EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání

Economics and Gender
Lecture 8
Stress and Gender

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Sick
Tired
Dread
Health
Fear
Time Management
Bills
Stress
Debt
No Sleep
Work
Fear
Worry
Job
Anxiety

Definition of Stress: problematic

- „bad boss“
  - Anonymous colleague
- „The magnitude of an external force, or stress, produces a proportional amount of deformation, or strain, in a malleable metal“
  - Hooke‘s law, 1658
- „a **state** of mental or emotional strain or tension resulting from adverse or demanding circumstances.“
  - Oxford dictionary
- **Reaction to a perceived threat (a stressor) to an important goal, such as the preservation of physical or social self**
  - Dickerson & Kemeny (2004)

Stressing Stimuli - Stressors

- Physical & Biogenic stressors
  - Various forms of pain, blaring light, deafening noise, extremes of heat or cold, perpetual frustration
  - Substance use & abuse (addiction & withdrawal)
  - e.g. Cold-pressor task (hand in icy water)
- Psychological stressors
  - Does not involve physical harm or other people
  - E.g. Losing family member
- Psycho-social stressors
  - Psychological + evaluation by others
  - E.g. Public speaking

Types of Stress

- negative or positive (depends on framing)
  - Distress (e.g., exams, divorce, deadlines)
    - Demand > supply
    - **Threat**- framing (Blasovich & Tomaka, 1996)
  - Eustress (e.g., marriage, graduation, job promotion)
    - Demand < supply
    - **Challenge**-type framing, like exercise
  - Depends on subjective appraisal
- Effect depends on duration
  - Acute stress
  - Chronic stress
- Severity of stressor
  - Mild challenge
  - Catastrophic events
  - Post-Traumatic Stress Disorder (PTSD)

Physiological Systems Involved in the Stress Response

- https://www.youtube.com/watch?v=sPS7GnromGo
- The nervous system
- The endocrine system
- The immune system

Measures of stress

- Physiological measures of stress symptoms:
  - Blood-volume pulse,
  - heart-rate,
  - electro-myographical signals,
  - respiration rate,
  - body temperature,
  - skin-conductance
  - Hormons – blood or saliva
- Subjective measures:
  - Questionnaire scales
  - simple ratings

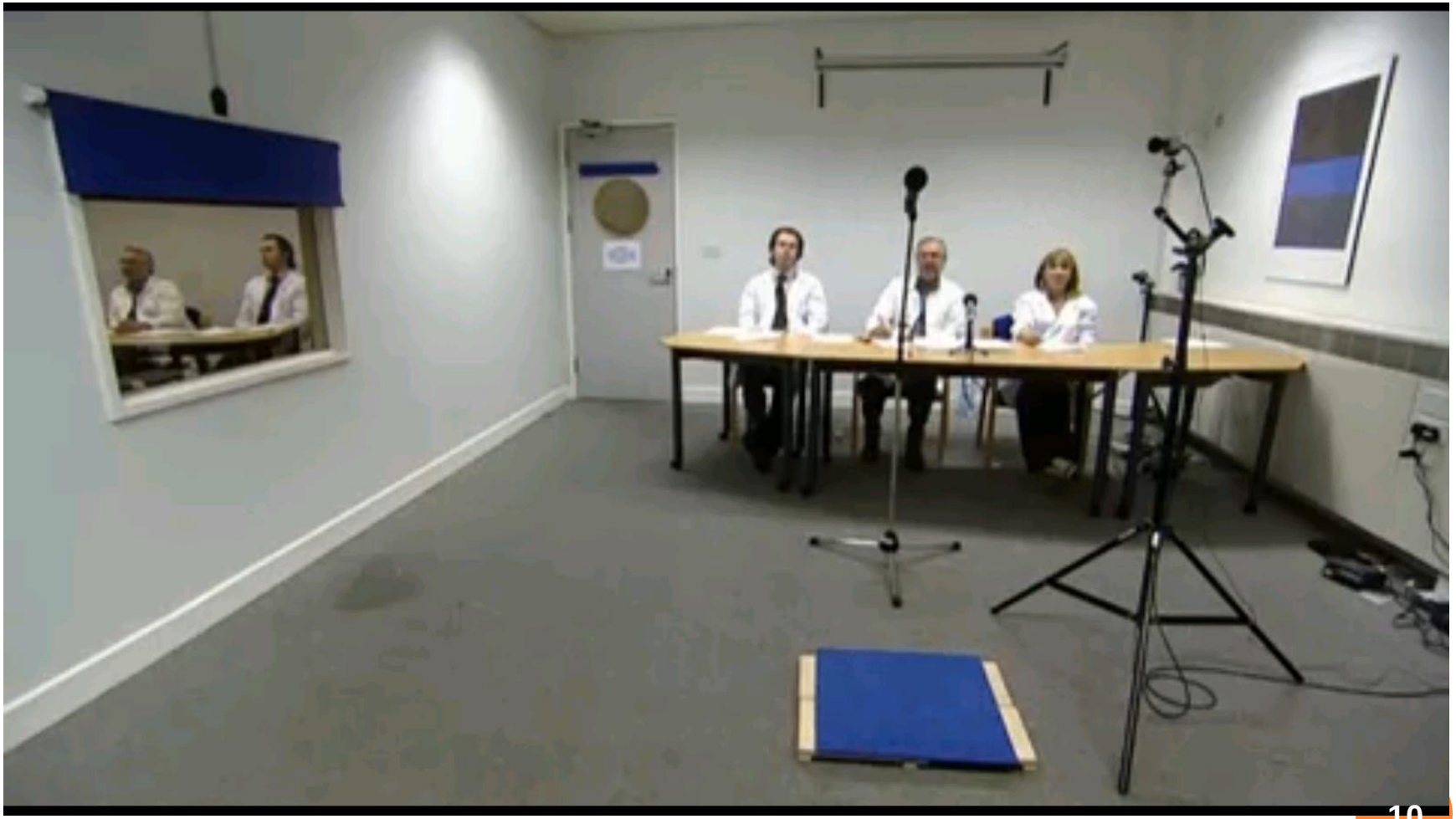
Effects of Acute Stress on DM
(Starcke & Brand, 2012)

- Deterioration in logical thinking, judgment
  - Greater **reliance on automatic response**
  - Distracted concentration
- Pre-occupation with an idea
  - **Fear of new ideas** or activities
  - Inability to learn, also from feedback
- Long-term consequences of decision neglected
- Altered feedback & emotional processing
- Reduced creativity (Ariely, 2009)
- Less objectivity
- Higher prosociality
  - (Takahashi et al., 2007, Von Dawans et al., 2012)
- Risk attitudes?

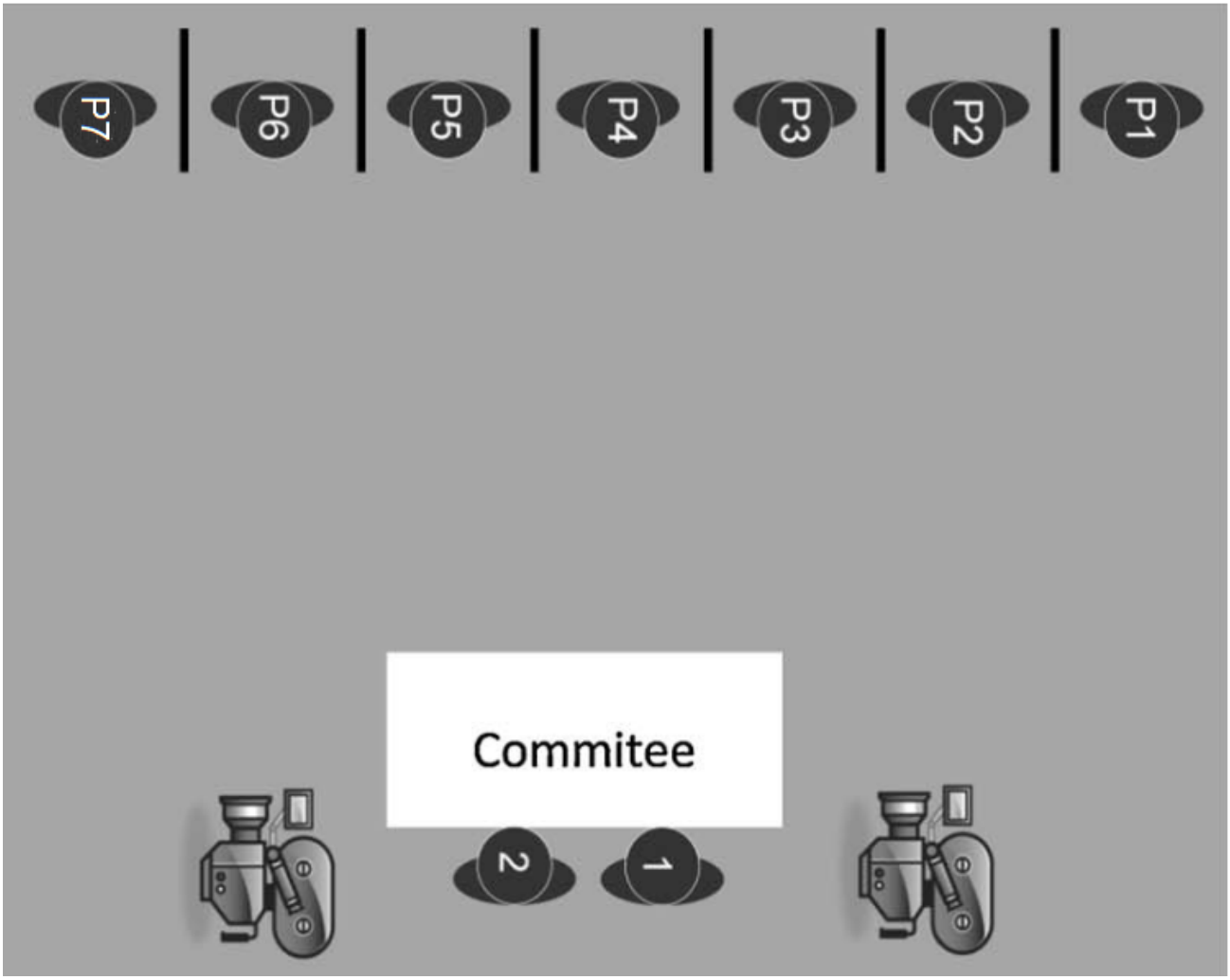
Research design - Stressor

- **Trier Social Stress Test** (TSST, Kirschbaum, 1993)
  - http://www.youtube.com/watch?v=aYI6lCeeT5g
  - for groups (von Dawans et al., 2011)
  - White coats, videocameras, no feedback
  - 1st part – **public speaking task**
    - Mock job interview
  - 2nd part – **mental arithmetic task**
    - 4785 -17 -17 -17 …
  - Control group
    - Similar nature of tasks, no stress
  - Debriefing
- **Measures**
  - Cortisol, heart-rate, MDM questionnaire

Research design – TSST



Source: youtube.com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P6
P5
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2
1

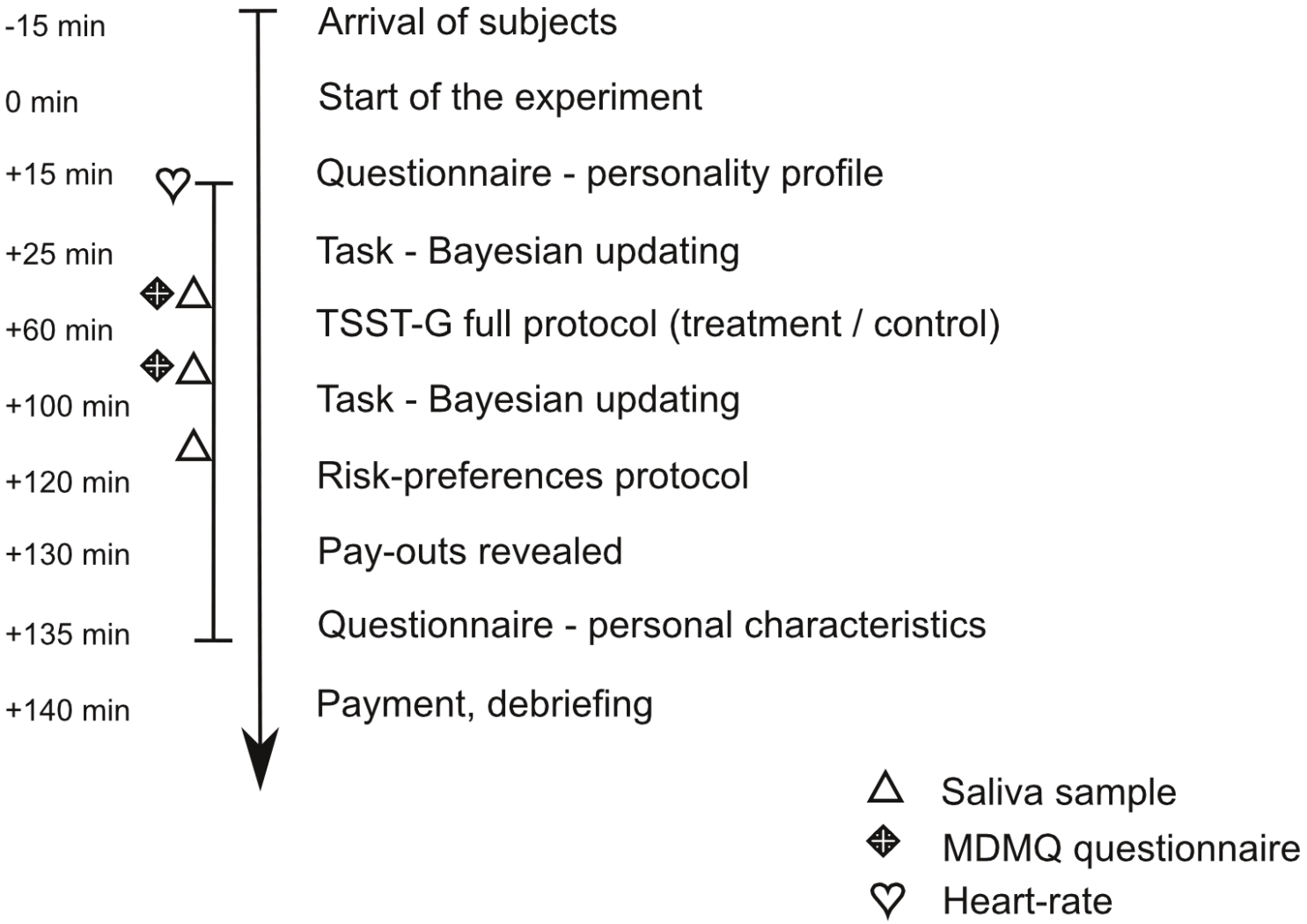
Risk Preferences under Acute Stress

Cahlíková & Cingl (2017)

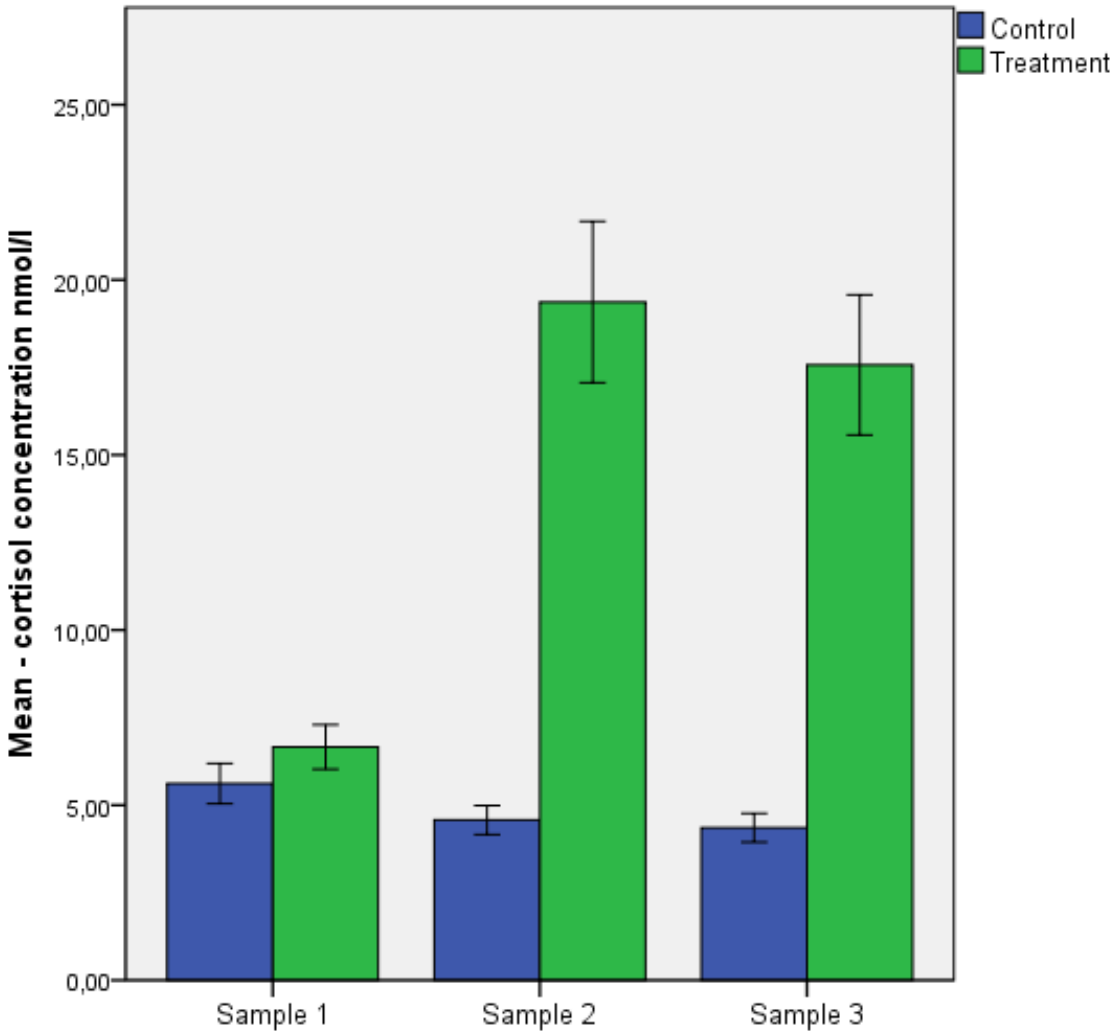
Motivation

- Many important risky decisions under stress
  - Market crash & stock trading
  - Doctors in emergency rooms
  - Police / army during strike
- **Related studies – inconclusive results**
  - Reasons:
    - Not efficient stressors
    - No proper control group
    - Repeated task – feedback processing
- Our stressor: TSST
- 151 healthy subjects
  - 70 M, 81 F

The timeline of the experiment



CORTISOL RESPONSE

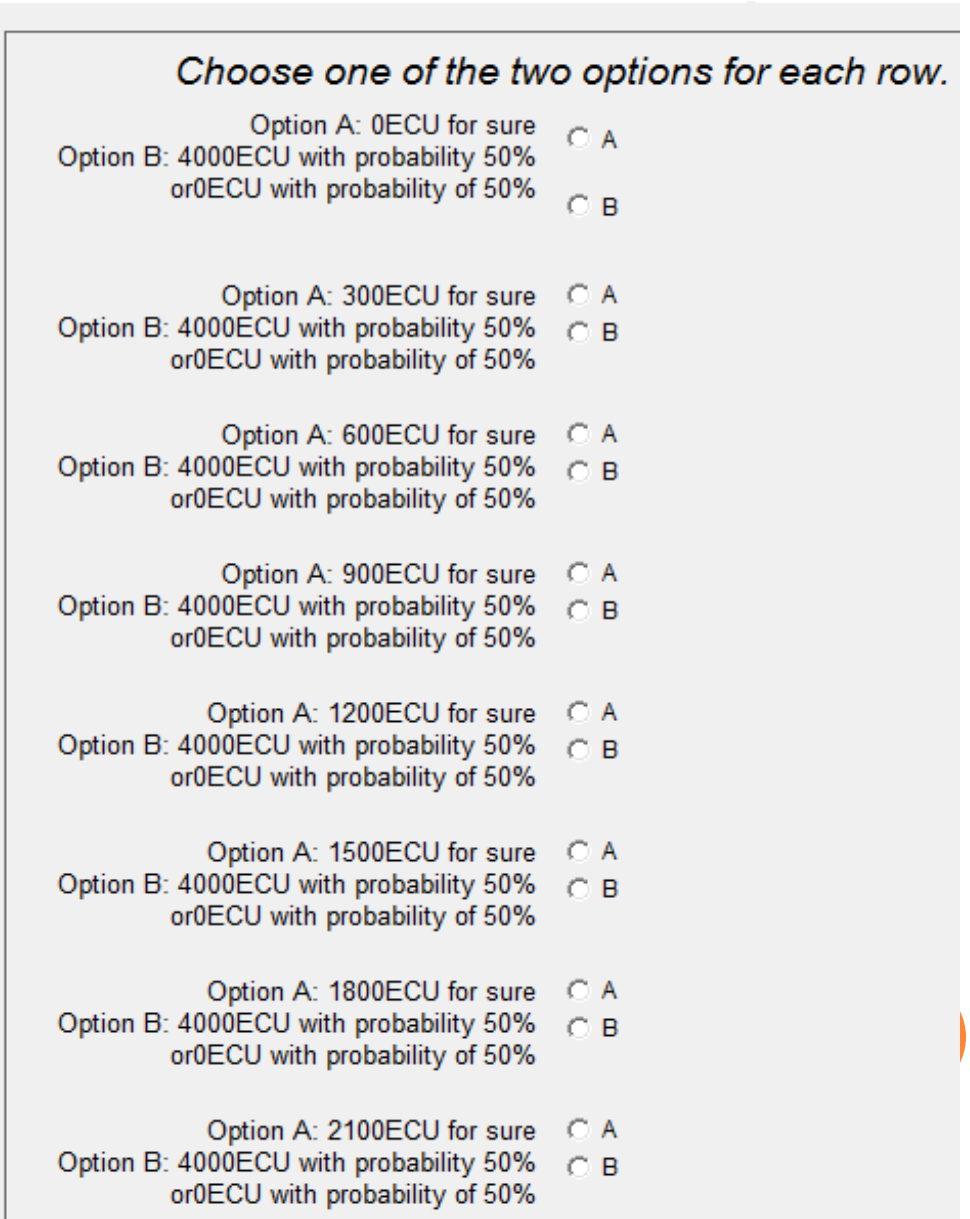


Error bars: +/- 1 SE

Risk-attitudes – task

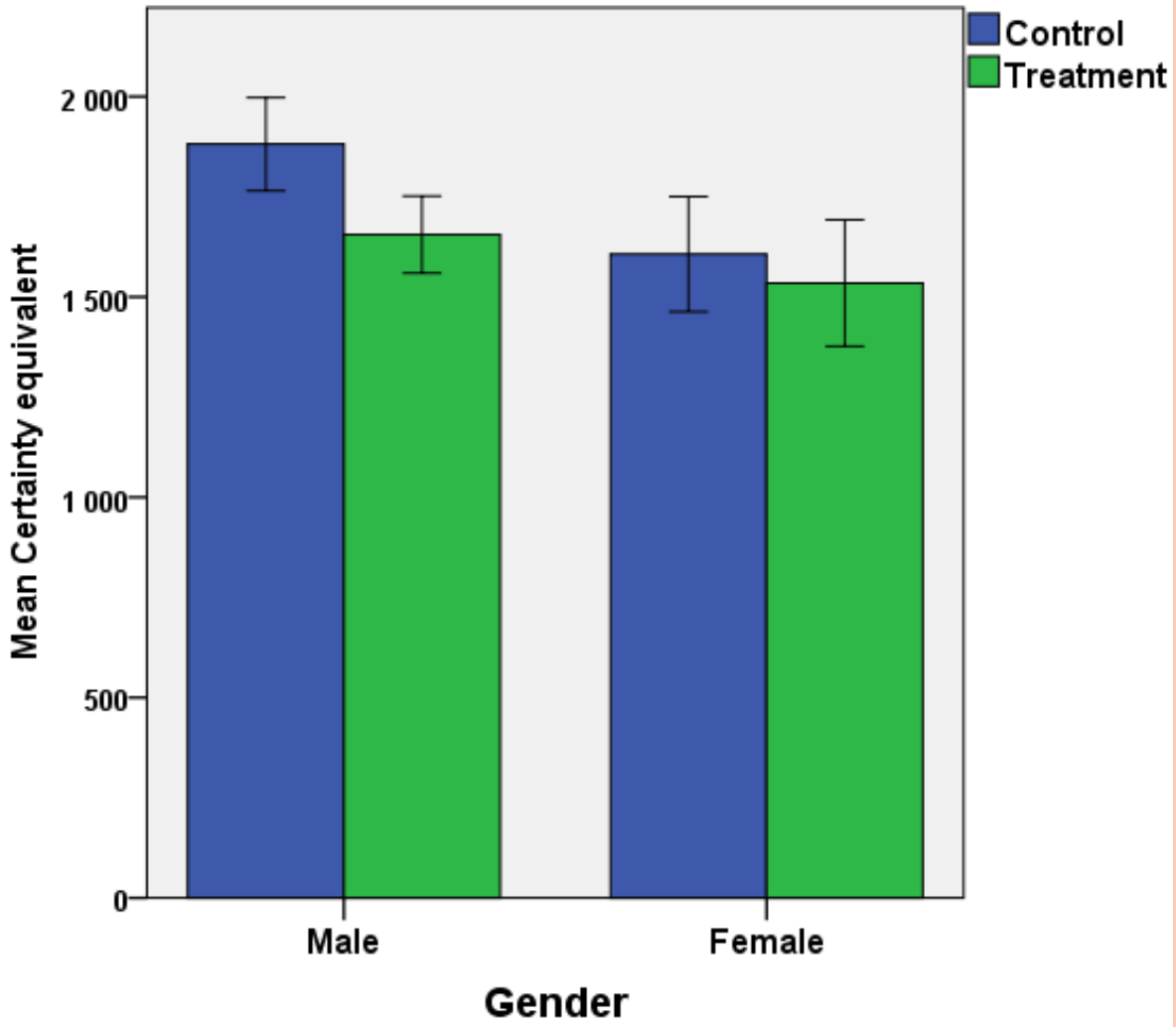
Dohmen et al. (2010, 2011)

- 10x choice: **safe payment** vs. **Lottery**
  - *„Do you prefer …“*
- Measure: Certainty equivalent
  - = Switching row
  - The higher, the more risk-seeking



RESULTS – **CAUSAL EFFECT** OF STRESS

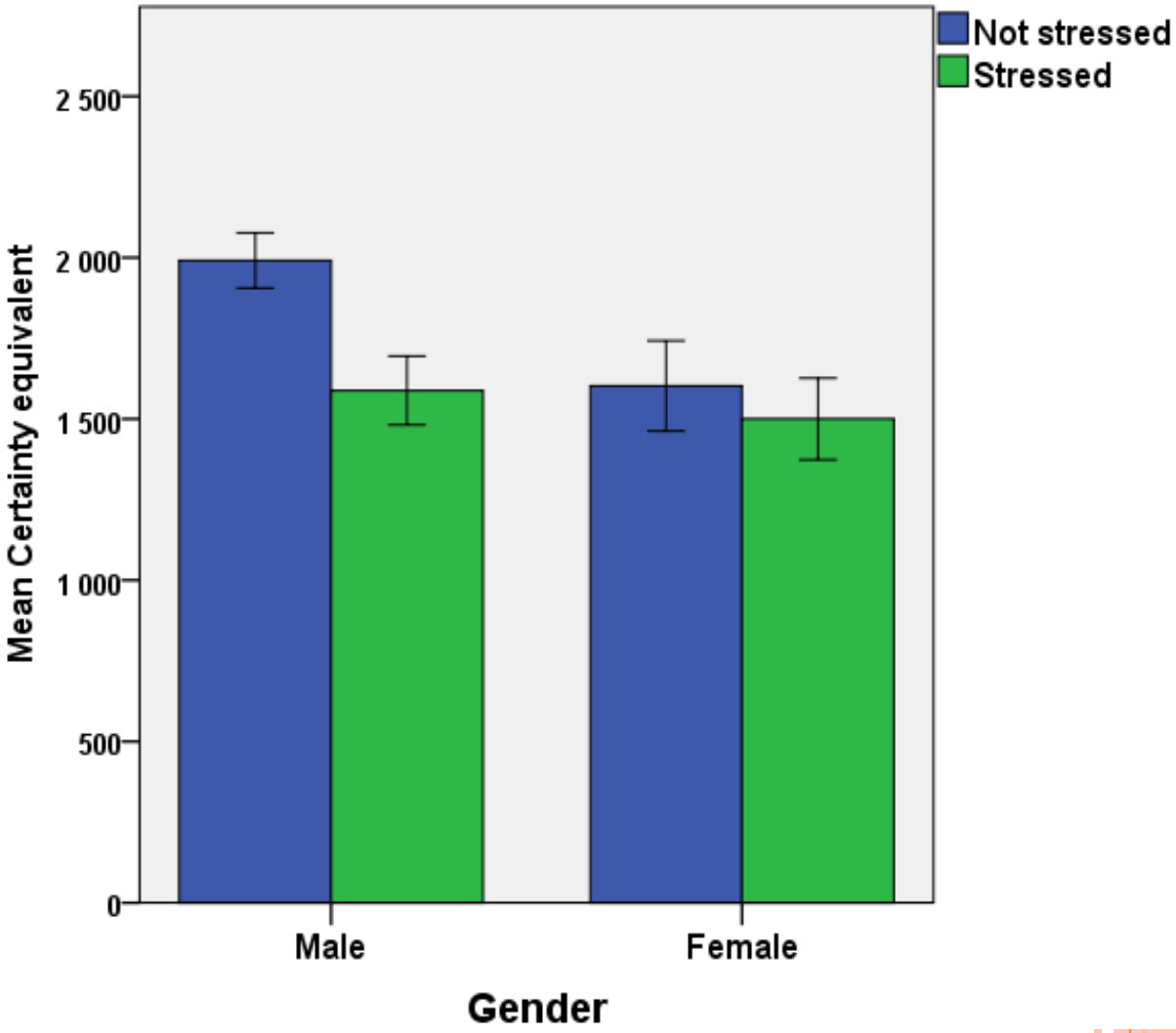
- (exposed vs not-exposed to stressor)
- **Males more risk-averse** when exposed to stress
  - * (p=0.092)
- Together M&F marginally significant (p=0.119)
- Regression: *
  - Controls: Gender, age, Big 5 personality profile



Error bars: +/- 1 SE

RESULTS – **CORRELATIONS**

- (stressed vs not stressed)
  - Stressed = cortisol increased
- **Stressed males more risk-averse** ** (p=0.016)
- **Together M&F more risk-averse** * (p=0.053)
- Regression: **
  - with controls ***



Error bars: +/- 1 SE

Risk-preferences - Conclusion

- Stress **increases risk-aversion**, controlling for personal characteristics
  - Driven by men
- **Acute vs. chronic** stress
  - (Voors et al., 2012) –chronic stress studies found increased risk-seeking
- **Real-life examples**
  - Investors seek „safe havens“ during market stress

- Other studies & replications: **mixed results**
  - Timing probably matters a lot

Competitiveness under stress

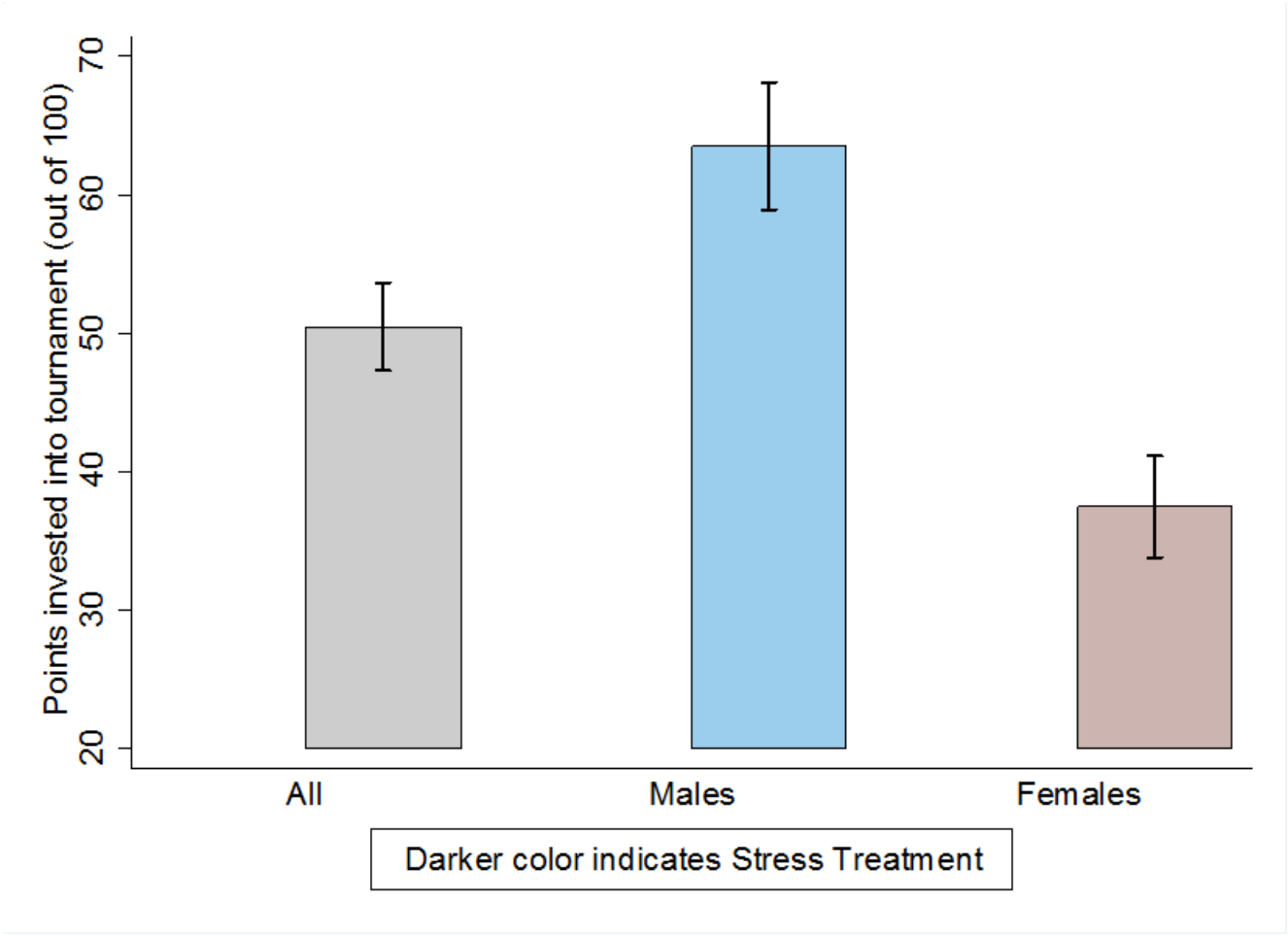
Willingness to compete
Cahlíková, Cingl, Levely 2017

- Low share of women in higher-level positions, segregation
- Approach to competition (Niederle & Vesterlund 2011):
  - Men more **willing to compete**
  - **Performance of men** responds more positively to an increase in competition
- Evidence:
  - Field: high-stakes exams (Jurajda & Munich 2011)
  - Lab: evidence is mixed, differs by setting and tasks (Gneezy and Rustichini 2004 vs. Niederle and Vesterlund 2007)
- Key career events (entrance exams, job interviews) involve **competing** against others, often in a very **stressful** environment
- ⇒ Competition = competitive incentives+stress
- ⇒ Effect of stress on performance and competitiveness

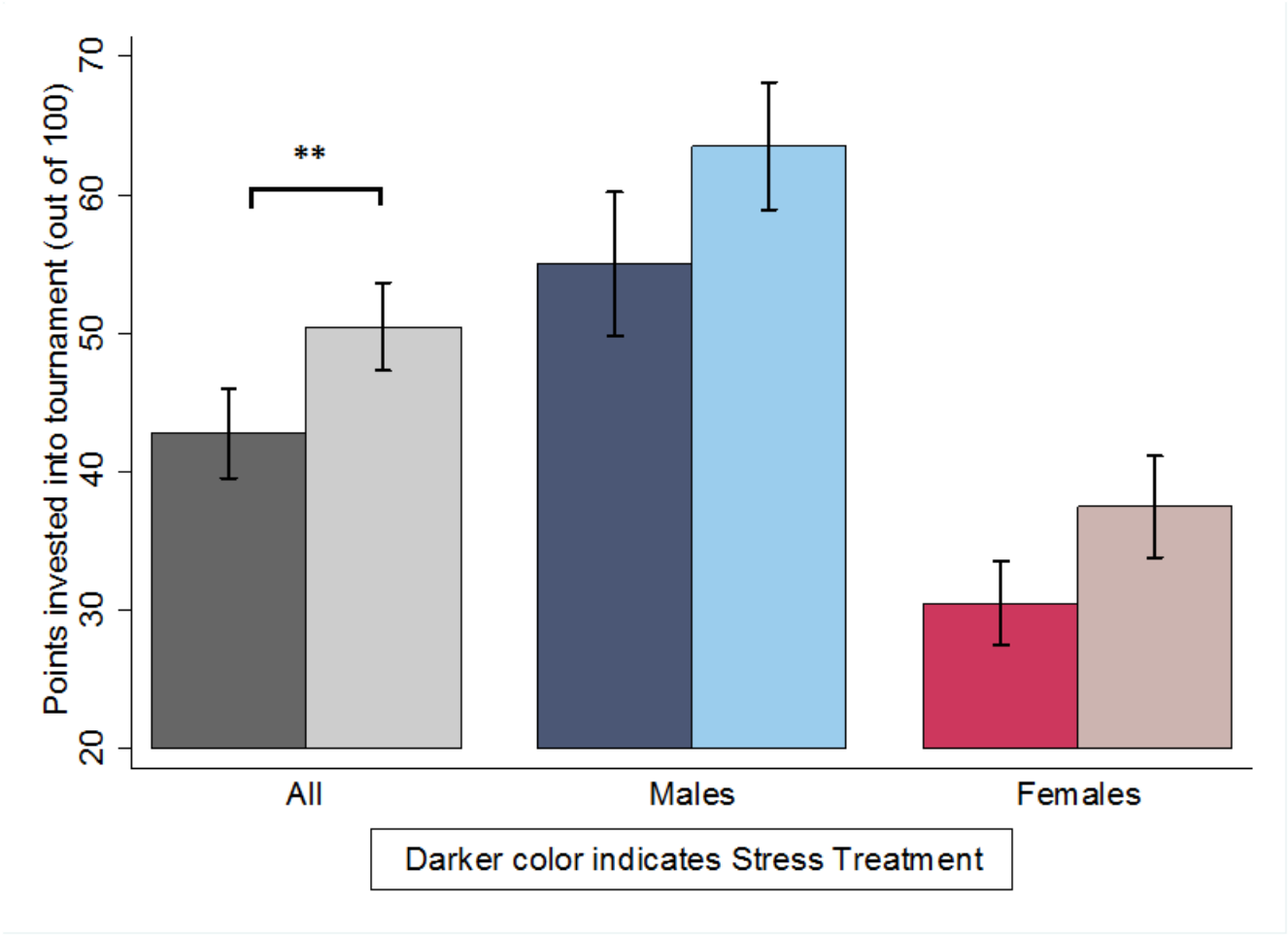
Design

- 190 subjects, 8/session, TSST-G
- **Task 1: Piece rate**
  - (25 CZK ≈ 1 euro per solved problem)
- Stressor Part 1: public speaking task
- **Task 2: Piece rate** (under stress)
  - (25 CZK ≈ 1 euro per solved problem)
- **Task 3: Tournament**
- Stressor Part 2 - ABC task
- **Task 4**: Linear **choice of compensation** scheme
  - main measure of WtC
- Task 5: Ex-post choice: WtC for Task 1
- Task 6: Ex-post choice: WtC for Task 2
- Risk preference task

Results


Points invested into tournament (out of 100)
20
30
40
50
60
70
All
Males
Females
Darker color indicates Stress Treatment

Results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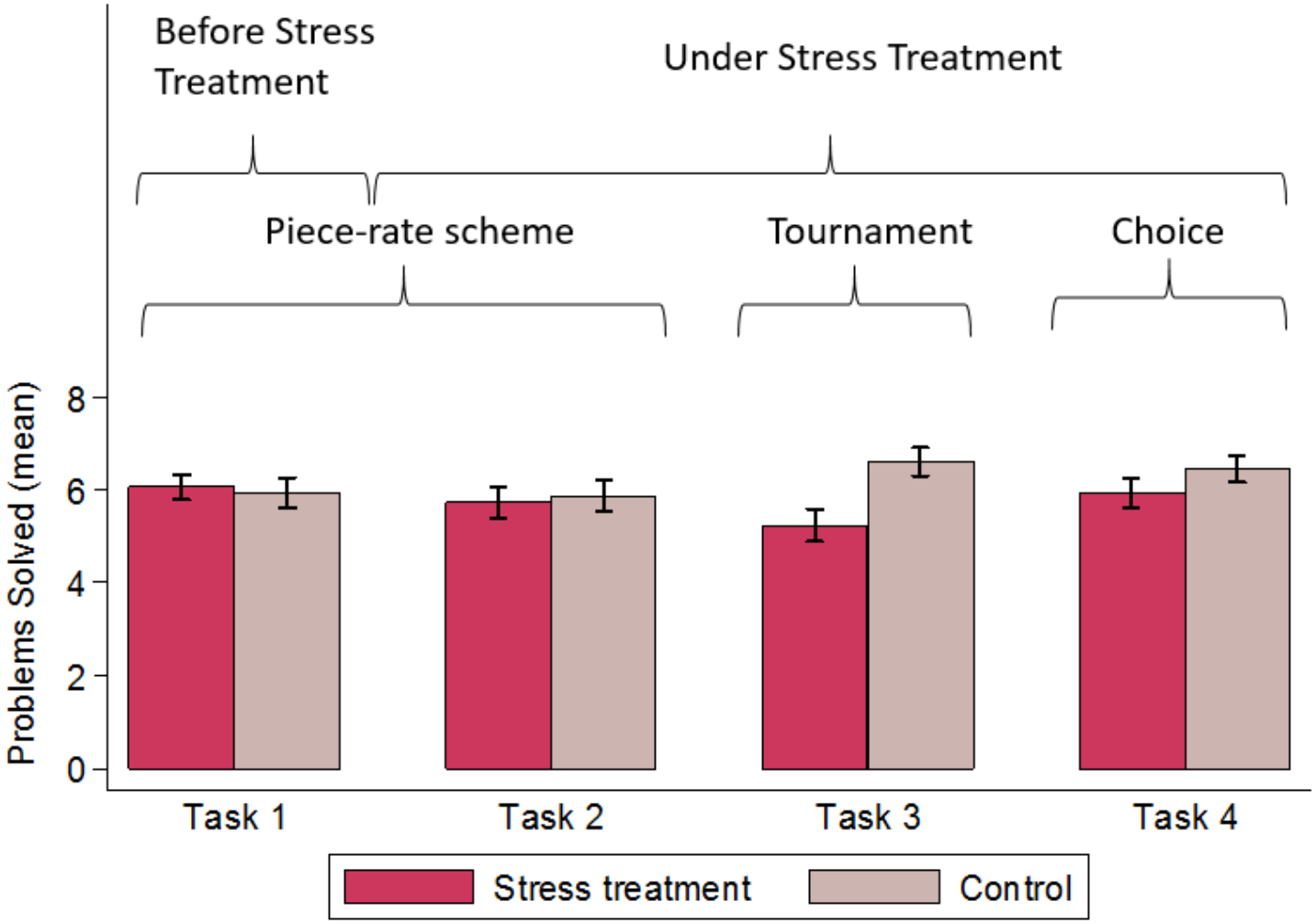
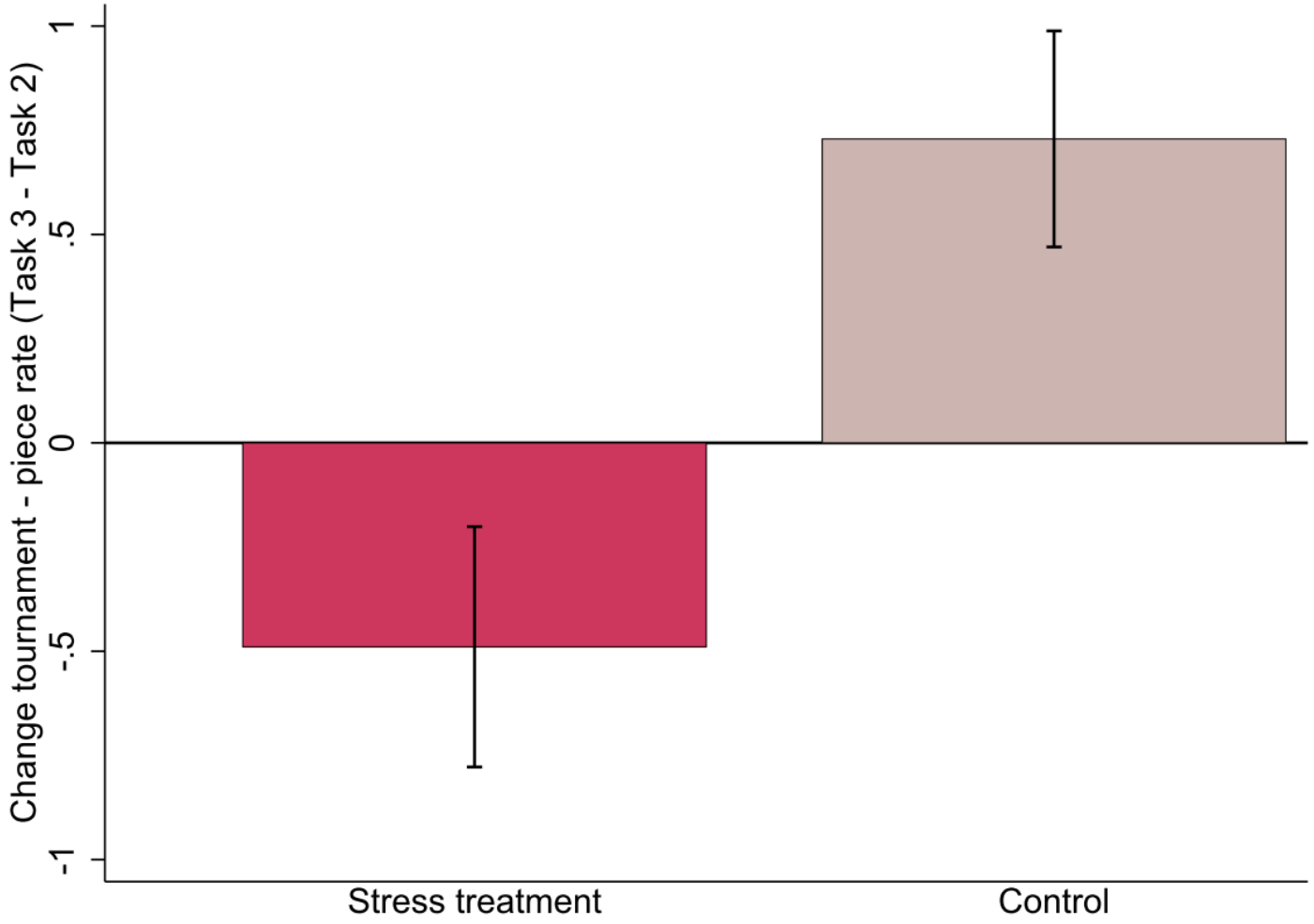
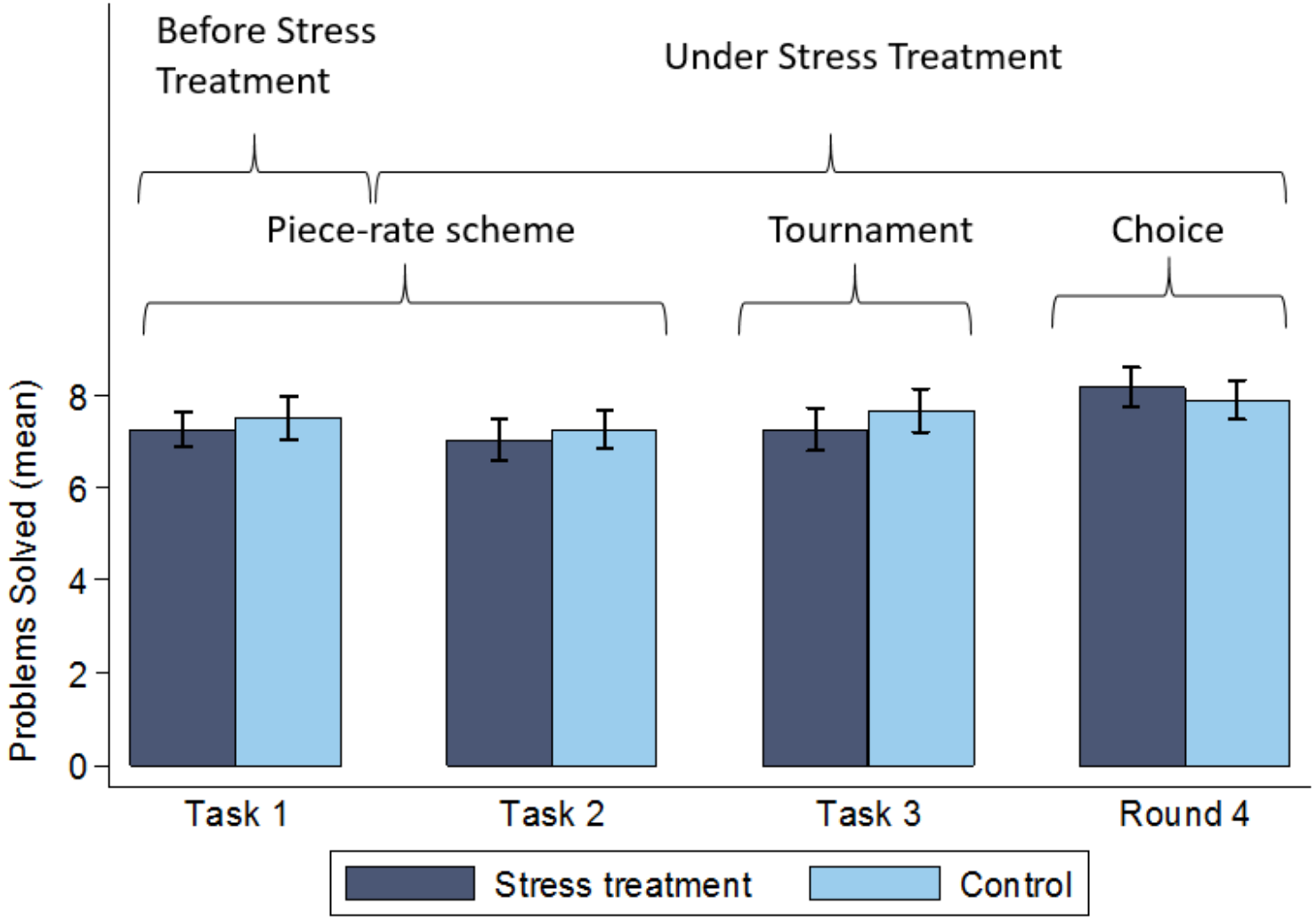
Results


Before Stress Treatment
Under Stress Treatment
Piece-rate scheme
Tournament
Choice
Problems Solved (mean)
0
2
4
6
8
Task 1
Task 2
Task 3
Task 4
Stress treatment
Control

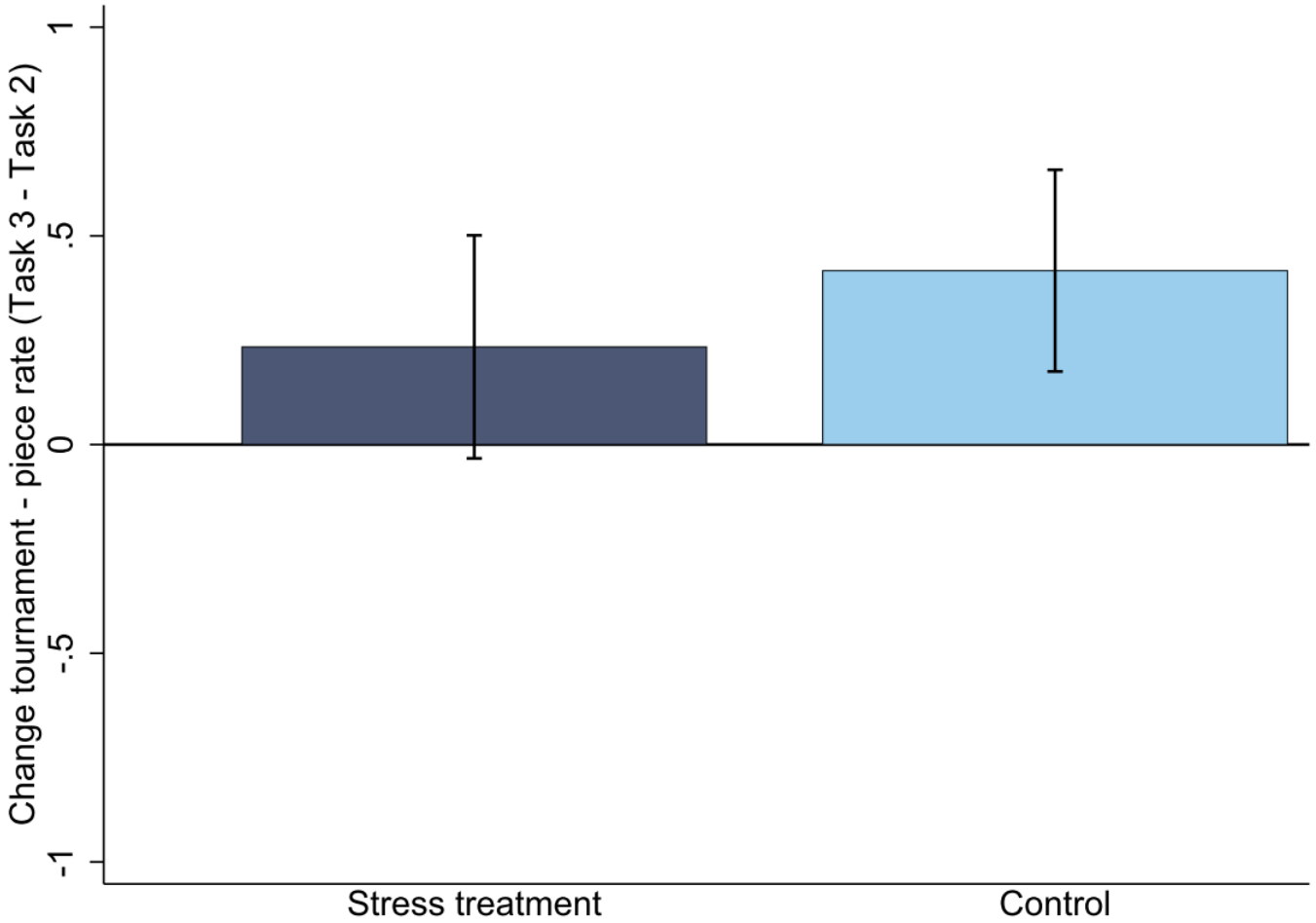
Results


Change tournament - piece rate (Task 3 - Task 2)
1
.5
0
-.5
-1
Stress treatment
Control

Results


Before Stress Treatment
Under Stress Treatment
Piece-rate scheme
Tournament
Choice
Problems Solved (mean)
0
2
4
6
8
Task 1
Task 2
Task 3
Round 4
Stress treatment
Control

Results


Change tournament - piece rate (Task 3 - Task 2)
1
.5
0
-.5
-1
Stress treatment
Control

Results summary

- No difference in ex-post WtC, confidence – same picture as WtC
- Tournament incentives work, but not for women under stress
  - Women under stress perform worse when forced to compete
  - ***interaction*** of psychosocial stress and competition is detrimental
  - Control women perform better under tournament, not a negative effect of stress when not competing
  - Also lower confidence in tournaments under stress
- Willingness to compete decreases under stress
  - Crucial for the results: have to compete under stress (no effect when only deciding under stress regarding past piece-rate performance)

Channels

- Women:
  - Lower WtC under stress linked to worse performance in tournaments under stress
    - (and lower related confidence)
- Men:
  - No effect of stress on performance or confidence
  - Not risk-preferences or feedback aversion
  - Not attention (d2 attention test)
  - Lower preference for performing in a competitive environment under stress (only ex-ante WtC affected)

Conclusion

- Psycho-social stress and competitive pressure may interact
- Overuse of competitive incentives may be detrimental to women
  - Path-dependence across sectors? Optimal management and hiring strategies can depend on initial gender composition
- Performance under stressful tournament may not reflect ability
  - E.g. Gender gap in grades vs. selective exams
- Policy implications for improving gender-balance
  - Choose appropriate hiring and management strategies
  - Lower stress; training and behavioral support
  - Lower competition - affirmative action?

Stress Management

Cross-Stressor Adaptation Hypothesis

- A stressor of sufficient intensity and/or duration will induce adaptation of stress response systems in general (also to other stressors)
- Exercise training is thought to develop cross-stressor tolerance:
  - Habituation: A decreased magnitude of response to some familiar challenge
  - (But: Sensitization: exercise is augmented source or response to a stressor)
- People report feeling less stress following acute exercise bouts
  - They are less stressed in general when they are physically active as opposed to being sedentary
- Mixed evidence so far

- http://www.ted.com/talks/chris_hadfield_what_i_learned_from_going_blind_in_space
- http://ed.ted.com/lessons/the-science-of-stage-fright-and-how-to-overcome-it-mikael-cho

Conclusion

- Stress has important effect on our lives
  - We cannot control it
- Acute vs chronic stress – different effects
  - Even opposing
- Behavioral effects
  - More intuitive, heuristical behavior
- Coping with stress: exercise may help
  - Repeated exposure to stressor decreases the response

Reading

- Mandatory:
  - Cahlíková, J., Cingl, L. (2017). “Risk Preferences under Acute Stress” *Experimental Economics*.
- Optional:
  - Goette, L., Bendahan, S., Thoresen, J., Hollis, F., & Sandi, C. (2015). Stress pulls us apart : Trait anxiety modulates self-confidence under stress. *Psychoneuroendocrinology*, 1–9. doi:10.1016/j.psyneuen.2015.01.019
  - Kemeny, M. E. (2003). The Psychobiology of Stress. *Current Directions in Psychological Science*, *12*(4), 124–129. doi:10.1111/1467-8721.01246
  - Starcke, K., & Brand, M. (2012). Decision making under stress: a selective review. *Neuroscience and Biobehavioral Reviews*, *36*(4), 1228–48. doi:10.1016/j.neubiorev.2012.02.003

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