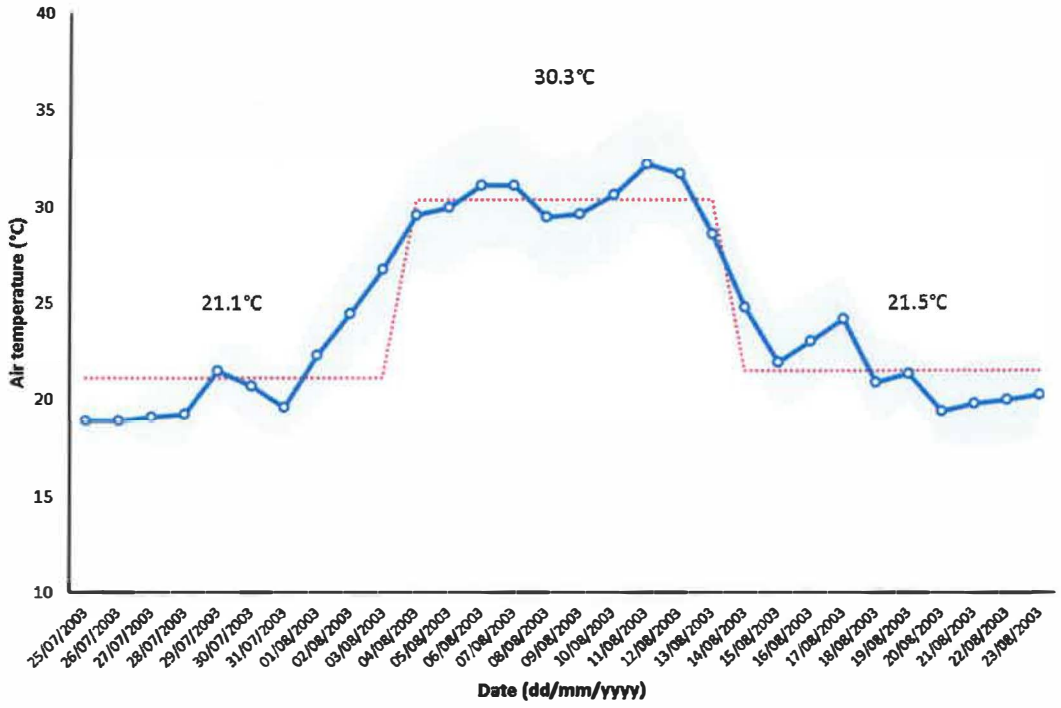


Figure 2| *Air temperature during the Paris heat-wave in 2003 (similar to the heat-stress experience by Slovene workers during a heat-wave).*

Health history questionnaire

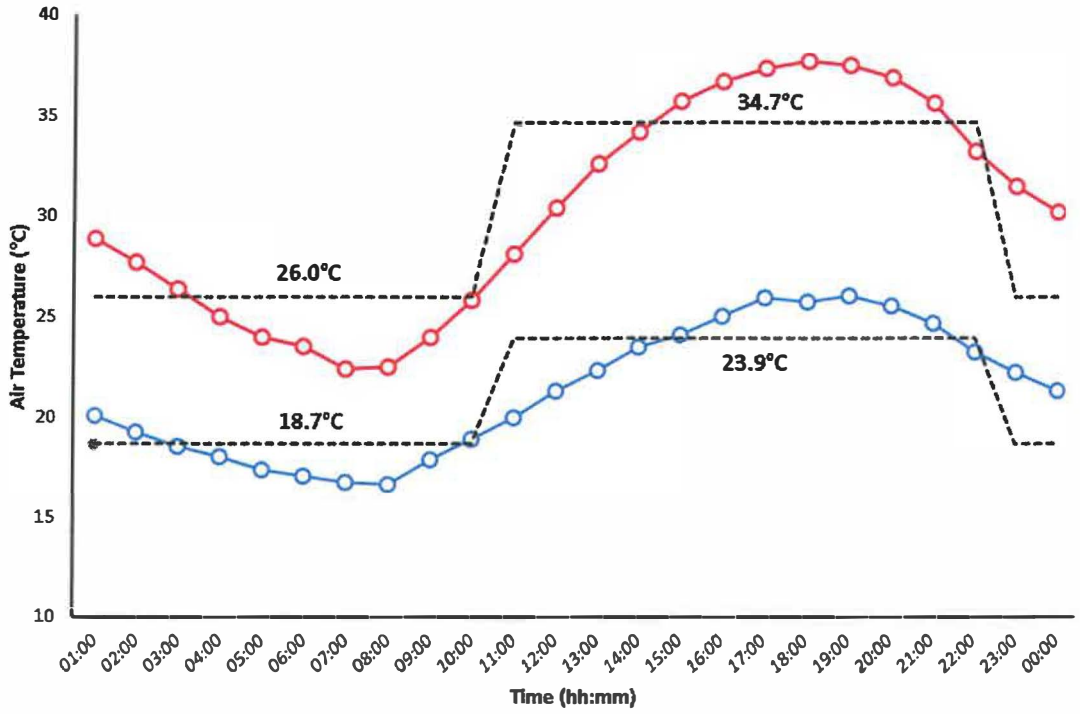


Figure 3 | *Air temperature during the experiment. Red and blue lines together with the accompanied shaded areas correspond to the actual air temperatures observed during and pre/post the heat wave of 2003 in Paris, respectively. Black dashed lines represent the air temperature that we are going to use in our experiment during the cool (23:00 – 10:00) and hot (11:00 – 22:00) hours of the day.*

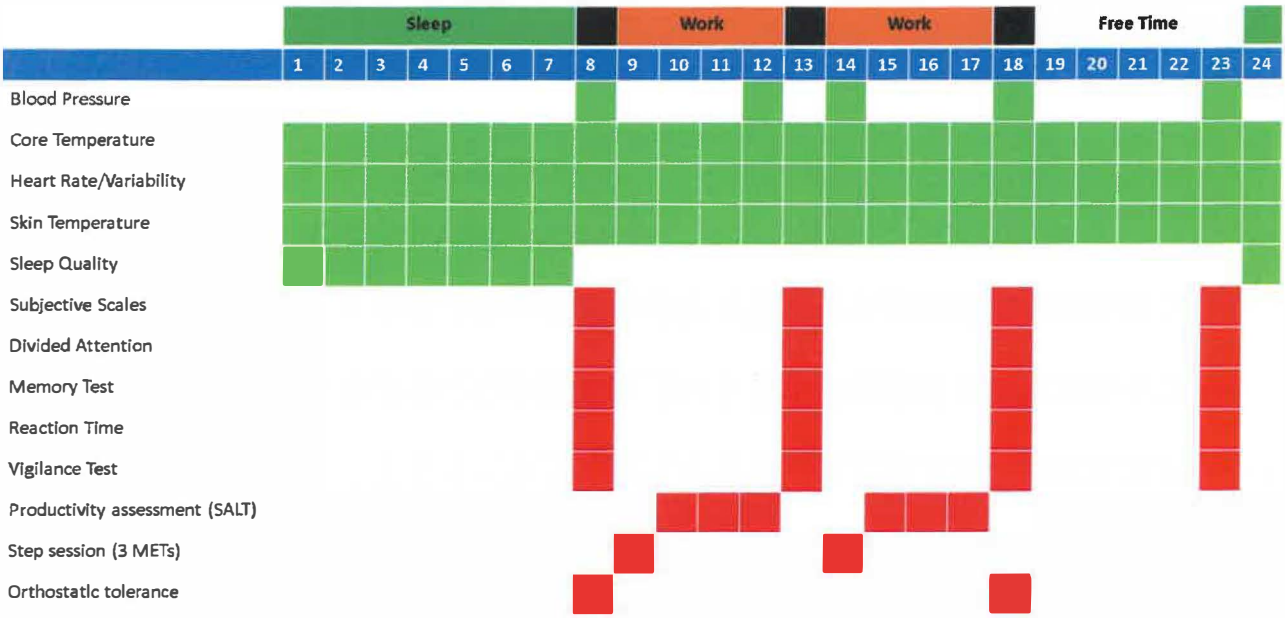
During the 10-day study, subjects will be confined at the Olympic Sport Centre Planica (Rateče). During their 10-day confinement, all participants will undergo a simulated eight-hour work-shift on a daily basis followed by eight hours rest and eight more for sleep. Specifically, they will follow a strict protocol consisting of different cognitive, physical, and labor performance test as described in "Data collection" section. Furthermore, pre- and post- study anthropometric measurements including height, mass, waist-to-hip ratio, and body composition assessment will be conducted using a stadiometer, a scale, a tape measure, and a DXA scanner with double x-rays level, respectively. Blood samples will be collected three times (at baseline and pre- post- heat-wave) to examine your hydration status. For the same reason, urine samples will be collected on a daily basis. Sleep quality and overall psychological status will be assessed using St. Mary's Hospital (SMH) sleep questionnaire(*17*), as well as the Profile of Mood States questionnaire(*18*) and the Positive and Negative Activation Schedule(*19*), respectively. No restrictions will be placed on water/food consumption or any other kind of work- or non-work-related behavior.

Health history questionnaire

Data Collection

All measurements involved in the current study are described below in alphabetical order. A time schedule of all the daily measuremnts involved in the study is shown below (Fig. 4).

Figure 4 | Schedule of all daily measurements involved in the study. Green, black, orange, and grey colors on the top of the graph represent sleep, meals (breakfast, lunch, and dinner), work, and free time, respectively. Light green and red colors correspond to the physiological and cognitive/labor data, respectively.



Health history questionnaire

Physiological and Subjective Data

P1. Blood pressure:

Blood pressure will be assessed using an automatic sphygmomanometer at baseline and every 8 hours throughout the day.

P2. Core temperature:

Core temperature throughout the day will be recorded using ingestible telemetric capsules (BodyCap, Caen, France). Core body temperature is considered to be an accurate reflection of the thermal state of an individual and it is associated with numerus behavioral and physiological functions.(*20, 21*)

P3. Heart rate and heart rate variability:

To assess the cardiovascular strain experienced by the participants throughout each day, heart rate will be monitored continuously using wireless heart rate monitors (Polar Team2, Polar Electro Oy, Kempele, Finland), which will also store the measured values. Heart rate is an indicator of the overall cardiovascular strain and it fluctuates considerably during exposure to different climatic conditions (*22*). The measurements of heart rate will be used to derive indices (high frequency and low frequency components) of heart rate variability. These will provide an index of the sympatho-vagal balance of activity (*23*).

P4. Skin temperature:

Skin temperature from multiple sites (chest, arm, thigh, leg, forearm, and finger) will be measured using wireless thermistors (iButtons type DS1921H, Maxim/Dallas Semiconductor Corp., USA) and will be expressed as mean skin temperature according to Ramanathan [mean skin temperature = 0.3(chest + arm) + 0.2(thigh + leg)].(*24*) Mean skin temperature will be assessed because it is a widely accepted measure representing the environmental stress experienced by humans in various environments. Previous studies found significant associations between changes in human mean skin temperature and the parameters of cognitive performance(*25*) and productivity.(*26*)

P5. Sleep quality assessment:

Sleep quality during sleep will be assessed using the non-invasive ZEO headband which was previously found to produce acceptable sleep scoring for stage REM, light and deep sleep.(*27*) Also, a photo of each participant will be taken prior to waking up every morning.

P6. Subjective scales:

Subjective thermal comfort (1 = comfortable; 5 = extremely uncomfortable), thermal sensation (-3 = cold; +3 = hot),(*28*) and perceived exertion (6 = no exertion at all; 20 = maximal exertion)(*29*) and every hour throughout the day.

Cognitive and Labour Performance Data

Familiarization for all tests will be undertaken prior to the experiments. During these familiarizations as well as during the data collection, volunteers will be isolated in a room with no external visual and/or acoustic stimuli. Furthermore, individual headphones will be provided to the volunteers to ensure receiving the same acoustic stimuli throughout the experiments. Screen brightness and sound volume will be remained constant throughout the experiments. The same sequence of cognitive performance tests (1^{st}: reaction time in acoustic stimuli; 2^{nd}: reaction time in visual stimuli; 3^{rd}: memory test; 4^{th}: divided attention; and 5^{th}: vigilance) will be followed throughout the experiments. Approximately 20 min will be required to complete all the cognitive tests. These tests will be repeated at baseline and every four hours throughout the day.

C1. Divided Attention:

This is a well-known test described in the Test for Attentional Performance(*30*) that has been well-accepted in the literature.(*31*) To run the test, we are going to use a computer software (freely available at www.famelab.gr/research/downloads/). In brief, this task involves both auditory and visual stimuli in parallel. During the test a number of visual stimuli (crosses) appear in a random configuration in a 4X4 matrix. At the same time, volunteers hear high- and low-pitch beeps in a random order. The aim is to touch the screen of a tablet computer as fast as possible when crosses form a square and, at the same time, two high- or low-pitch beeps are emitted twice in a row.

C2. Memory Test:

This test will be conducted using a computer software (freely available at www.famelab.gr/research/downloads/) to perform Sternberg's Memory Test.(*32*) In this well-known test, volunteers had to observe carefully a random sequence of one to six digits (ranging from 0 to 9) in white font and displayed for 1.2 seconds each. Following a 2-sec delay, a random digit (from the numbers that were previously presented) in yellow font will be presented. Participants will have to indicate whether the yellow digit was part of the sequence of numbers presented or not by pressing the "yes" or "no" buttons on the screen of a tablet computer as fast as possible. Each test includes a total of 24 trials.

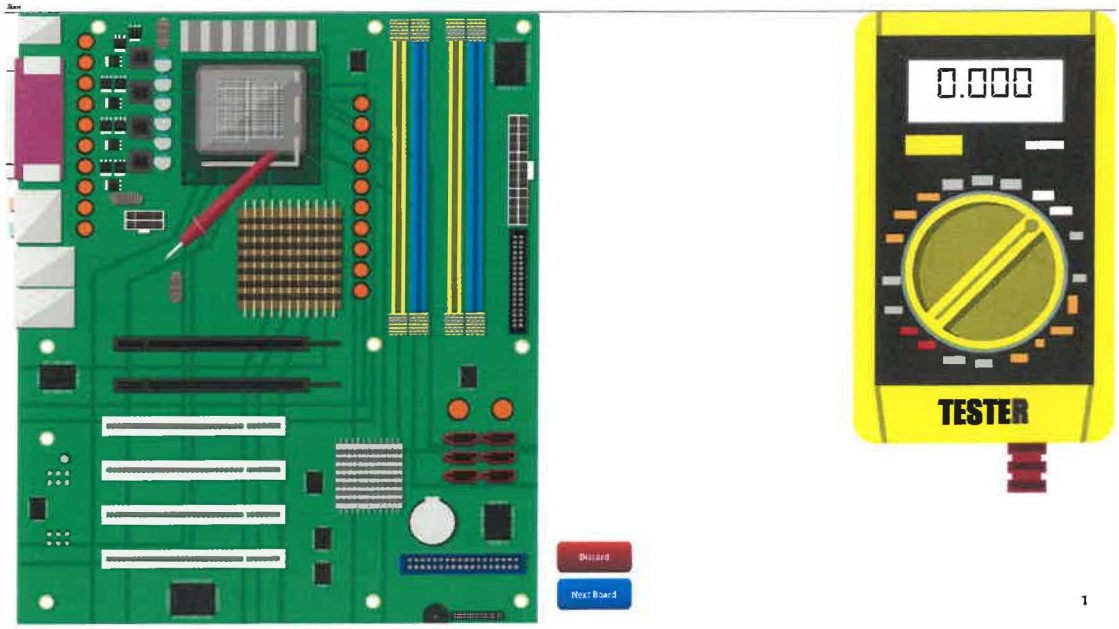
C3. Reaction Time:

This is a computer software (freely available at www.famelab.gr/research/downloads/) to assess reaction time. Participants will be requested to place their finger on the screen of a tablet computer and to remove it as fast as possible after receiving a visual (i.e., screen turning from black to yellow) or acoustic (i.e., a loud beep will be heard) stimulus.

C4. Simulated Assembly Line Task (SALT):

Previous studies identified that heat stress plays an important catalytic role on labour effort(*26*) and productivity(*33*). Although those findings are of major importance, there is no published information regarding the effects of OH-stress on the collaboration between different workers performing manual labor in the heat. For this reason, our volunteers will undergo a simulated assembly line task (SALT) for six hours during every day of the experiment. This is a modified test of an older computer-driven test published in 1992 which presents volunteers with images of electronic circuit boards that pass across a video monitor as objects might travel on an assembly line conveyor belt (Fig. 5).(*34*) In brief, this task involves performing quality control inspections on each circuit board in order to identify and discard faulty 'products' (by clicking "discard") or repair certain types of defective boards (by pressing the right click). Subjects will be trained for a minimum of five hours during two separate sessions prior to inclusion into the study.

Figure 5 | Graphical illustration of the simulated assembly line task.



C5. Step Session:
Stepping at a rate of 12 steps per minute on a 20cm-stepper (2.8 METs)(*35*) will be utilized to simulate "manual or unskilled labor, light effort" according to the compendium of physical activities (code: 11475).(*36*) Two sessions of one hour each will be performed during the morning (09:00) and afternoon (14:00) work sessions throughout the experiment.

C5. Vigilance Test:
This is a well-known vigilance test described in the Test for Attentional Performance(*30*) that has been well-accepted in the literature.(*37*) To run the test, we are going to use a computer software (freely available at www.famelab.gr/research/downloads/). In brief, this task involves two squares arranged vertically. A pattern jumps from one square to the other. Sometimes the pattern repeats in the same square. When this happens, volunteers are instructed to touch the screen of a tablet computer as fast as possible. The total duration of this test was set to six minutes.

Health history questionnaire

VPRAŠALNIK O ZDRAVSTVENEM STANJU

Institut Jožef Stefan
Odsek za avtomatiko, biokibernetiko in robotiko
Jamova cesta 39,
1000 Ljubljana

Informacije o preiskovancu:

Ime in priimek: Telefon:

Datum rojstva: Starost: Email:

Datum: Tlak v mirovanju:

Prosimo preberite!

Zdravstveni vprašalnik je namenjen odkrivanju dejavnikov, ki ogrožajo zdravje in zagotavljanju varnosti pri izvedbi poskusov. Zato vas prosimo, da pozorno preberete vprašanja in obkrožite ustrezne odgovore.

1. Kako bi opisali svojo trenutno telesno pripravljenost?

   Zelo nepripravljen / Pripravljen / Zelo pripravljen

2. Ali se redno ukvarjate z vadbo? Da / Ne

   Če da, prosimo navedite s kakšno?

   Lahka vadba: srčni utrip malo hitrejši kot ponavadi, med vadbo lahko normalno govorite (hoja, raztezanje, pospravljanje, vrtnarjenje itd.)

   Srednje zahtevna vadba: srčni utrip je višji kot ponavadi, med vadbo lahko govorite (hitra hoja, aerobika, počasno plavanje, vadba za moč itd.)

   Zahtevna vadba: srčni utrip je zelo povišan, med vadbo ne morete govoriti ali pa je govor prekinjen zaradi pospešenega dihanja (tek, tennis, košarka, kolesarjenje itd.)

3. Kako pogosto se ukvarjate z vadbo? .....

4. Kako pogosto se ukvarjate z maksimalno vadbo?

   Nikoli / Včasih / Pogosto

5. Kako bi opisali svojo trenutno telesno težo?
   Prenizka / Idealna / Rahko prekomerna / Zelo prekomerna

6. Ali ste redni kadilec/ka? Da / Ne Če da, koliko cigaret na dan? .....

7. Ali ste občasni kadilec/ka? Da / Ne Če da, koliko cigaret na teden? .....

8. Ali ste bivši kadilec/ka? Da / Ne Če da, kdaj ste prenehali? .....

9. Ali jemljete (občasno ali redno) še kakšne druge psihoaktivne snovi? Da / Ne

10. Ali pijete alkohol? Da / Ne
    Če da, ali: pijete le občasno? Da / Ne
    pijete vsak dan? Da / Ne

11. Ste bili v zadnjih 6. mesecih kdaj pri zdravniku? Da / Ne
    Če da, vam je predpisal kakšne omejitve pri vadbi ali prehrani? .....

12. Ste v zadnjih dveh tednih imeli prehlad, gripo ali katerokoli drugo obolenje z zamašeno nosno votlino? Da / Ne
    Če da, prosimo navedite več podrobnosti: .....

13. Ali trenutno jemljete katerokoli zdravilo? Da / Ne

    Če da, katero?.....

14. Ali imate kakšne alergije? Da / Ne
    Če da, prosimo napišite katere? .....

15. Ste se že kdaj morali odpovedati vadbi/športu zaradi problemov z zdravjem? Da / Ne
    Če da, prosimo napišite zakaj? .....

16. Se med vadbo utrudite hitreje kot osebe vaše starosti Da / Ne

17. Ste kdaj imeli kakšno od naslednjih bolezni?

Astma	Da / Ne
Kronična obstruktivna bolezen pljuč	Da / Ne
Diabetes	Da / Ne
Visok krvni tlak (hipertenzija)	Da / Ne
Kakršnakoli oblika težav s srcem	Da / Ne
Visok holesterol	Da / Ne
Epilepsija	Da / Ne
Omedlevica/vrtoglavica	Da / Ne

Če ste na katerega od zgoraj navedenih vprašanj odgovorili z »da«, prosimo navedite več podrobnosti, da lahko določimo, če je varno, da sodelujete v raziskavi.

.....

Če ste za astmo odgovorili z »da«, prosimo navedite, če so vam v zadnjih 4 letih bila predpisana kakšna zdravila, kako se imenujejo, kako pogosto jih jemljete ter kdaj jih nazadnje vzeli?

.....

18. Vam je zdravnik kdaj povedal, da imate šum na srcu?
    Da / Ne

Če da, prosimo navedite več podrobnosti: .....

19. Vam je zdravnik kdaj povedal, da imate srčno aritmijo?
Da / Ne

Če da, prosimo navedite več podrobnosti: .....

20. Ali imate zgodovino težav s srcem?
Da / Ne

Če da, prosimo navedite več podrobnosti: .....

21. Ste imeli v zadnjem mesecu hudo virusno okužbo (npr. mononukleoza, miokarditis)?
Da / Ne

Če da, prosimo navedite več podrobnosti: .....

22. Ali vam je zdravnik kdaj povedal, da imate anemijo?
Da / Ne

Če DA, prosimo navedite več podrobnosti: .....

23. Vam je zdravnik kdaj povedal, da imate revmatično vročino?
Da / Ne

Če DA, prosimo navedite več podrobnosti: .....

24. Ste kdaj zboleli za katero izmed naslednjih bolezni?

Vročinska kap, sončarica	Da / Ne
Bolezen ali poškodba zaradi mraza (ozebline)	Da / Ne
Slaba prekrvavitev (vključno z Raynaudovo boleznijo)	Da / Ne
Periferna nevropatija	Da / Ne

Če ste na katerega od zgoraj navedenih vprašanj odgovorili z »da«, prosimo navedite kdaj se je pripetilo, kaj je bil razlog, da se je pripetilo ter kakšne so bile posledice?

.....

25. Prosimo, navedite, če ste kdaj bili zadržani v bolnišnici čez noč (kdaj, kako dolgo, zakaj, kdaj ste popolnoma ozdravili):
.....
.....

26. Imate še kakšno drugo zgodovino bolezni o kateri vas še nismo vprašali?
Da / Ne

Če da, prosimo navedite več podrobnosti: .....

27. Ali imate trenutno poškodovan kakšen sklep, mišico ali hrbet?
Če da, prosimo navedite več podrobnosti: .....

28. Ste v zadnjem mesecu morali prekiniti s kakšno od aktivnosti zaradi slabega počutja ali poškodbe?

    Če da, prosimo navedite več podrobnosti: .....

29. So v vaši družini prisotne bolezni srca in ožilja (npr. nepričakovan srčni zastoj)?

    Da / Ne

    Če da, prosimo navedite več podrobnosti (kako so povezani z vami, starost, kaj se je naredilo: .....

30. Ali je kateri izmed vaših družinskih članov mlajši od 50 let:

Umrl hitro in nepričakovano?	Da / Ne
Se zdravil zaradi ponavljajoče se omedlevice/vrtoglavice?	Da / Ne
Imel nepojasnene in nepričakovane napade?	Da / Ne
Se je nepojasnjeno in nepričakovano utopil?	Da / Ne
Imel nepojasnjeno prometno nesrečo?	Da / Ne
Imel presaditev srca?	Da / Ne
Imel vstavljen defibrilator ali srčni spodbujevalnik?	Da / Ne
Se je zdravil zaradi neregularnega srčnega utripa?	Da / Ne
Imel operacijo srca?	Da / Ne

Če ste na katerega od zgornje navedenih vprašanj odgovorili z »da«, prosimo navedite kako je ta oseba povezana z vami, kaj se jim je pripetilo ter koliko so bili stari, ko se je pripetilo?

.....

31. Ste kdaj utrpeli katerega izmed naslednjih bolezenskih znakov:

Zadihanost in bolečine v prsnem košu v mirovanju	Da / Ne
Bolečine v prsnem košu med vadbo	Da / Ne
Nepričakovana zadihanost med naporom	Da / Ne
Omotica med naporom	Da / Ne
Kolaps med vadbo	Da / Ne
Palpitacija (nepojasnjeno pospešeno bitje srca)	Da / Ne

Če ste na katerega od zgornje navedenih vprašanj odgovorili z »da«, prosim navedite več podrobnosti: .....

32. Ali ste darovalec krvi? Da / Ne

    Če DA, ste darovali kri v zadnjem tednu: .....

33. <u>Samo za ženske (za sodelovanje pri raziskavah, ki vključujejo hipoksijo, vročinski stres ter naporno vadbo)</u>

    Prosimo, navedite, če ste mogoče noseči: Nisem noseča / Nisem prepričana / Noseča

34. Ali menite, da vročino dobro prenašate?

    Da / Ne

    Če NE, prosimo navedite več podrobnosti: .....

35. Ali ste bili v obdobju zadnjih 3 mesecev izpostavljeni dolgotrajnejši (> 5 dni) hujši vročini (> 30 °C)?

    Da / Ne

Če NE, prosimo navedite več podrobnosti: .....

36. Ali ste v življenju zaradi vročine kdaj občutili simptome kot so nepričakovana izčrpanost, slabost, glavobol, vrtoglavica, omedlevica, bruhanje, krči?

Da / Ne

Če DA, prosimo navedite več podrobnosti: .....

37. Ali menite, da obstajajo še kakšni drugi razlogi, o katerih vas nismo vprašali, ki bi vam preprečili uspešno sodelovanje v raziskavi?

Da / Ne

Če DA, prosimo navedite več podrobnosti: .....

38. Natančno sem prebral vprašanja v zdravstvenem vprašalniku in podal resnične odgovore.

Da / Ne

Kontakt za nujne primere

Ime: ..... Odnos: .....

Naslov: .....

Telefonska številka: .....

Ime preiskovanca: **Datum:** **Podpis preiskovanca:**

Ime preiskovalca: **Datum:** **Podpis preiskovalca:**

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZDRAVJE

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Institut Jožef Stefan

Jamova cesta 39, 1000 Ljubljana

VPRAŠALNIK ZA PREVERJANJE ZDRAVSTVENEGA STANJA SODELUJOČIH V RAZISKAVI *»Učinkovitost osebnih strategij hlajenja med vročinskimi valovi«* (vsa vprašanja se nanašajo tudi na obdobje preteklih 14 dni):

Ime in priimek preiskovanca:_____

Datum:_____

	VPRAŠANJE	**DA**	**NE**
1.	Imate povišano telesno temperaturo (nad 37,5° C)?		
2.	Ali ste prehlajeni?		
3.	Ali kašljate?		
4.	Vas boli v grlu, žrelu?		
5.	Imate spremenjen okus ali vonj?		
6.	Imate občutek težkega dihanja ali stiskanja v prsnem košu?		
7.	Imate bolečine v mišicah?		
8.	Imate prebavne težave (drisko ali bruhanje)?		
9.	**Ima kdo drug doma ali v službi takšne težave?**		
10.	Ste imeli morda pozitiven bris na Covid-19?		
11.	Ste bili v stiku s COVID-19 potrjenim bolnikom (oboleli svojci, sostanovalci, sodelavci, sošolci, sopotniki...)?		

*** V kolikor ste na katerokoli vprašanje odgovorili pozitivno, v raziskavi žal NE morete sodelovati.**

S podpisom potrjujem resničnost vseh navedb:

6. Informacija o denarnem nadomestilu osebam v raziskavi.

Osebe, ki bodo sodelovali v raziskavi, bodo nastanjeni v Olimpijskem športnem centru Planica 10 dni, oziroma 240 ur. V tem času bodo izvajali teste vsak dan. Za sodelovanje v raziskavi bodo dobili € 270.

7. Prikaz stroškov raziskave, absolutni znesek na vključeno osebo in odstotni deleži za posamezne namene.

Predvideni stroški raziskav so prikazani v tabeli spodaj

Preiskovanci	€ 2700
Nastanitev preiskovancev v Olimpijskem športnem centru Planica	€ 5000

8. Informacija o denarnem ali kakšnem drugačnem nadomestilu raziskovalcem v raziskavi.

Raziskovalci so stalno zaposleni na Institutu Jožef Stefan in ne bodo dobili denarno ali kakšno drugo nadomestili za delo na tem projektu.

9. Opis skrbi za varnost in koristi v raziskavo vključenih oseb.

Preiskovanci bodo stalno (24/7) pod nadzoromo, predvsem med simuliranim vročinskim valom. Osnovne meriteve njihovega zdravstvenega stanja bodo opravlejen zjturaj in vsaki 6 do 8 ur. Med 10-d poskusom bodo vedno (24/7) pristona ekipa raziskovalcev , ki bo tudi nadzorovala varnost in zdravstveno stanje preiskovancev.

Lead Investigator: Dr Leonidas Ioannou

E-mail: ioannouLG@gmail.com

Study title: Effect of heat-wave on workers' health and productivity

We would like to invite you to take part in our research study. Please read this form carefully. If you consent to take part, as a participant, in this study led by dr. Leonidas Ioannou then please sign the consent form. If you have any query, or are unsure or uncertain about anything, then you should not sign until your problem has been resolved and you are completely happy to volunteer. Additionally, you must not have any medical conditions which are exacerbated by exercise.

Background and purpose of the study?

The current study will examine the effects of a heat-wave on the psychophysical strain experienced by workers, aiming to improve their health and to preserve their labor capacity and productivity.

Outline of the study methodology

On arrival to the laboratory you should be familiarized with the equipment and the protocol, with time taken to inform you of the procedures required during the study. During this time, you will be asked to fill out a health history questionnaire and your resting blood pressure will be assessed. Thereafter, you will be transferred to the Olympic Sport Center of Planica where the study will take place.

The experiment is consisting of a familiarization day followed by three more periods (pre-, during-, and post- heat-wave) of three days each (Fig. 1). Specifically, pre- and post- heat wave environment will be thermoneutral (average temperature during the day: ~21.3 °C), while during heat-wave you will be exposed to elevated heat stress (average temperature during the day: ~30.3 °C), simulating an actual heat-wave occurred in Paris in 2003. During your stay in Planica you will participate in a simulated assembly line 8-hour work-shift on a daily basis. This assembly line test is consisted of two hours of very low intensity exercise (stepping at a rate of 12 steps per minute on a 20cm-stepper) and six hours of computer-based tasks. This task involves performing quality control inspections on circuit boards in order to identify and discard faulty 'products' (by clicking "discard") or repair certain types of defective boards (by pressing the right click) (Fig. 3). All measurements involved in the study will take place at the same time of the day throughout the experimental protocol. During the study accommodation and food will be provided by the research team.

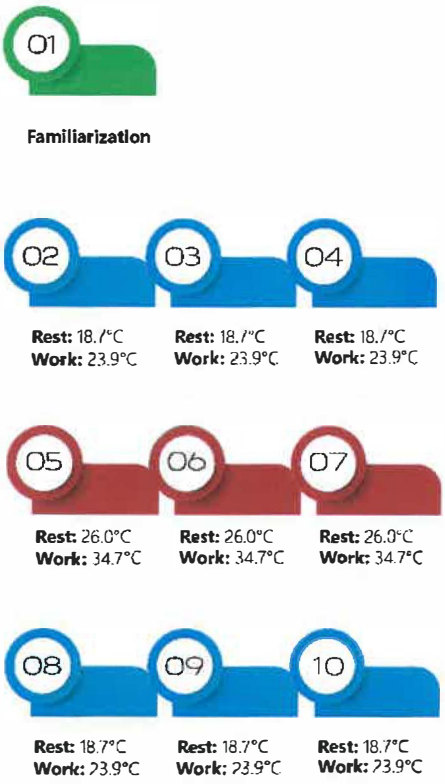


Figure 1 | *Timeline of the protocol. Day 1 (green) represents the familiarization day, days 2-4 and 8-10 (blue) correspond to the pre- and post- heat-wave period, respectively. Days 5-7 (red) represent the simulated heat-wave period.*

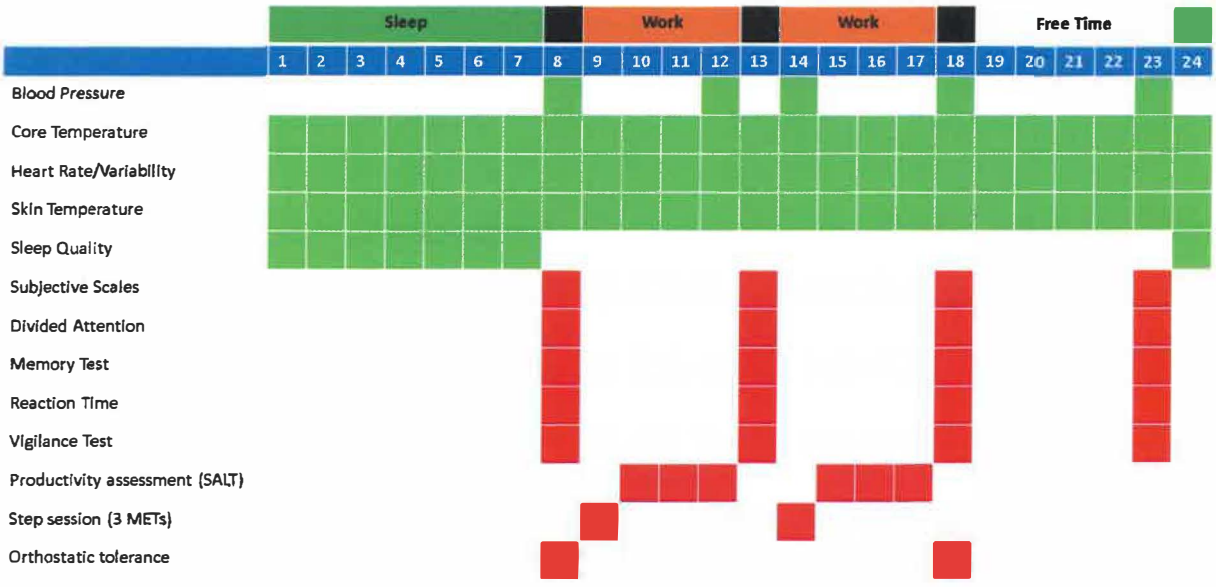


Figure 2| *Schedule of all daily measurements involved in the study. Light green and red colors correspond to the physiological and cognitive/labor data, respectively.*

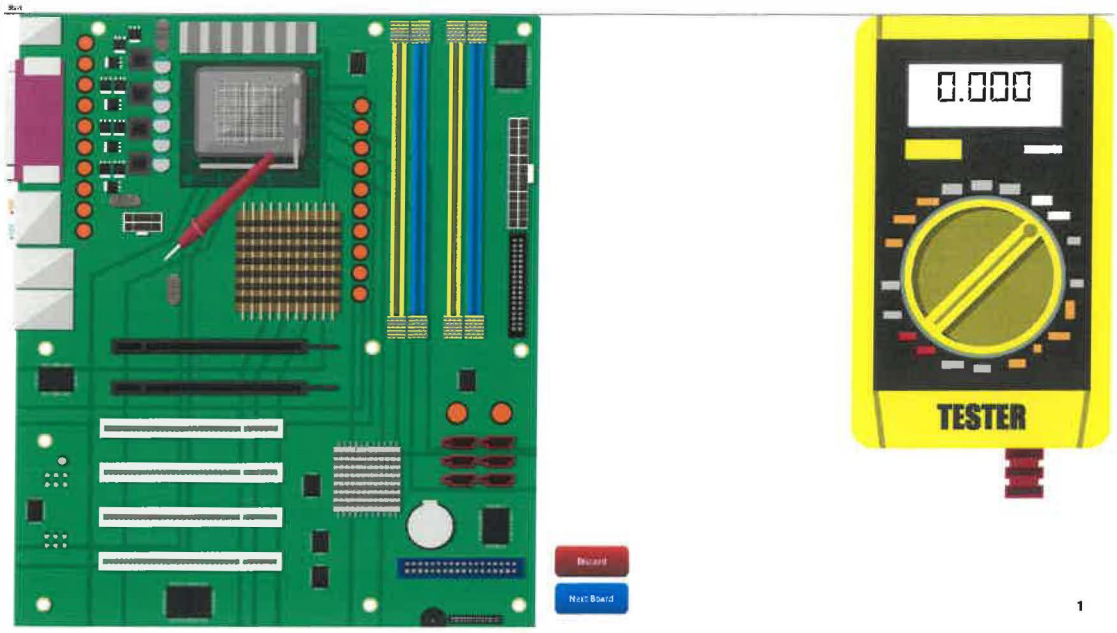


Figure 3 | *Graphical illustration of the simulated assembly line task.*

Why have I been invited?

Males aged 18 years and older are sought for this study. As a volunteer you should be well and be used to this level of exercise. You should also be free from any injury or illness that might interfere with, or be exacerbated by, participation in maximal tests. Participants that are hypo- or hypertensive will be excluded from participation. If you are unsure whether you are fit enough to participate in this study, then you may wish to undertake a medical review prior to volunteering for such activities. Please ask the present investigators if this is the case.

What measurements will be taken (or data collected)?

Baseline measurements – Your height, body mass, body composition, and maximal oxygen uptake will be assessed. Dual x-ray absorptiometry shall be used for the assessment of body composition at our facilities in the Olympic Sports Centre Planica on a separate day. Maximal oxygen uptake will be assessed using a graded incremental treadmill running test during which the treadmill speed will be increased by 0.5 km/h every 60 seconds. The treadmill gradient will remain at 1% throughout the exercise test with the aim of eliciting volitional exhaustion in ~8 to 12 minutes. 5 to 10 minutes after the initial test is completed you will complete a 2 minute warm-up followed immediately by a run to exhaustion at a treadmill speed 0.5 km/h faster than the final speed achieved during the initial incremental test, in order to verify if a 'true' maximum rate of oxygen uptake was achieved in the first test. Throughout each exercise test you will breathe through an oronasal facemask for the measurement of expired gases. You will be required to wear a heart rate monitor around your chest to measure your heart rate throughout the test. You will also be required to wear an oronasal face mask whilst in the environmental chamber. This will allow the assessment of breathing variables; including the volume and composition of air you expire. You will be familiarized with the treadmill and online gas analysis system prior undertaking any of the data collections.

Measurements throughout the experiment – Blood samples will be collected three times (at baseline and pre- post- heat-wave) to examine your hydration status. For the same reason, urine samples will be collected on a daily basis. Sleep quality and overall psychological status will be assessed using St. Mary's Hospital sleep questionnaire, as well as the Profile of Mood States

questionnaire and the Positive and Negative Activation Schedule, respectively. A list with all the measurements involved in the current experiment can be found below.

1. ***Blood pressure:*** Blood pressure will be assessed using an automatic sphygmomanometer five times per day.
2. ***Core temperature:*** Core temperature throughout the day will be recorded using ingestible telemetric capsules.
3. ***Heart rate/variability:*** Heart rate and heart rate variability will be collected using wireless heart rate monitors
4. ***Skin temperature:*** Skin temperature from multiple sites (chest, arm, thigh, leg, forearm, and finger) will be measured using wireless thermistors.
5. ***Sleep quality assessment:*** Sleep quality during sleep will be assessed using the non-invasive ZEO headband. Also, a photo of each participant will be taken prior to waking up every morning.
6. ***Subjective scales:*** Subjective thermal comfort, thermal sensation, and perceived exertion will be used as indicators to describe.
7. ***Divided Attention:*** This is a computer software. In brief, this task involves both auditory and visual stimuli in parallel. During the test a number of visual stimuli (crosses) appear in a random configuration in a 4X4 matrix. At the same time, volunteers hear high- and low-pitch beeps in a random order. The aim is to touch the screen of a tablet computer as fast as possible when crosses form a square and, at the same time, two high- or low-pitch beeps are emitted twice in a row.
8. ***Memory Test:*** This test will be conducted using a computer software to perform Sternberg's Memory Test. In this test, you will have to observe carefully a random sequence of one to six digits (ranging from 0 to 9) in white font and displayed for 1.2 seconds each. Following a 2-sec delay, a random digit (from the numbers that were previously presented) in yellow font will be presented. You will have to indicate whether the yellow digit was part of the sequence of numbers presented or not by pressing the "yes" or "no" buttons on the screen of a tablet computer as fast as possible. Each test includes a total of 24 trials.
9. ***Reaction Time:*** This is a computer software to assess reaction time. You will be requested to place their finger on the screen of a tablet computer and to remove it as fast as possible after receiving a visual (i.e., screen turning from black to yellow) or acoustic (i.e., a loud beep will be heard) stimulus.
10. ***Simulated Assembly Line Task:*** In brief, this task involves performing quality control inspections on each circuit board in order to identify and discard faulty 'products' (by clicking "discard") or repair certain types of defective boards (by pressing the right click).
11. ***Step Session:*** Stepping at a rate of 12 steps per minute on a 20cm-stepper will be utilized to simulate "manual or unskilled labor, light effort" Two sessions of one hour each will be performed during the morning and afternoon work sessions throughout the experiment (see Fig. 2).
12. ***Vigilance Test:*** To run the test, we are going to use a computer software. In brief, this task involves two squares arranged vertically. A pattern jumps from one square to the other. Sometimes the pattern repeats in the same square. When this happens, you have

to touch the screen of a tablet computer as fast as possible. The total duration of this test is set to six minutes.

13. ***Orthostatic tolerance test.*** This test will measure the response of your heart rate to maintain blood pressure during a change in posture. Following 10 minutes of supine rest, you will be passively tilted to a 60° head-up position for 10 minutes. During this time, we will continuously measure heart rate and blood pressure. The experiment will be terminated, in the event of any signs of pre-syncope (i.e. should we observe any signs that might indicate a risk of fainting, you will be immediately returned to the supine position.

Do I have to take part?

No, taking part in this research is entirely voluntary. It is up to you to decide if you want to volunteer for the study. We will describe the study in this information sheet. If you agree to take part, we will then ask you to sign the attached consent form.

Expenses and payments

For the two visits – maximal oxygen uptake test & familiarization protocol + body composition assessment in Planica – you will be paid a total of **30 € net** (15 € each visit). This amount will then be added to the 240 € payment for the 10-day experiment in Planica. Therefore, the payment you will receive for the whole study will be **270 € net**.

Anything else I will have to do?

In the 24 hours prior to the maximal oxygen uptake testing you must:

- Not consume alcohol
- Maintain your habitual diet including caffeine consumption. In the two hours prior to each visit please do not consume any caffeine. Examples of caffeinated products to avoid are tea, coffee, carbonated drinks and chocolate.
- Ensure you attend the test in a fed hydrated state, which allows you to exercise at a vigorous intensity in hot ambient conditions. Do not eat immediately prior to the testing sessions.
- Not complete any strenuous exercise.
- Not expose yourself to high ambient temperatures

What are the possible disadvantages and risks of taking part?

The study protocol includes elements which you may find hard and may make you tired.

What will happen if I do not want to carry on with the study?

As a volunteer you can stop any test at any time or withdraw from the study at any time before finishing all experiments, without giving a reason if you do not wish to. If you do withdraw from a study after some data has been collected, you will be asked if you are content for the data collected thus far to be retained and included in the study. If you prefer, the data collected can be destroyed and not included in the study. Once the experiment has been completed, and the data analyzed, it will not be possible for you to withdraw your data from the study.

What if there is a problem?

If you have a query, concern, or complaint about any aspect of this study, in the first instance you should contact the Lead Investigator (LI) if appropriate. If there is a complaint, please contact the Supervisor with details of the complaint. The contact details for the LI are detailed on the first page.

Will my taking part in the study be kept confidential?

The raw data, which identifies you, will be kept securely by the Lead Investigator. Any documents containing your personal information will be password protected and all other documents will use a participant identification code in order to keep your results anonymous.

The data, when made anonymous, may be presented to others at scientific meetings, or published as a project report, academic dissertation or scientific paper or book. It could also be made available to any sponsor of the research. Anonymous data, which does not identify you, may be used in future research studies approved by an Appropriate Research Ethics Committee.

The raw data, which would identify you, will not be passed to anyone outside the study team without your express written permission. The exception to this will be any regulatory authority who may have the legal right to access the data for the purposes of conducting an investigation in exceptional cases.

The raw data will be retained for up to 30 years. When it is no longer required, the data will be disposed of securely (*e.g.* electronic media and paper records / images) destroyed.

Thank you

Thank you for taking time to read this information sheet and for considering volunteering for this experiment. If you do volunteer for this experiment your consent will be sought on the following page. You will then be given a copy of this information sheet and your signed consent form, for you to keep.

Lead Investigator: Dr Leonidas G. Ioannou

E-mail: ioannouLG@gmail.com

Study Title: Effect of heat-wave on worker's health and productivity.

Please state any criteria that must be met before participating

- Male participants between older than 18 years of age will be able to volunteer to take part in this study.
- Participants must healthy as determined by health history questionnaire.
- Participants must be familiar with exercise of a maximal nature.
- Participants must have a resting diastolic blood pressure of ≥60 to ≤90 mmHg and a resting systolic blood pressure of ≥90 to ≤150 mmHg.

Please initial each box if content

1. I confirm that I have read and understood the information sheet for the above taught laboratory/research project and that I have had the opportunity to consider the information, ask questions and that these have been answered satisfactorily. ☐

2. confirm that I am well and free from injury and am capable of undertaking the activities described in the information sheet. ☐

3. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason without my legal rights being affected. ☐

4. I agree to take part in this taught laboratory/research project. ☐

Name of Participant: **Date:** **Signature:**

Name of Witness: **Date:** **Signature:**

1. Izjava predlagatelja ali odgovorne osebe

Institut Jožef Stefan

Odsek za avtomatiko, biokibernetiko in robotiko

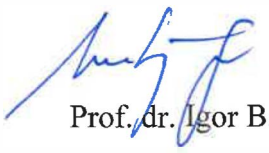
Jamova cesta 39

1000 Ljubljana

Spodaj podpisani prof. dr. Igor B. Mekjavić, izjavljam:

- da se dokumenti poslani v elektronski obliki ne razlikujejo od tistih v papirni obliki in da pri sebi hranim dokumente z lastnoročnimi originalnimi podpisi;
- da so prevedeni dokumenti identični originalu;
- da jamčim za strokovno pravilnost vloženih besedil;
- da so ustrezne pristojbine plačane v skladu z Uredbo o pristojbinah Komisije Republike Slovenije za medicinsko etiko (Uradni list RS, št. 48/18).

Ljubljana, 25.8.2020



Prof. dr. Igor B. Mekjavić

2. Izjava predlagatelja

Institut Jožef Stefan

Odsek za avtomatiko, biokibernetiko in robotiko

Jamova cesta 39

1000 Ljubljana

Spodaj podpisana prof. dr. Igor. B Mekjavić, in izr. dr. Leonidas Ioannou izjavljava, da se osebe v raziskavo ne bo vključevalo s pritiskom ali neprimernim napeljevanjem. Prav tako izjavljava, da bomo upoštevali načela Helsinške deklaracije, Oviedske konvencije ter slovenskega Kodeksa zdravniške etike o biomedicinskih raziskavah na človeku.

Ljubljana, 26.8. 2020

Prof. dr. Igor. B Mekjavić

dr. Leonidas G. Ioannou

3. Izjava vodstva

Institut Jožef Stefan

Jamova cesta 39

1000 Ljubljana

Spodaj podpisani direktor Instituta Jožef Stefan prof. dr. Jadran Lenarčič potrjujem, da dovoljujem raziskavo in da ne ustanova ne raziskovalci niso v nasprotju interesov. Prav tako potrjujem, da je na ustanovi poskrbljeno za strokovnost dela in varnost oseb v raziskavi ter da so raziskovalci, vključeni v raziskavo, usposobljeni za delo v zvezi z raziskavo.

Ljubljana,26.8.2020

Institut "Jožef Stefan" Ljubljana, Slovenija 13

Prof. dr. Jadran Lenarčič

Direktor

4. Izjava strokovnega predstojnika

Institut Jožef Stefan

Odsek za avtomatiko, biokibernetiko in robotiko

Jamova cesta 39

1000 Ljubljana

Spodaj podpisani predstojnik oddelka za Avtomatiko, biokibernetiko in robotiko na Institutu Jožefa Stefana prof. dr. Aleš Ude izjavljam:

- da je na ustanovi poskrbljeno za strokovnost dela in varnost oseb v raziskavi;
- da so raziskovalci, vključeni v raziskavo, usposobljeni za delo v zvezi z raziskavo;
- da so zmožni pravočasno prepoznati morebitne zaplete, ki bi lahko ogrožali zdravje ali življenje oseb v raziskavi in da so zmožni pravilno ukrepati;
- da bom nadziral raziskovalce, da bodo upoštevali načela Helsinške deklaracije o biomedicinskih raziskavah na človeku, določila Konvencije Sveta Evrope o varovanju človekovih pravic in dostojanstva človeškega bitja v zvezi z uporabo biologije in medicine (Oviedske konvencije in protokolov k njej);
- in slovenskega Kodeksa zdravniške etike.

Ljubljana,25.8.2020

Prof. dr Aleš Ude

vodja Odseka za avtomatiko,
biokibernetiko in robotiko

17. Objava rezultatov in morebitnih člankov.

Data management

The collected data will be kept for a maximum of five years after the usage and/or publication of the results. Apart from all technical considerations for confidentiality and privacy, the user's right for protection of personal data is supported by the principle of autonomy, which implies that the user explicitly "owns" the personal data and manages any interactions on them. In case of withdrawal from the study, the participants have the right to have their data destroyed. At all stages of data collection, we will treat the collected data with respect to personal data confidentiality as applied by each participant's countries National Laws and the EU legislation. Collected data at all stages, will be treated with respect to person anonymity, and will be discharged after the project is completed. Moreover, particular attention will be given to avoid the unnecessary collection and use of personal data.

The participants are bound to:

- Ensure the person anonymity, when possible, in any collection of personal data.
- Safeguard confidentiality through appropriate technological mechanisms (e.g. data encryption in all transmissions of personal data)
- Retain the exclusive right to have access to one's personal data
- Provide the participants with the opportunity to withdraw from any procedure if for any reason one feels uncomfortable with it
- Forbid secondary use of the collected data by individuals or organizations not involved in the project
- At the completion of the study, offer the study volunteers with a summary consisting of their own results, group values, and overall summary interpretation.

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