



Change in sickness behavior assessed with the Sickness Questionnaire after endotoxin challenge is associated with the degree of change in inflammatory cytokines

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Background

The Sickness Questionnaire (Andreasson et al. 2016) is a newly developed questionnaire for self-reported sickness behavior in humans. Here, we tested how sickness behavior develops using the Sickness questionnaire in an experimental study where healthy subjects received 2.0 ng/kg endotoxin and were followed over 7 hours

Procedure

- 22 healthy subjects
- injected with lipopolysaccharide (2.0 ng/kg) and placebo
- within-subject design (minimum 20 days between sessions)

Assessments

- 5 time points: Baseline and 1.5 h, 3 h, 5 h and 7 hours after injection
- Sickness behavior: Sickness Questionnaire (Andreasson et al. 2016)
- Cytokines: interleukin (IL)-6, IL-8 and TNF-alpha (ELISA)
- Body temperature (Celsius)

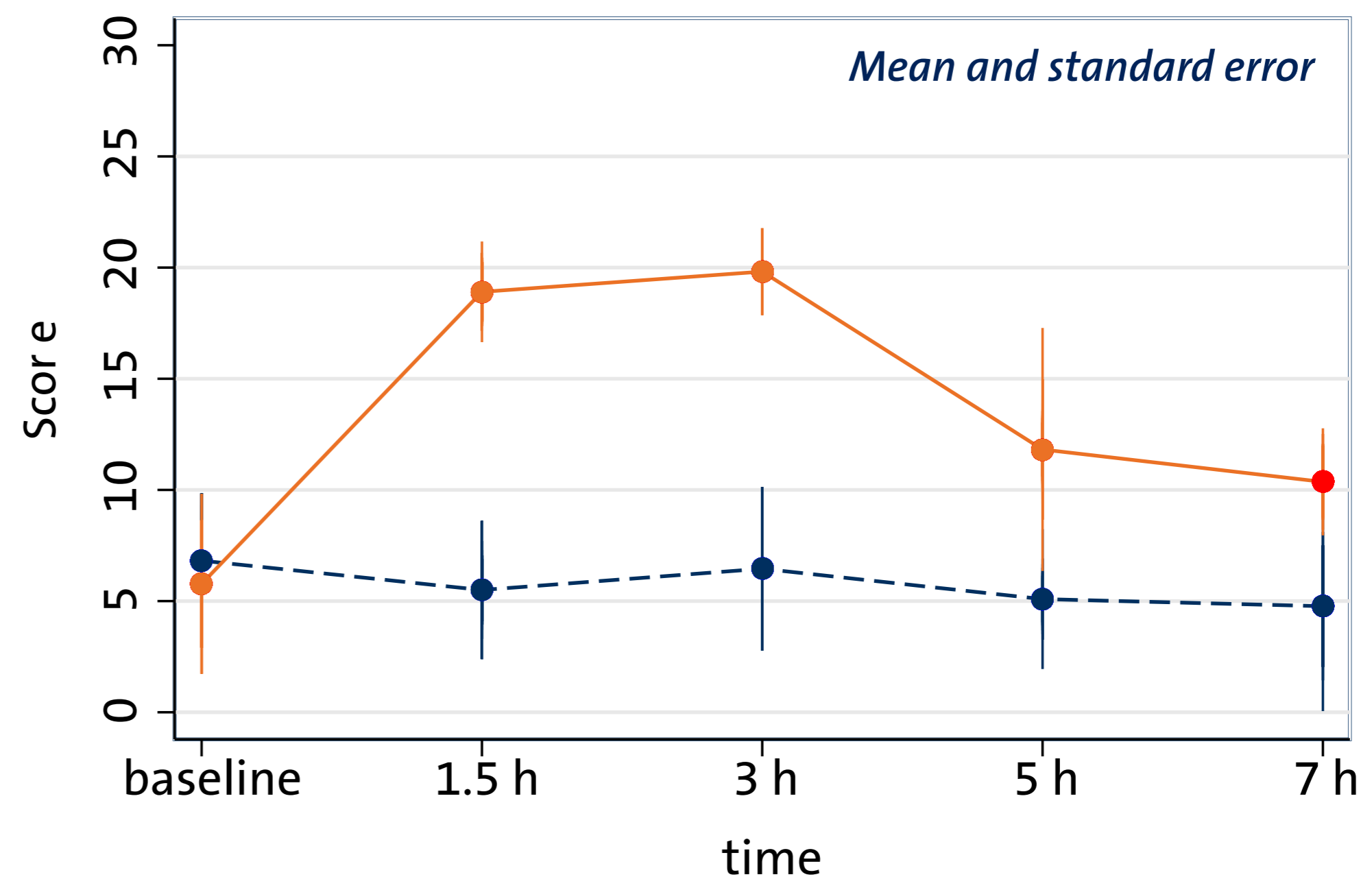
Statistics

1. The interaction between time and condition on sickness behavior was tested in a mixed effect regression analysis with id as random effect.
2. The association between relative change in cytokines, change in body temperature and change in sickness behavior after endotoxin injection was investigated in a mixed effect regression model including change between baseline and 1.5h, 1.5 to 3 h, 3 h to 5 h and 5 to 7 h.

Effect of endotoxin simulation on sickness behaviour over time

Sickness Questionnaire	b	95% Confidence interval	p
Time 1 (1.5 h vs baseline)	-1.32	-3.63-.99	0.26
Time 2 (3 h vs baseline)	-.36	-2.67-1.95	0.76
Time 3 (5 h vs baseline)	-1.73	-4.04-.58	0.14
Time 4 (7 h vs baseline)	-2.05	-4.35-.26	0.08
Condition (endotoxin)	-1.05	-3.35-1.26	0.375
Condition*Time 1	14.5	11.2-17.7	<.001
Condition*Time 2	14.4	11.1-17.7	<.001
Condition*Time 3	7.77	4.51-11.0	<.001
Condition*Time 4	6.64	3.37-9.90	<.001
Intercept	6.82	4.97-8.66	<.001

Sickness Questionnaire



Results

1. Sickness behavior peaked at 1.5 (score 18.9 vs baseline score 5.8) and 3 hours (score 19.8), and although a significant recovery was seen at 5 and 7 h (scores 11.8 and 10.4), had still not returned to baseline (b's=7.7 and 6.6, p's<.001).
2. The relative changes in all three cytokines (p's<.001) and change in body temperature (b=4.19, p<.001) were significantly associated with change in sickness behavior.

Conclusion

Change in sickness behavior assessed with the Sickness Questionnaire after endotoxin challenge is associated with the degree of change in inflammatory cytokines and change body temperature and can last for 7 hours, further supporting the validity of Sickness Questionnaire as a measure of cytokine induced sickness behavior.

References

Andreasson A, Wicksell RK, Lodin K, Karshikoff B, Axelsson J, Lekander M. A Global Measure of Sickness Behavior: Development of the Sickness Questionnaire. *J Health Psychol.* 2016 Jul 24. pii: 1359105316659917.

CONTACT