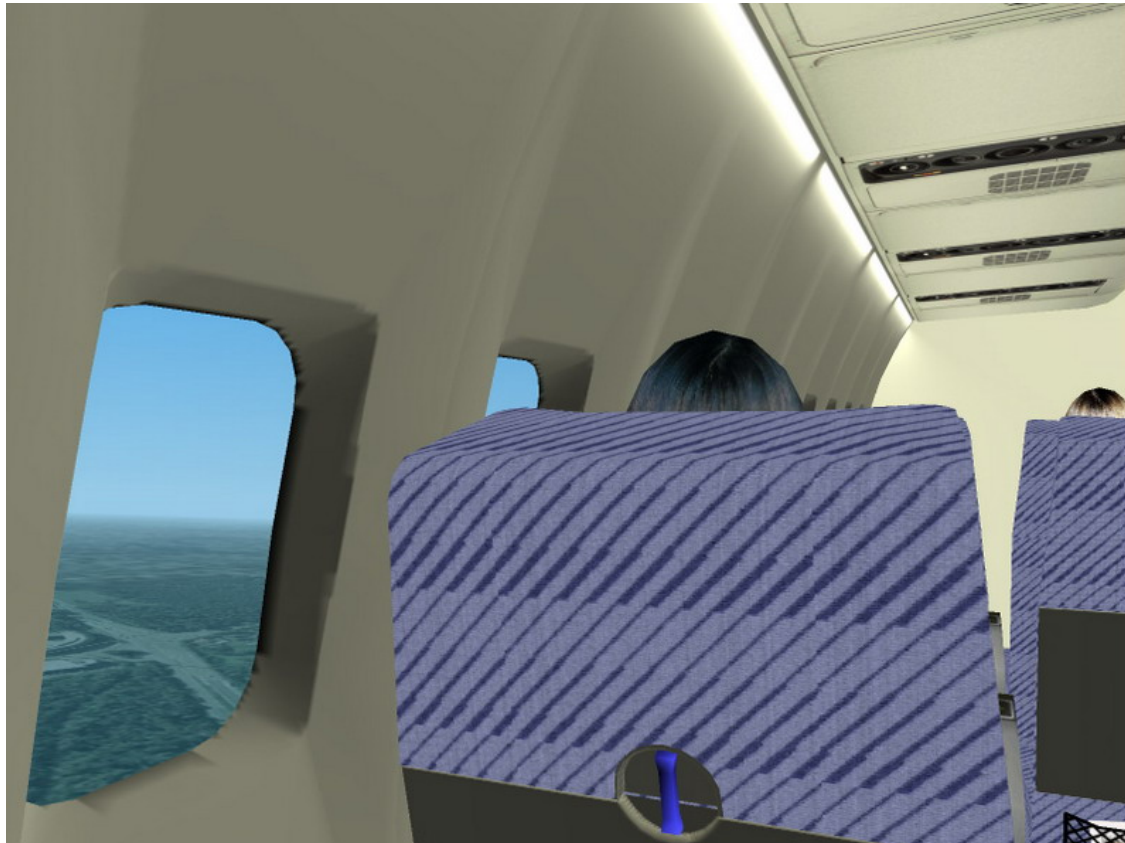


Subjective and physiologic reactions of flight phobics during
VR exposure and treatment outcome:

What adds motion simulation?



Subjective and physiologic reactions of flight phobics during
VR exposure and treatment outcome:

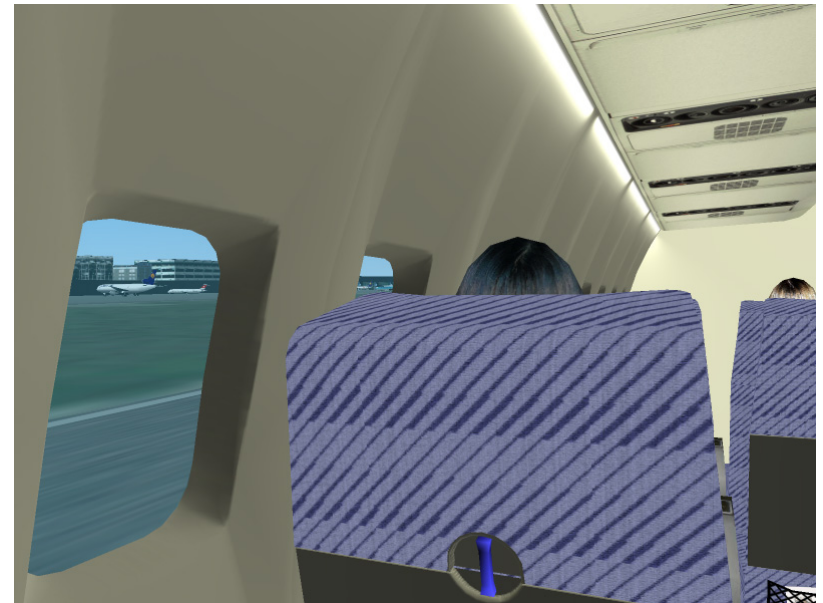
What adds motion simulation?

Andreas Mühlberger, Georg Wiedemann & Paul Pauli

Thanks to
Sonja Petrusek
Petra Wolf
Matthias Wieser

Heinrich Bühlhoff
MPI for Biological Cybernetics

Supported by the
Deutschen Akademie für Flugmedizin



Rationale: Exposure therapy



Mechanisms

- Physiology: habituation
- Psychology: change of irrational beliefs, e.g., danger expectancy

What must happen during exposure (Foa & Kozak, 1986)?

- experience of fear
- fear reaction habituates during exposure
- fear reaction vanishes with repeated exposure

Rationale: Exposure therapy



Network theory by Foa and Kozak:

- subjective and physiological activation
- habituation within and between exposures

Virtual Reality Exposure Therapy



VRET: Exposure not in reality, but in simulated environment

Questions based on network theory:

- Is fear elicited?**
- Is habituation taking place?**
- Last but not least: is fear of flying attenuated?**

Study questions



Two predictions from network theory when including motion simulation

- 1. More fear and physiological activation!**
- 2. Enhanced outcome of VR exposure!**

Premise 1: Effectivity



Effectivity of VRET for flying phobia: general results

VR exposure is effective (without motion simulation)

- Rothbaum, B.O., Hodges, L., Anderson, P.L., Price, L., & Smith, S. (2002). Twelve-month follow-up of virtual reality and standard exposure therapies for the fear of flying. *Journal of Consulting and Clinical Psychology, 70*, 428-432.
- Wiederhold, B.K., & Wiederhold, M.D. (2003). Three-year follow-up for virtual reality exposure for fear of flying. *CyberPsychology & Behavior, 6*, 441-445.

Premise 1: Effectivity



Effectivity of VRET for flying phobia: own approach

One session VR exposure is effective in reducing fear of flying!

Mühlberger, A., Wiedemann, G., & Pauli, P. (2003). Efficacy of a one-session virtual reality exposure treatment for fear of flying. *Psychotherapy Research*, 13, 323-336.

Mühlberger, A., Weik, A., Wiedemann, G. & Pauli, P. (in press). One-session virtual reality exposure treatment for fear of flying: one year follow-up and graduation flight accompaniment effects. *Psychotherapy Research*.

Premise 2: Fear activation



Participants: 20 flight phobics and matched controls

Simulation: 4 flights with turbulences

- **visual, acoustic and vestibular stimuli (motion)**

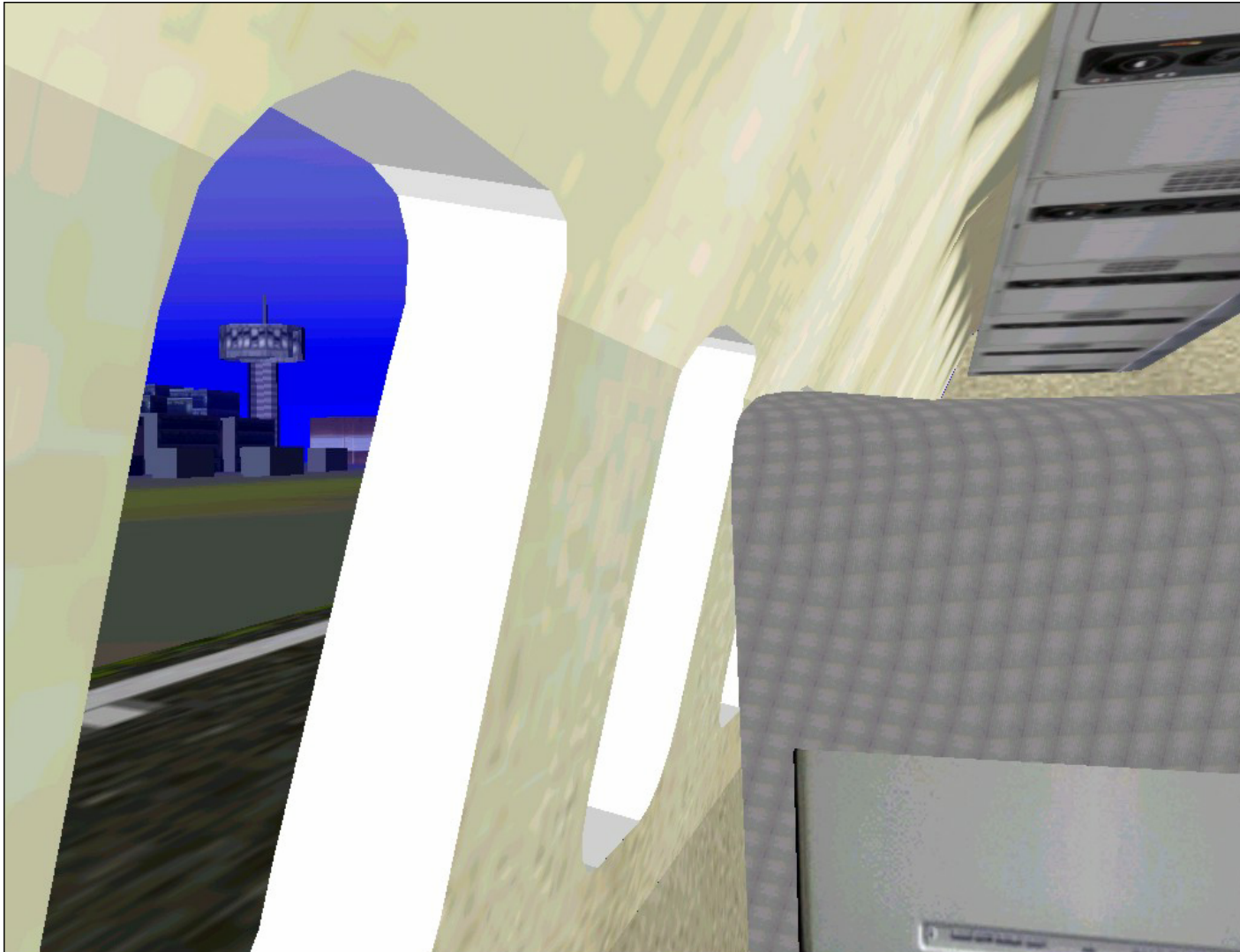
Mühlberger, A., Petrusek, S., Herrmann, M. J. & Pauli, P. (2005). Biocyberpsychologie: Subjektive und physiologische Reaktionen von Flugphobikern und Gesunden bei Exposition mit virtuellen Flügen. *Zeitschrift für Klinische Psychologie und Psychotherapie*. 34, 133-143.

Other study: Wiederhold, B.K., Jang, D.P., Kim, S.I., & Wiederhold, M.D. (2002). Physiological monitoring as an objective tool in virtual reality therapy. *CyberPsychology & Behavior*, 5, 77-82.

Flight simulator



„Airplane“, window view



„Airplane“, inside view



Premise 2: Fear activation



Participants: 20 flight phobics and matched controls

Simulation: 4 flights with turbulences

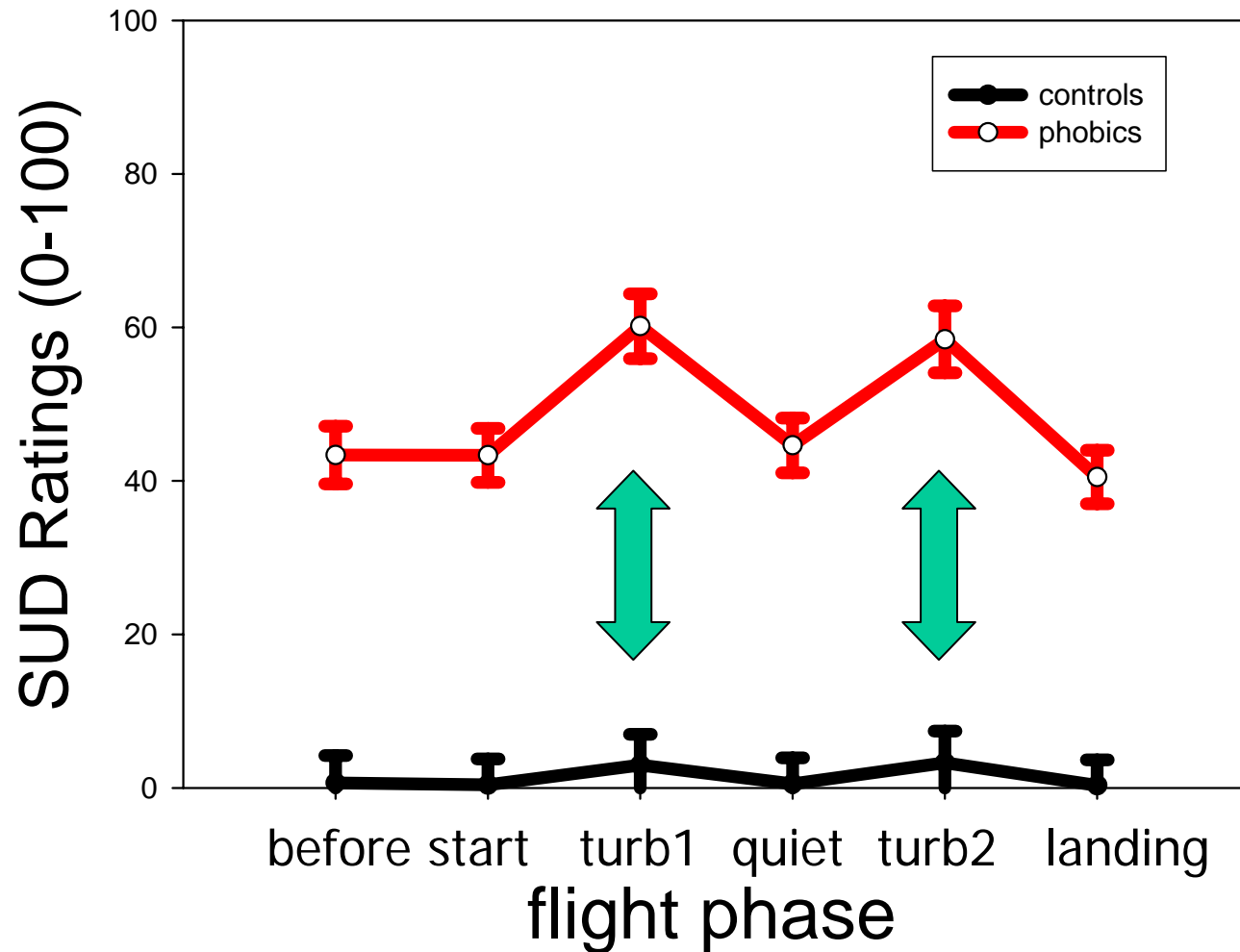
- **visual, acoustic and vestibular stimuli (motion)**

Measures: subjective fear, heart rate, skin conductance

Mühlberger, A., Petrusek, S., Herrmann, M. J. & Pauli, P. (2005). Biocyberpsychologie: Subjektive und physiologische Reaktionen von Flugphobikern und Gesunden bei Exposition mit virtuellen Flügen. *Zeitschrift für Klinische Psychologie und Psychotherapie*. 34, 133-143.

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Subjective Fear



Present study



What adds motion simulation?

Components of therapy



Information booklet

- fear & coping
- all about flying
- flying phobia and therapy

One individual session, about 3 hours

- treatment preparation, cognitive intervention
- 4 VR-flights, 18 min each

Design



VR Therapy

booklet, one hour preparation and 4 virtual flights

Experimental variation

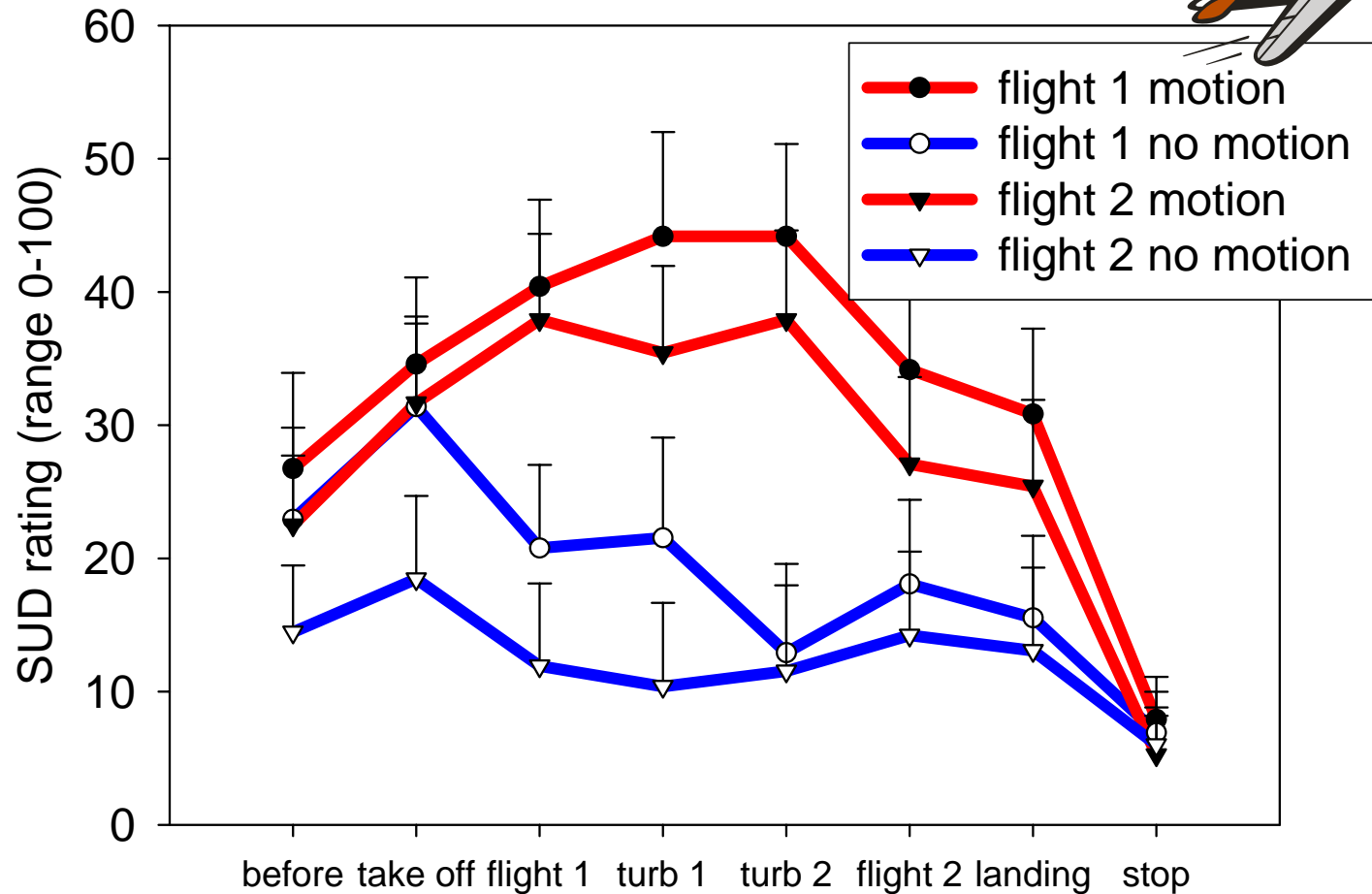
4 VR flights of 18 min each with **or** without motion simulation

Participants

25 flight phobics (12 with motion, 13 without)

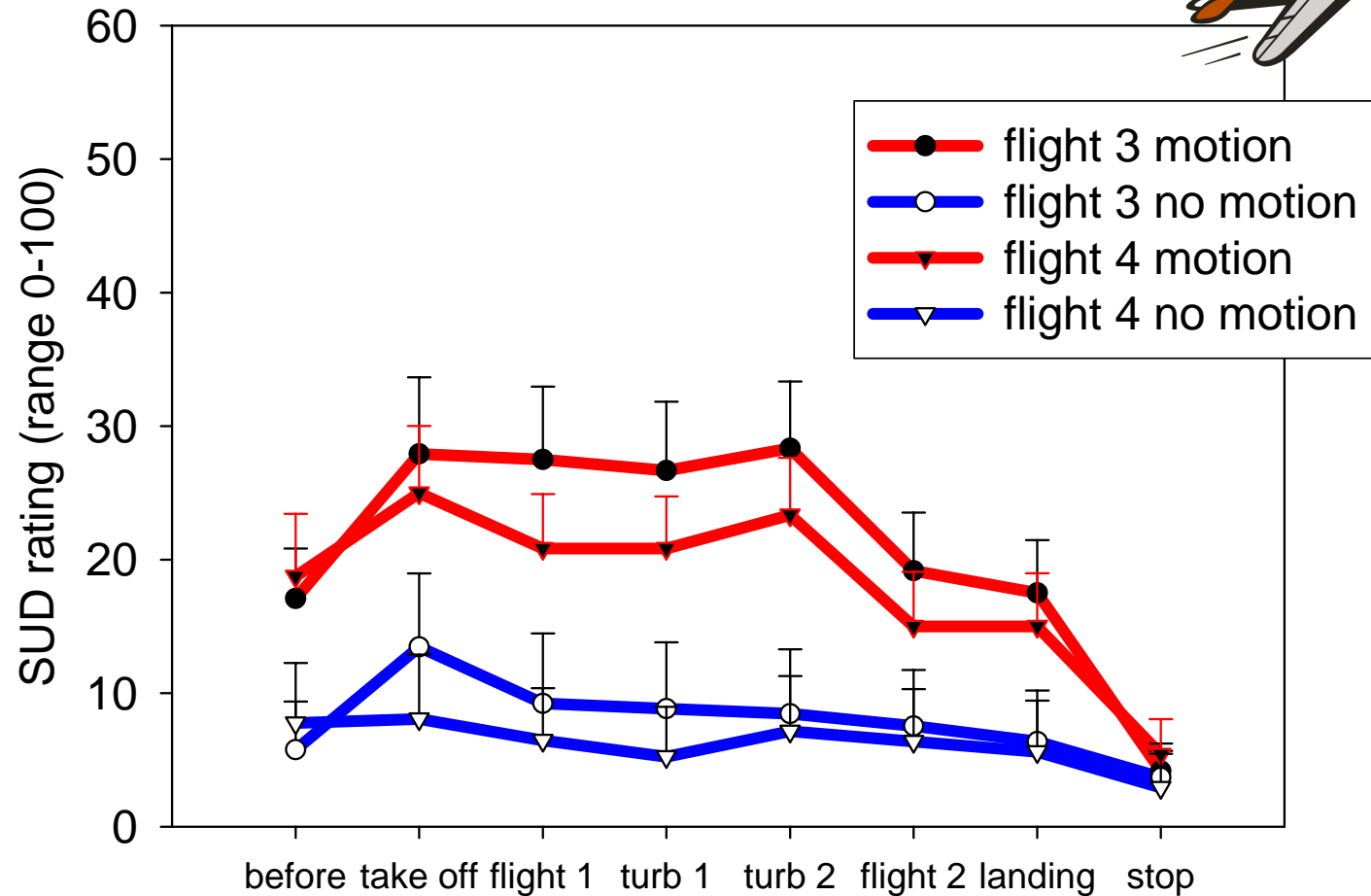
Virtual flights included start, quiet flight, turbulences and landing

Subjective fear, flights 1 & 2



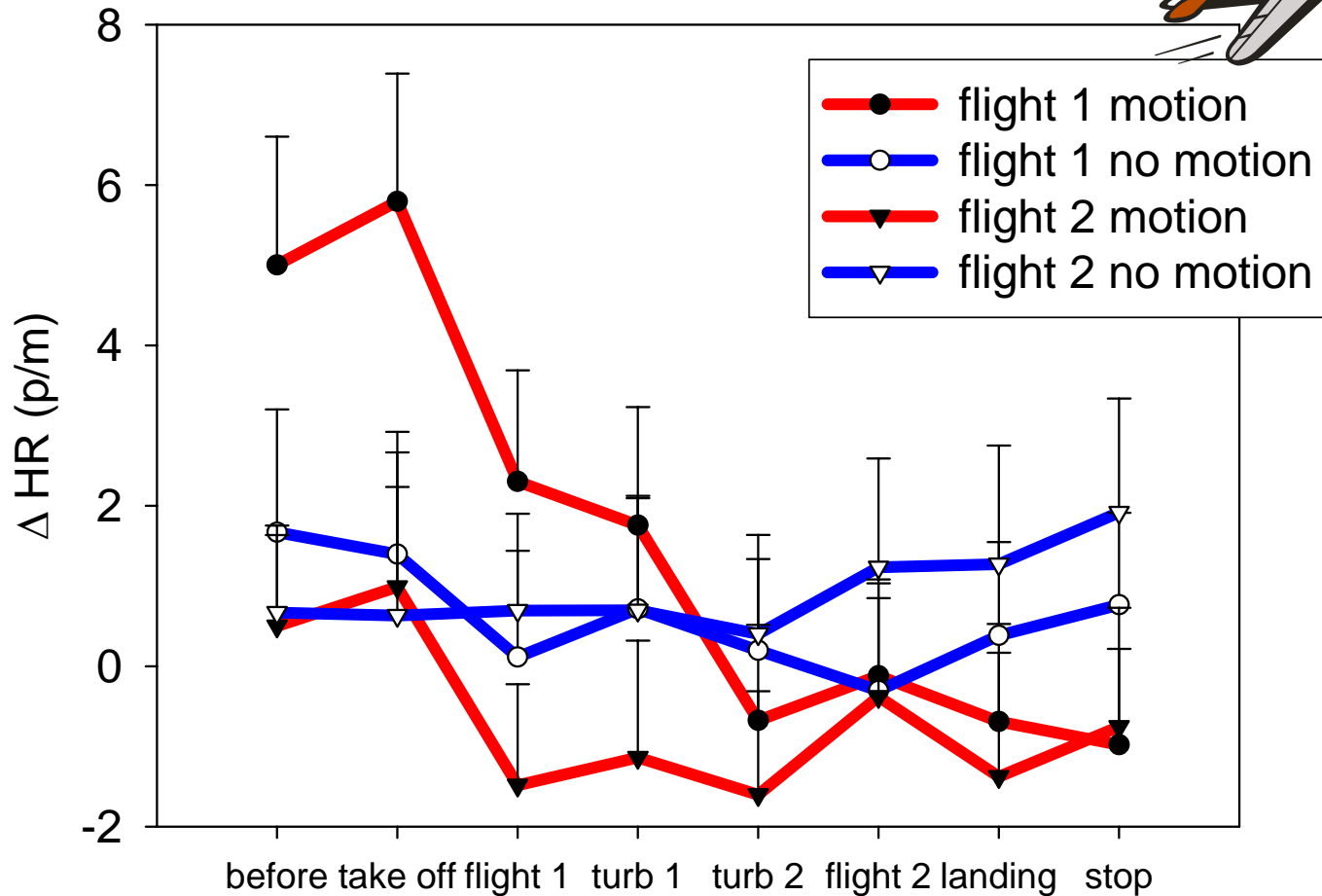
More fear with motion simulation!

Subjective fear, flights 3 & 4



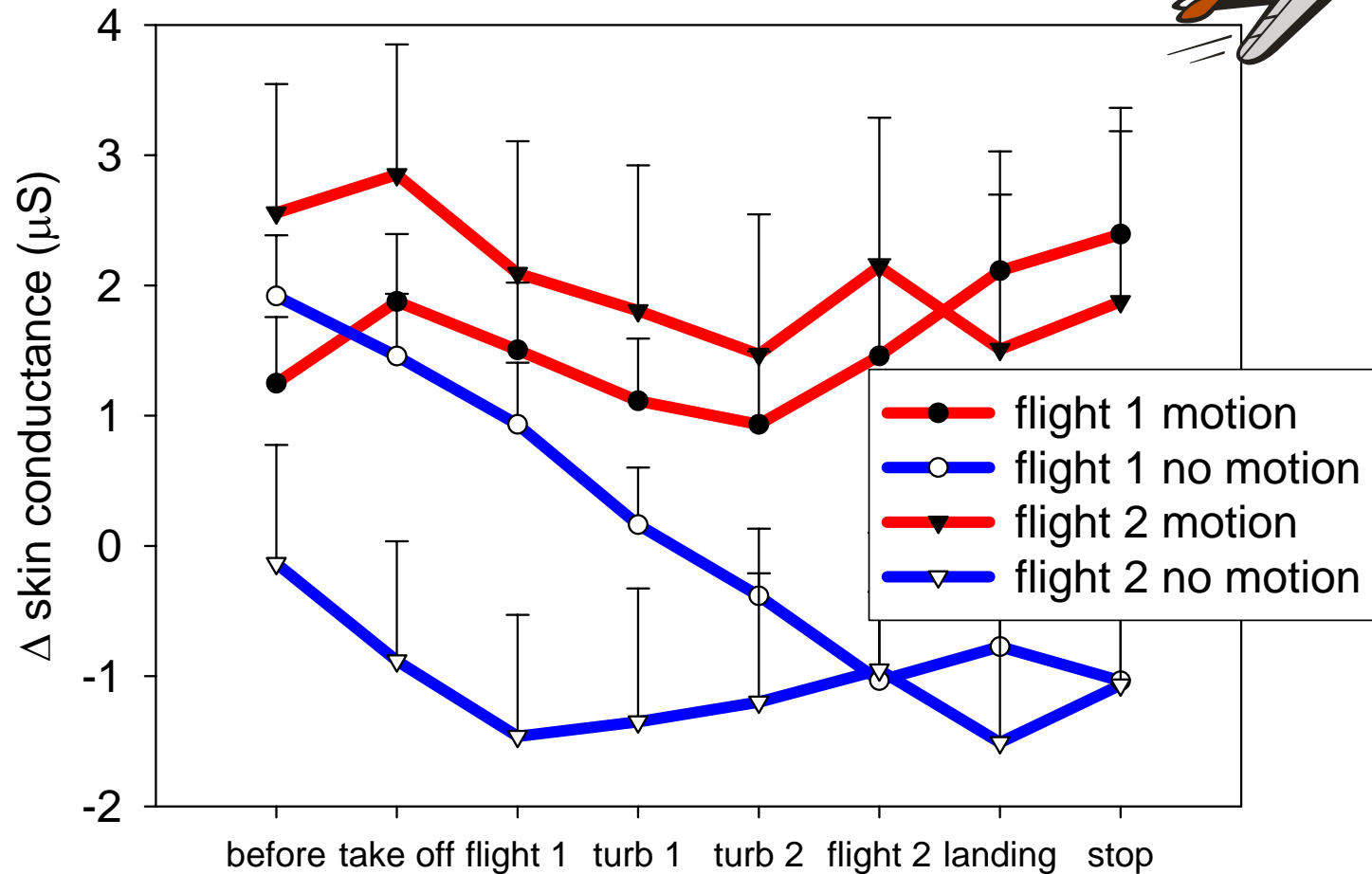
No difference in habituation of subjective fear!

Heart rate , flights 1 & 2



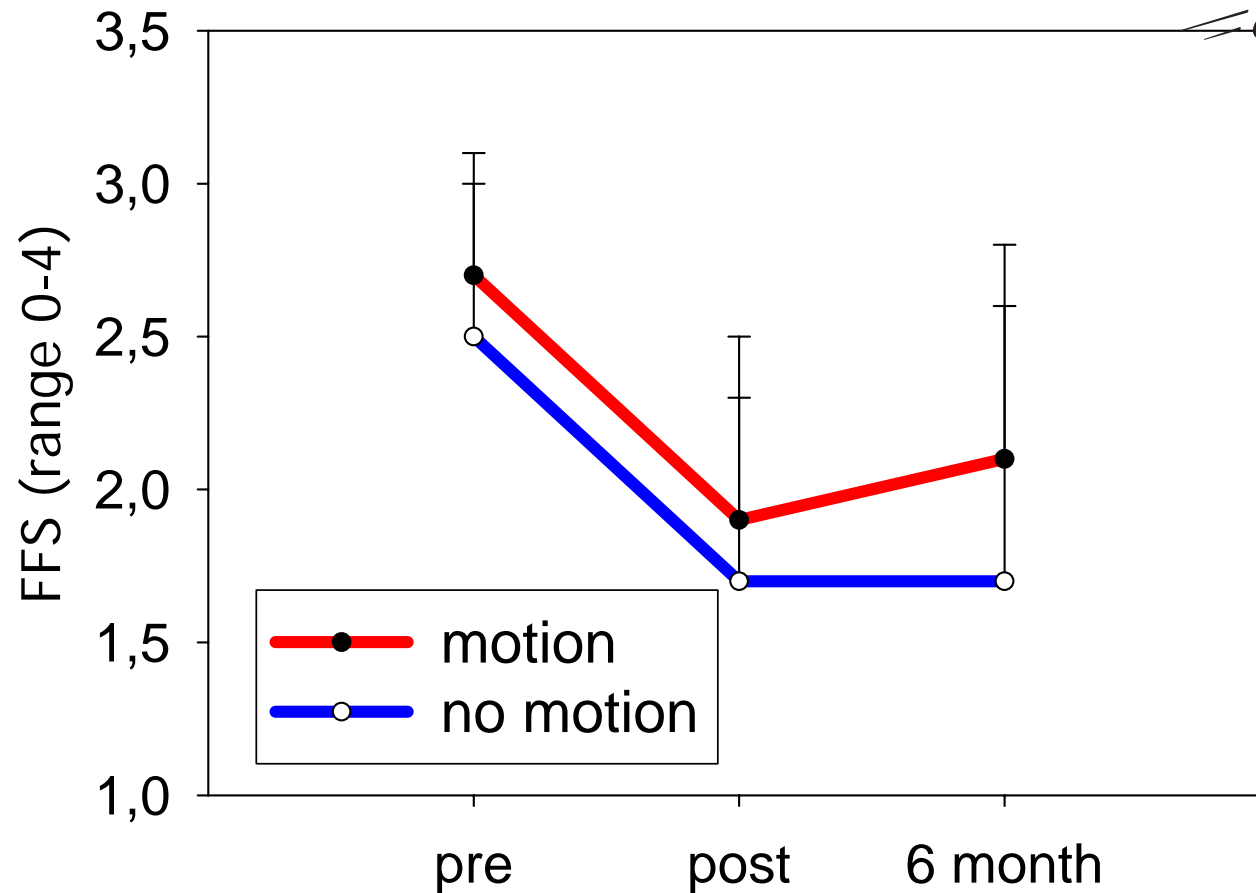
Higher initial heart rate with motion simulation!

Skin conductance, flights 1 & 2



Higher skin conductance with motion simulation!

Treatment Outcome



No difference in treatment outcome!

Summary of results

Flight simulation with motion elicits more subjective fear and physiological arousal.

Subjective fear habituates as fast as during flight simulation without motion, but on a generally lower level.

SCL habituates slower.

HR habituates fast, no reaction in group without motion simulation.

Both groups had a reasonable, but **similar outcome**.

Conclusions

Motion simulation is not a necessary component for treatment.

Initially elicited fear may not be the crucial point for treatment outcome.

Habituation more important?

Thanks for your attention!

