Anti Fear of Flying Seminar of Austrian: Physiological Recordings and Ratings

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Motivation of Study

Investigating physiological and psychological aspects (habituation, responses to specific aspects of flying, modulation by amount of fear) of people with flight anxiety during an anti fear of flying seminar by:

- Analysing autonomous arousal (HR, HRV)

- Oxygen saturation (SpO2)

- Stress (salivary cortisol)

- Perception of situation: Fear, aspects of control, physiological sensations, mood

Procedure of Seminar

1st day: Information about anxiety and aviation with clinical psychologist and professional pilot (headquarter Austrian).

2nd day: Confrontation – exposure in vitro exposure flight by simulator training, relaxation training, cognitive restructuring, training of coping skills, visit air-traffic control (at airport Schwechat, technical base).

3rd day: Technical and aerodynamic info, visit of an aircraft in the hangar of the airport, relaxation training in the airplane, briefing and explanation of pilots and crew for the flight, scheduled commercial flight in Europe (London, Oct. 2004, n=14; Amsterdam, Mar 2005, n=13; London, Mai 2005, n=8) out and in.

Behavioral and Cognitive Group Treatment for Fear of Flying

(Van Gerwen, L., Dysart, R., Rondos, J., & Wolfger, R., 2006)

Concept behind Anti Fear of Flight Seminar:

- Training program in group-setting
- Training by clinical psychologist and professional pilot
- Information of relevant psychological factors involved in fear and anxiety, cognitive model of panic and anxiety
- Information about aerodynamics
- Information about traffic control and meteorogical aspects
- Relaxation exercises and breathing exercises
- Coping skills: Learning skills for handling phobic problems,
- Systematic de-sensation (visit airplane, simulator, real flights)
- Building of personal fear hierarchies and acceptance of fear

Design, Subjects and Procedure

- 3 X 55 ANOVA design of Group (Control, Anxious, Highly Anxious) X Conditions (repeated factor)
- 24 Participants of anti fear of flying seminar
- 9 Control persons
- Procedure:
  - ECG recordings during all days of seminar (Controls only during flights)
  - SpO2: Spot measures 2-5 times per day
  - Cortisol: On the flights out during descend
  - Ratings of flight anxiety (pre- and post seminar)
  - Ratings of moods etc. on each day at specific epochs

Recordings and Equipment

Holter ECG - MK3 TOM for ECG recordings

Medilog simple view software for visualisation and analyzing of signals (ECG, HR, Respiration).

Finger- pulse- oxyometer (clip) for oxygen saturation and pulse.

Cortisol salvia sampling to determine the level of stress.

Measures (Variables)

Ratings

- Flight Anxiety Situations (FAS) questionnaire (Van Gerwen et al., 1999)
  - Anticipatory Flight Anxiety Scale
  - In-Flight Anxiety Scale
  - Generalized Anxiety Scale

- Flight Anxiety Modality (FAM) questionnaire (Van Gerwen et al., 1999)
  - Somatic Modality
  - Cognitive Modality
  - Panic-score
  - Number of Panic-items rated

- State-Trait-Inventory (Spielberger et al., 1970)
  - State anxiety
  - Trait anxiety

- Fear and Mood:
  - physiological sensation (Cronbach alpha = .82)
  - diffuse fear (Cronbach alpha = .74)
  - cognitive fear (Cronbach alpha = .77)
  - unconfidence joyless. (Cronbach alpha = .90).

Measures (Variables)

Physiological variables

- Mean heart rate (HR)
    - Intervalls of 5 min
    - Only blocks with 5 successive valid PQRST-appearence were analysed

- Heart rate variability (HRV) calculated from N-N intervalls (4 kHz)
    - pNN50 (percent of sucessive N-N intervall >50 msec)
    - LF% (percent of power in the range of 0.04 Hz – 0.15 Hz of total power)
    - HF% (percent of power in the range of 0.15 Hz – 0.40 Hz of total power)
    - Log LF/HF

- Oxygen Saturation (SpO2)
    - From the fingerpuls by a clip

- Salivary cortisol

Overview of the procedure for 3 seminars
(Seminar1: AMS, Seminar2: AMS, Seminar3: LON)

Pre seminar		Day 1 Theory	Day 2 Simulator	Day 3 Crew Real flights	Post seminar
R A T I N G S	Control n = 9	----------------	---------------	Mood+Fear: 6t SpO$_2$: 5t Cortisol HR, HRV: 24t	R A T I N G S
	Anxious n = 15	Moods+Fear: 2t SpO2: 2t Cortisol HR, HRV: t1-7	Moods+Fear: 3t SpO2: 3t Cortisol HR, HRV: t8-20	Mood+Fear: 6t SpO2: 5t Cortisol HR, HRV: t21-55	
	Very Anxious n = 9	Moods: 2t SpO2: 2t Cortisol HR, HRV: t1-7	Moods: 3t SpO2: 3t Cortisol HR, HRV: t8-20	Moods: 6t SpO2: 5t Cortisol HR, HRV: t21-55	

Subjects in Groups

	Controls	Anxious	Highly Anxious
N	9	15	9
Fem.	4	10	5
Male	5	5	4
Age	32.4 $\pm$ 11.4	43.2 $\pm$ 10.9	36.8 $\pm$ 14.2
BMI	22.8 $\pm$ 1.4	24.96 $\pm$ 3.96	23.98 $\pm$ 4.4

Grouping of anxious Ss into "Anxious" and "Highly Anxious"
       FAS score general >31 and
       FAS total >47

No group difference (all *p's* > .10) regarding
- ✓ number of flights taken
- ✓ fear level during the last flight
- ✓ Interventions against fear
- ✓ Demographic variables

Mean HR (bpm)

Legend:
- 0 Controls (n=9)
- 1 Anxious (n=15)
- 2 Highly Anxious (n=9)

Day 1 therory

Day 2 flight-simulator

Day 3 real flight

Take-off 1

Take-off 2

Y-axis: 70,00 — 80,00 — 90,00 — 100,00 — 110,00 — 120,00

X-axis labels: begin d1, theory, theory capt, end d1c, begin d2 c, seating, turbulence, relaxing, landing, restaurant c, begin d3, hangar, restaurant d3, captain, crew, captain, crew cc, lounge out c, seating out, start out, flight out 20 min, go down out, 5 min to landing out, duty free, boarding in, engines in, flight in 10 min, flight in 30 min, 10 min to landing in, landing in

3 h   6 h   12 h

Summarized results of ANOVAs for mean HR and HRV measures of real flights

	Group $F(2, 30)$	Condition $F(23, 690)$	Group x Condition $F(46, 690)$
Mean HR	4.26*	36.63***	2.24***
pNN50	0.72	2.19**	1.64**
Log LF/Hf	1.20	1.61*	1.75**
HF%	1.28	1.78*	1.22
LF%	5.33*	2.32***	1.84***

Note: * p < .05, ** p < .01, ** p < .001

Mean Heart Rate +/- 95% CI

pNN50 +/- 95% CI

HF% +/- 95% CI

Controls
Highly Anxious
Anxious

Fligh Log LF/HF +/- 95% CI_t out

Shop
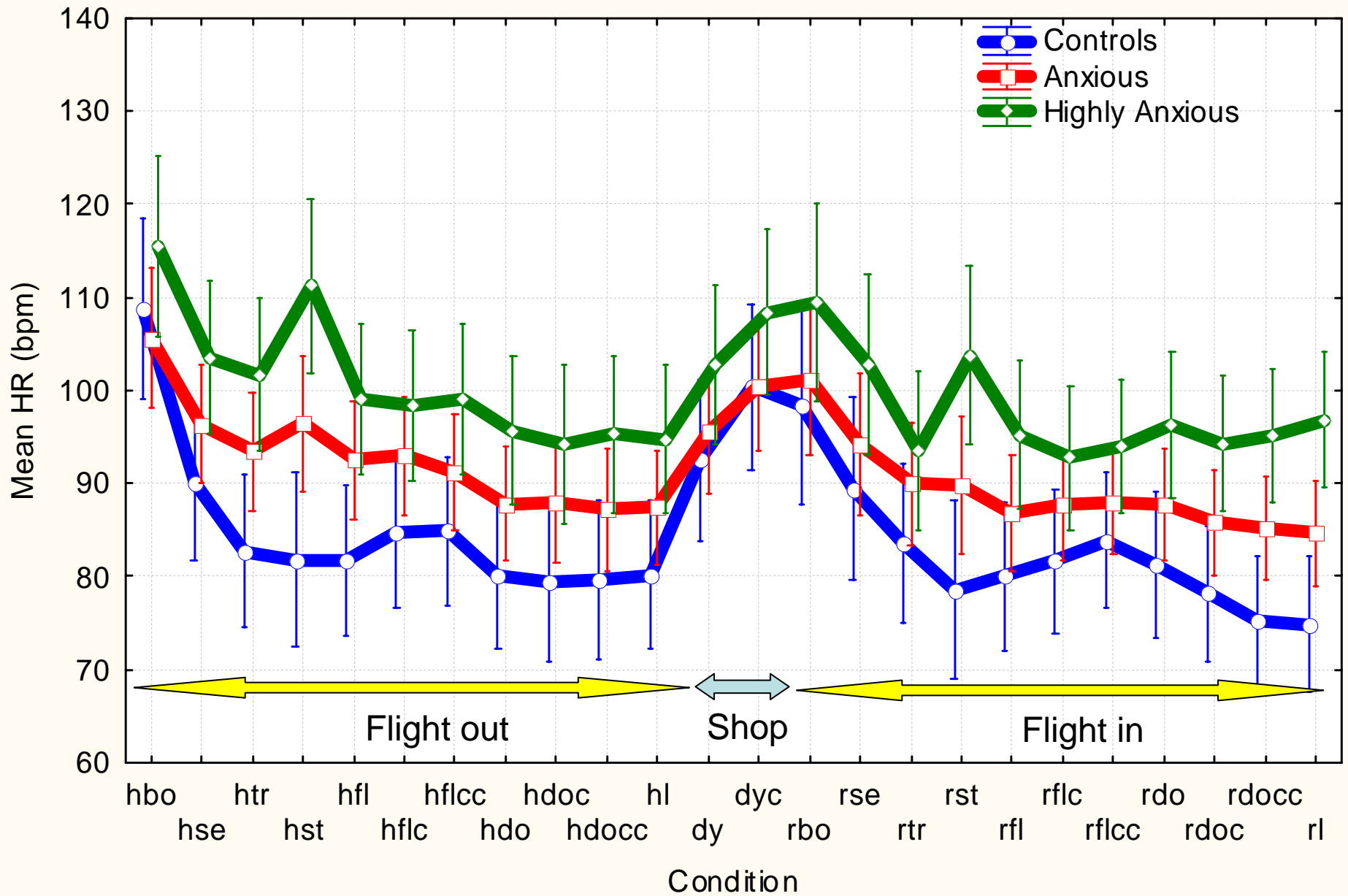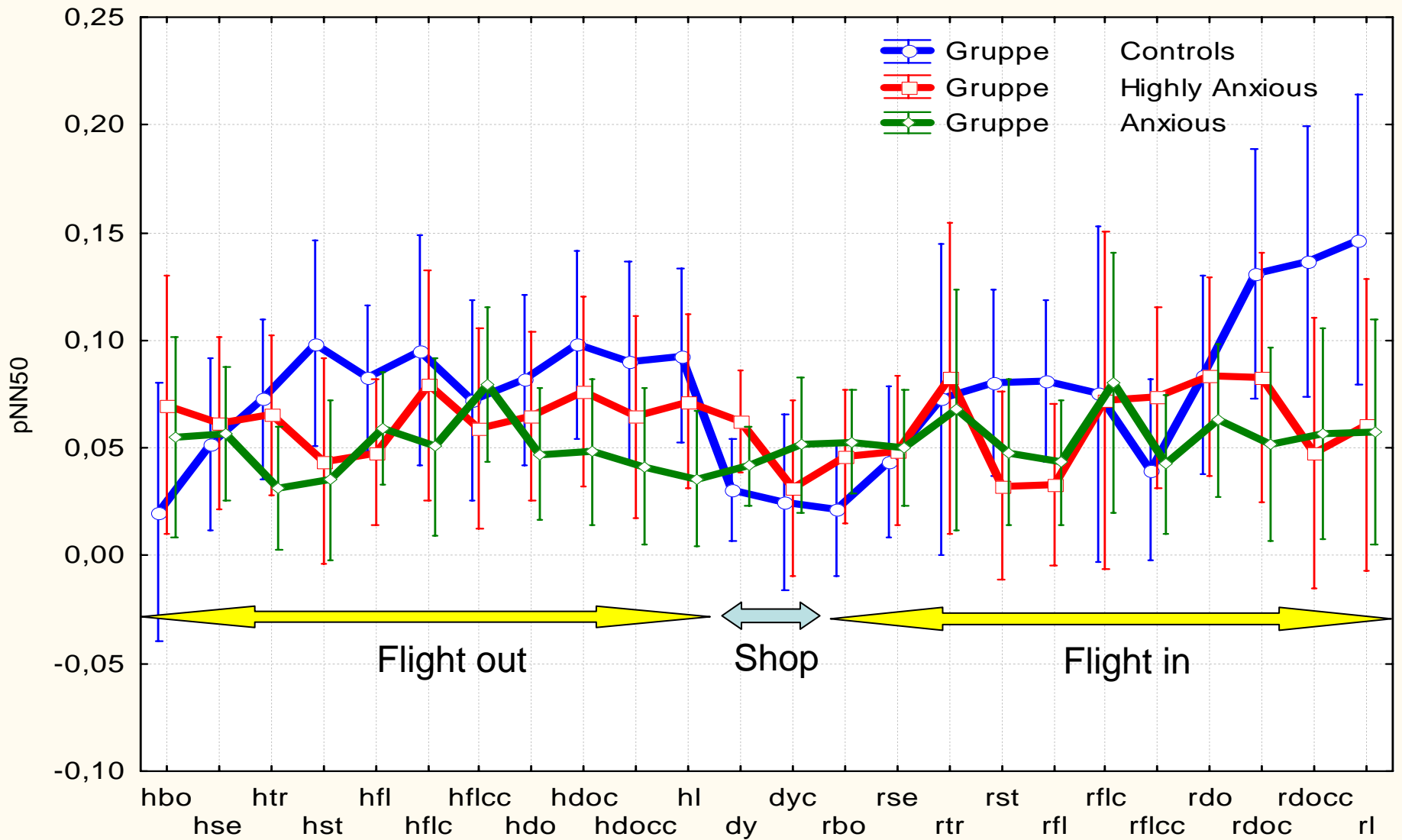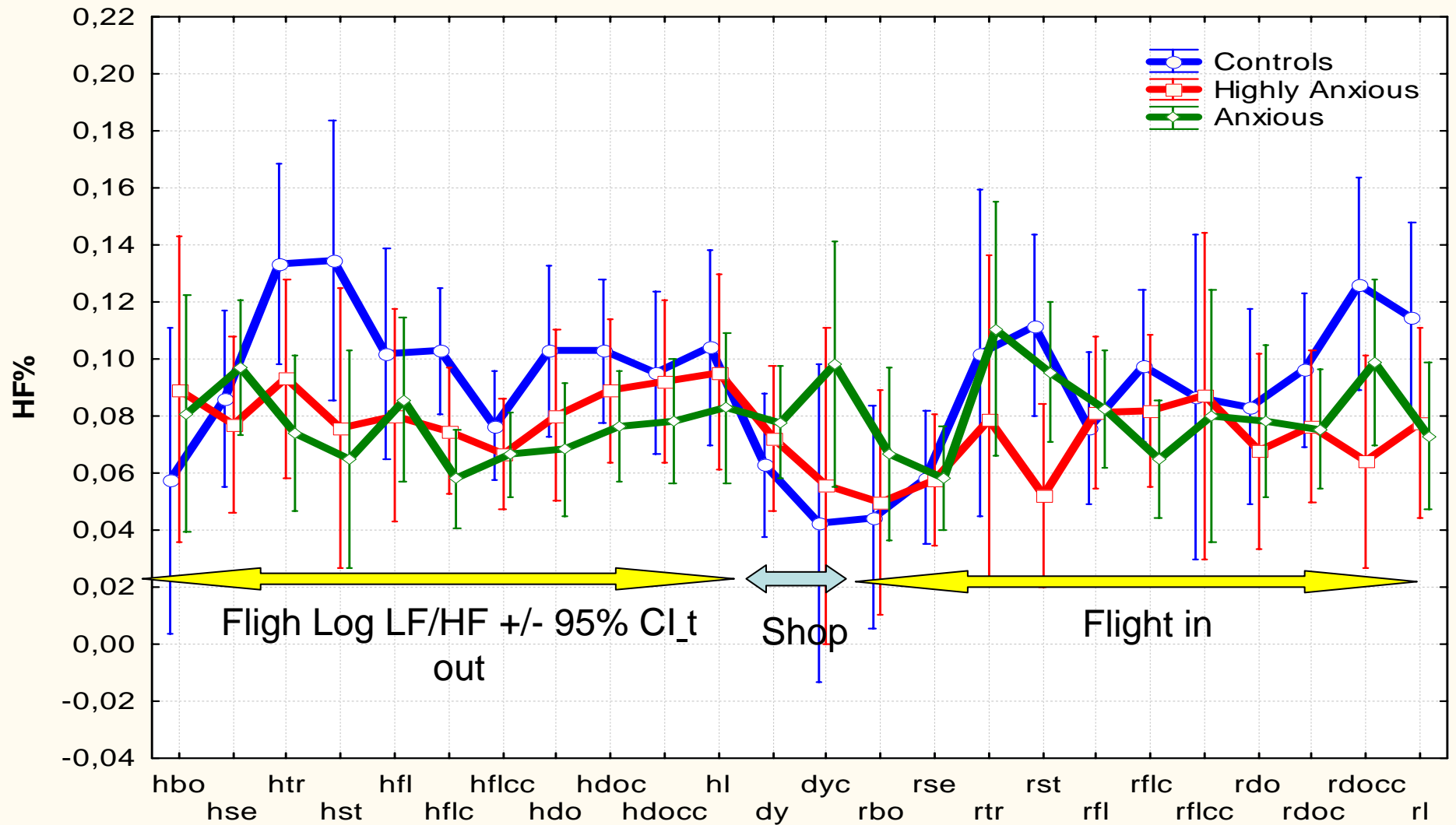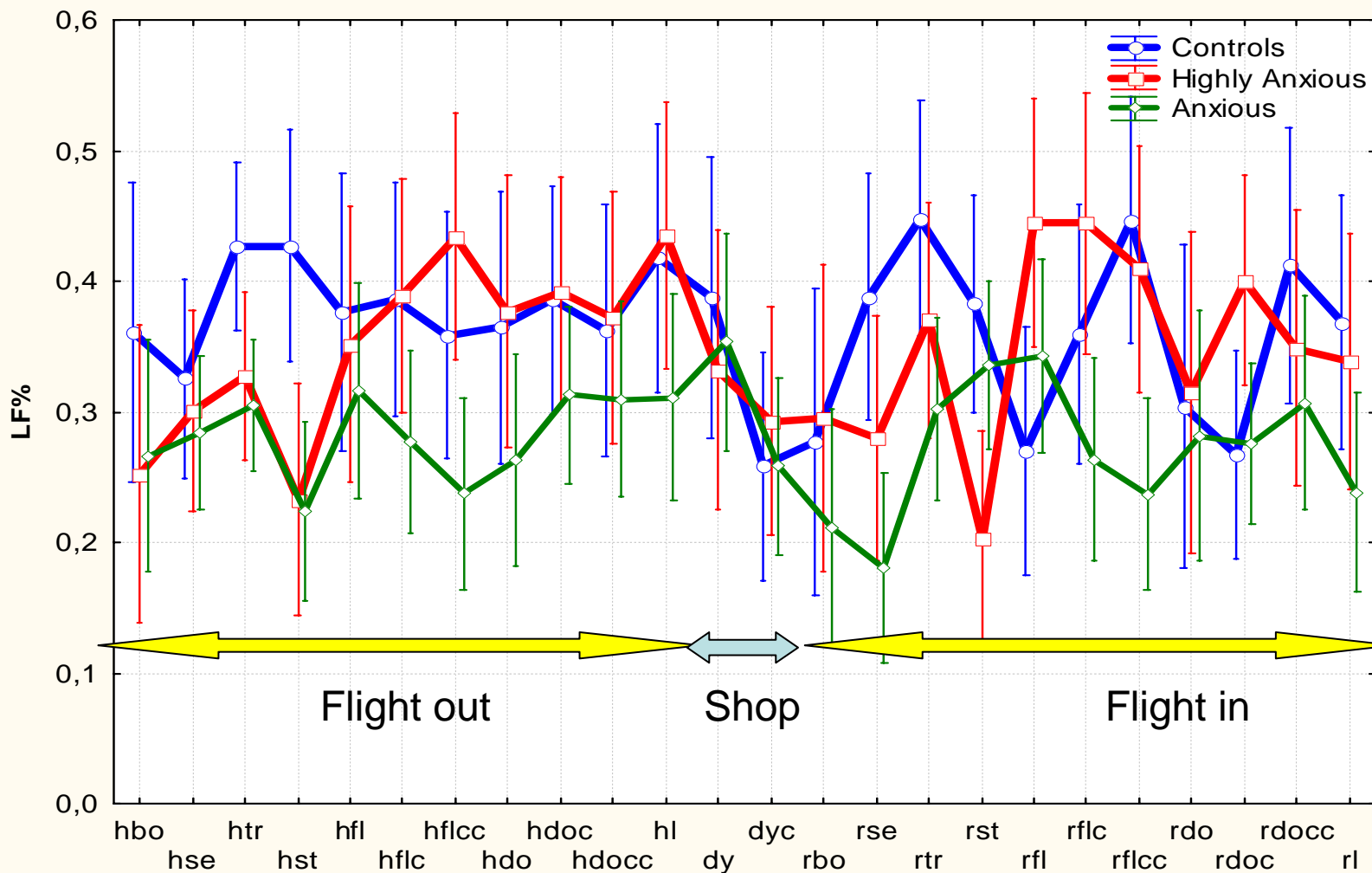
Flight in

LF% +/- 95% CI

Log LF/HF +/- 95% CI
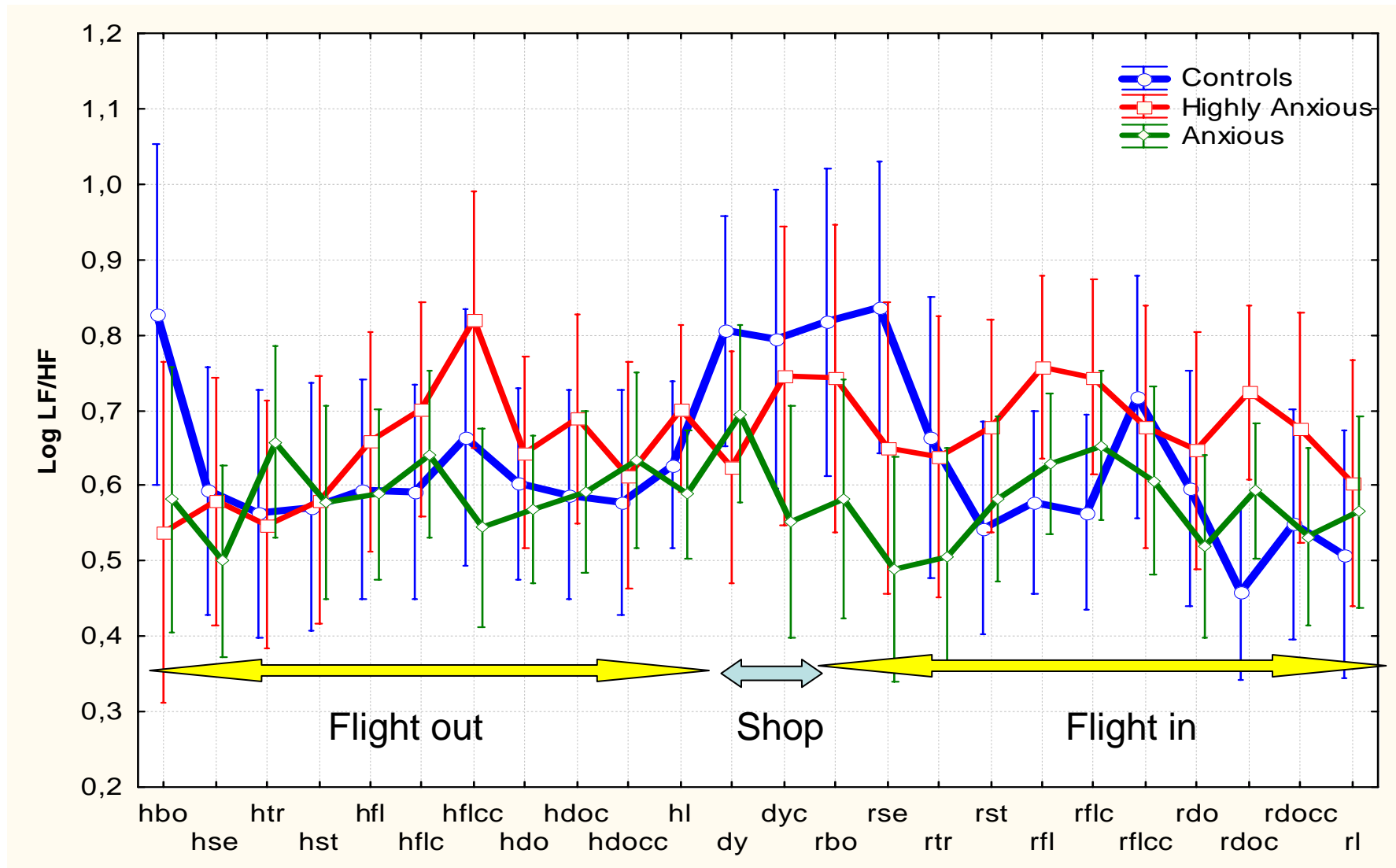
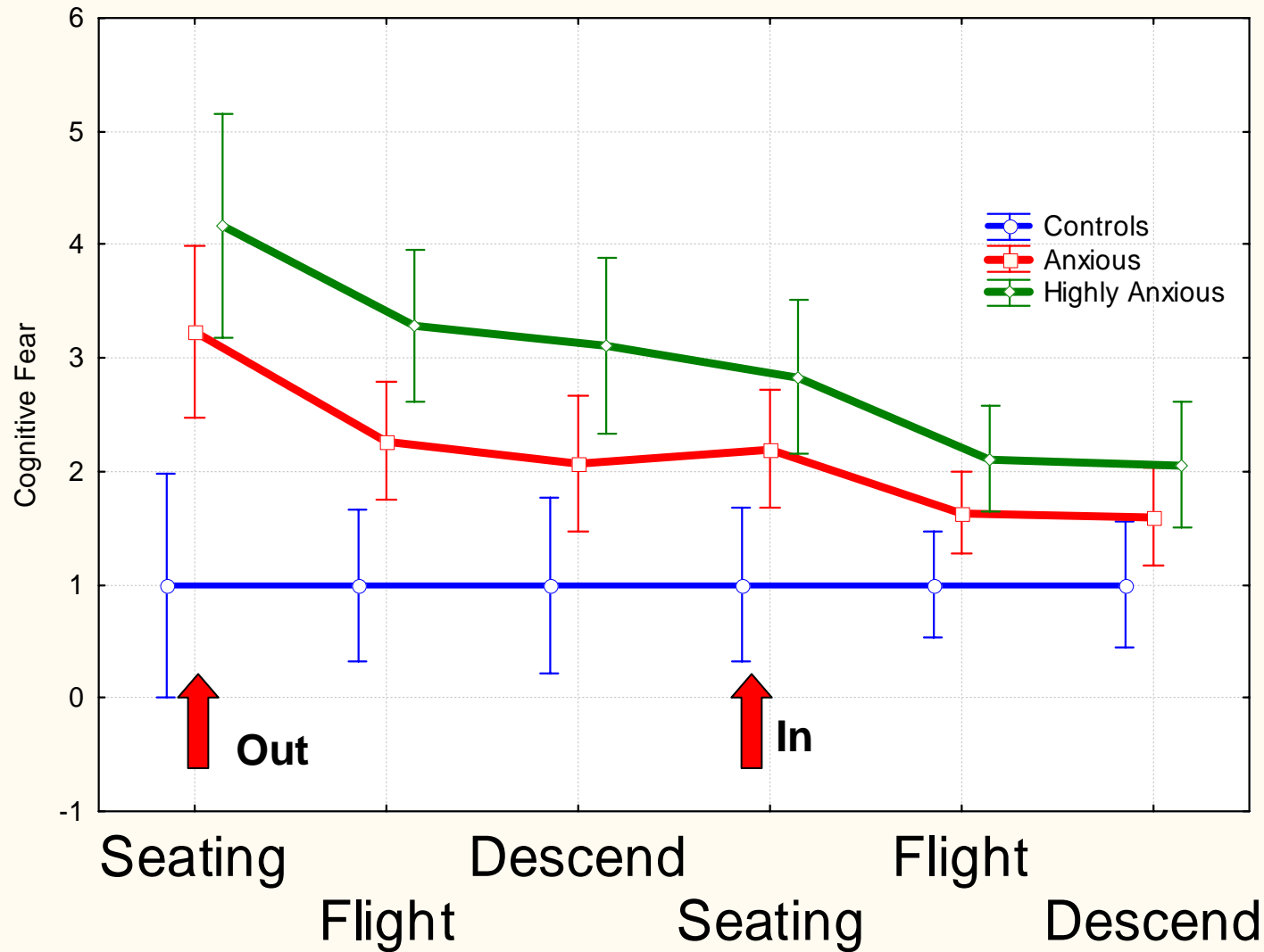# Salivary Cortisol Concentration during flight out of Vienna +/- 95% CI
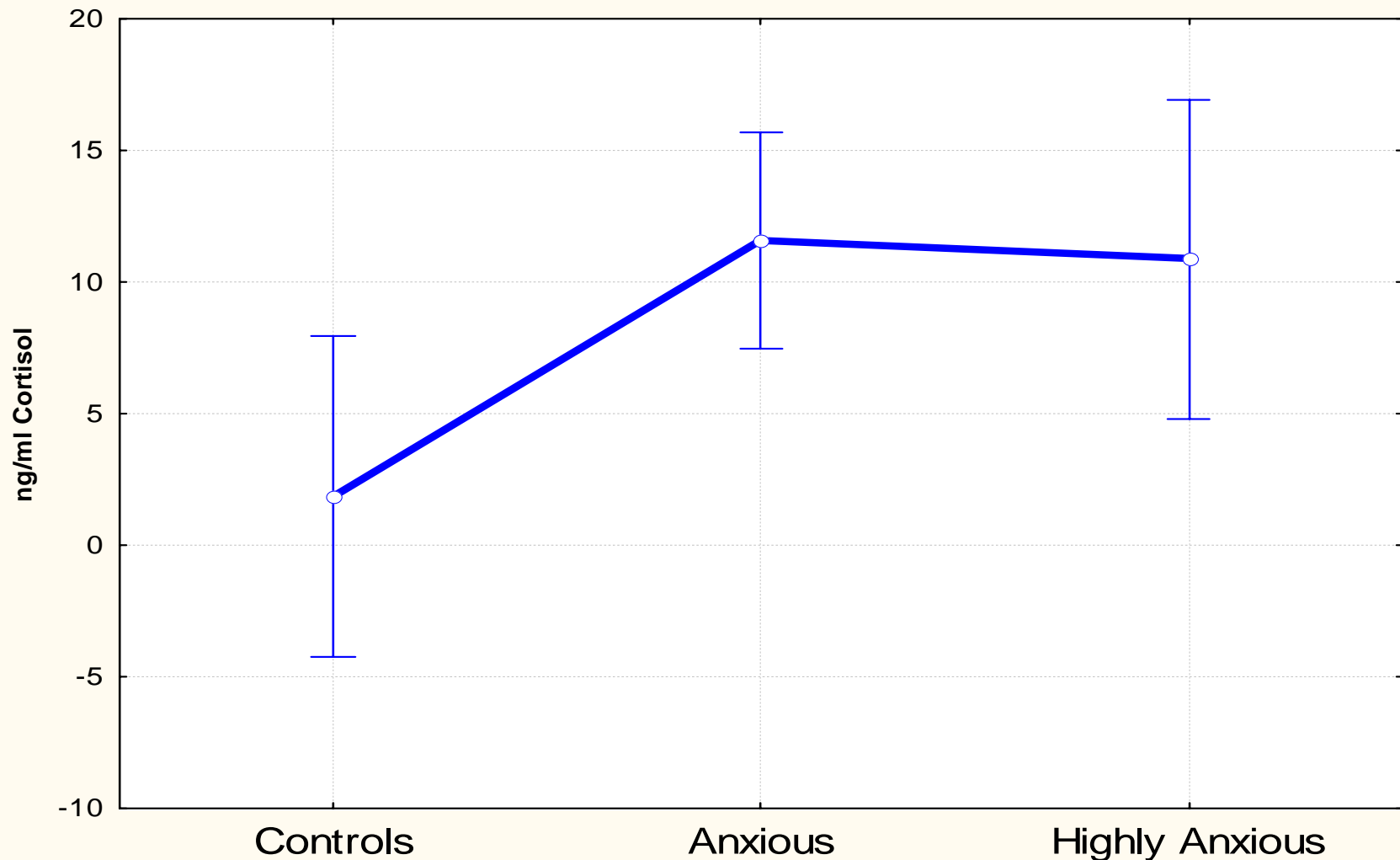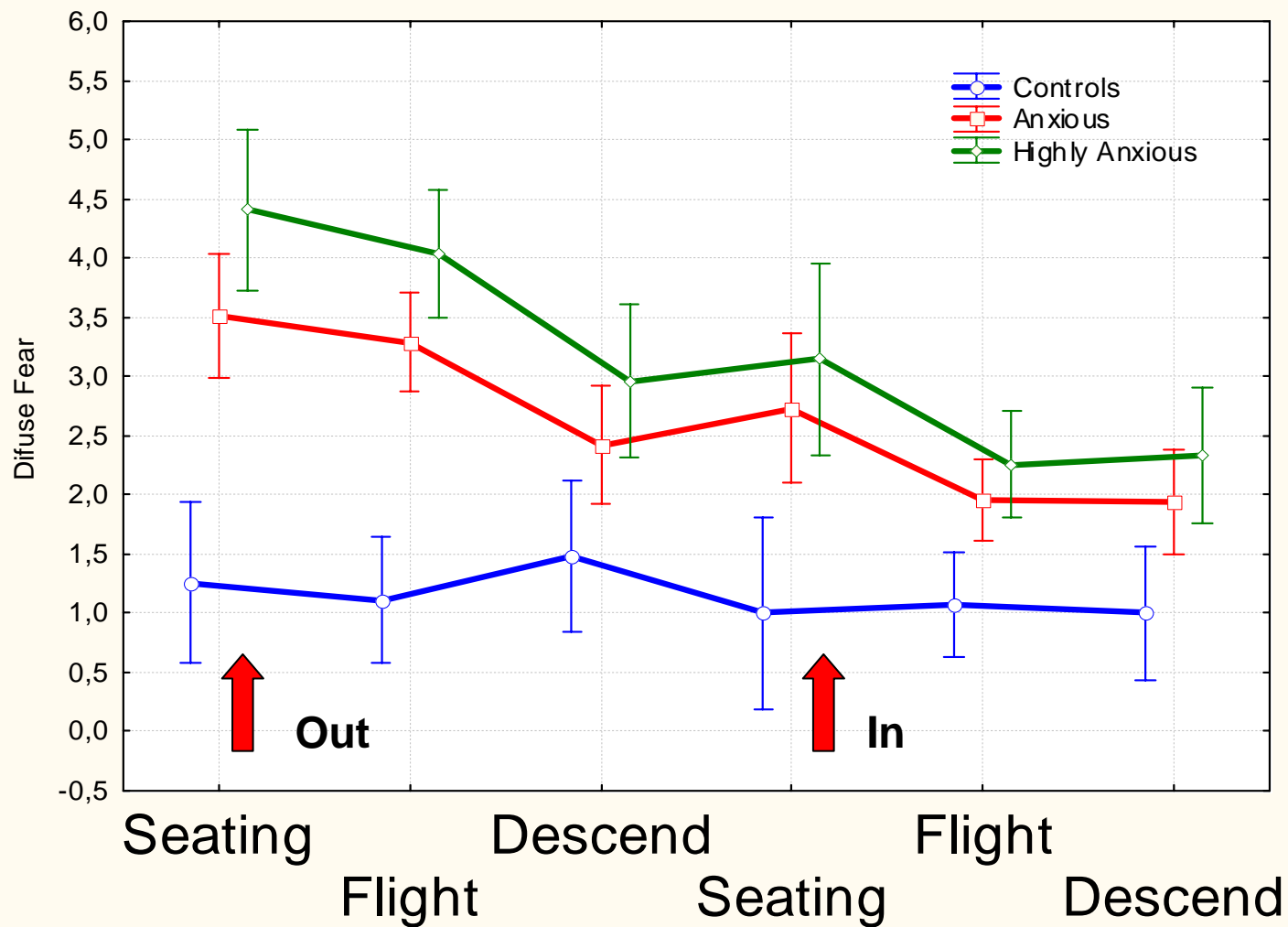
Saturation of Oxygen during real flights +/- 95% CI
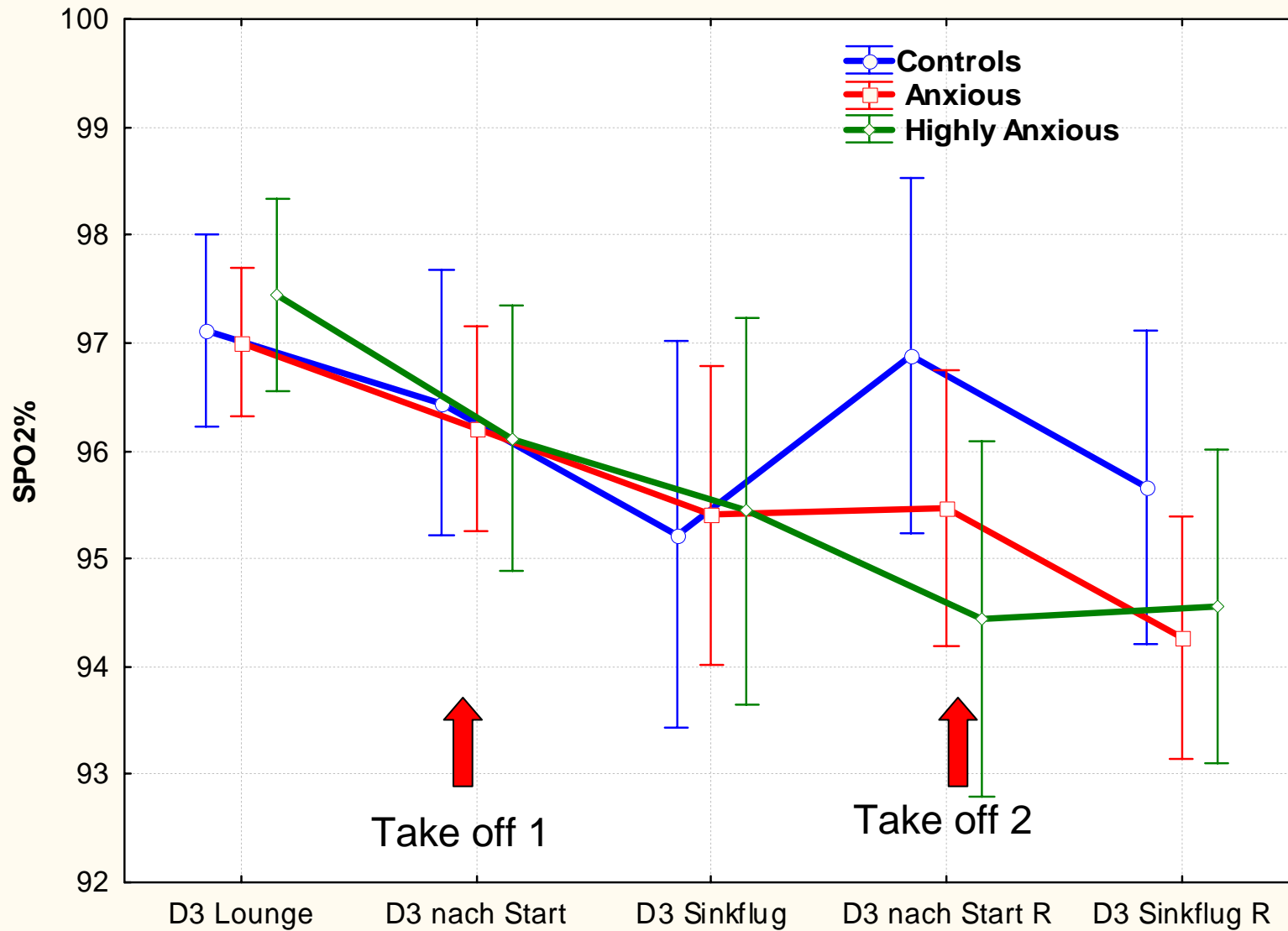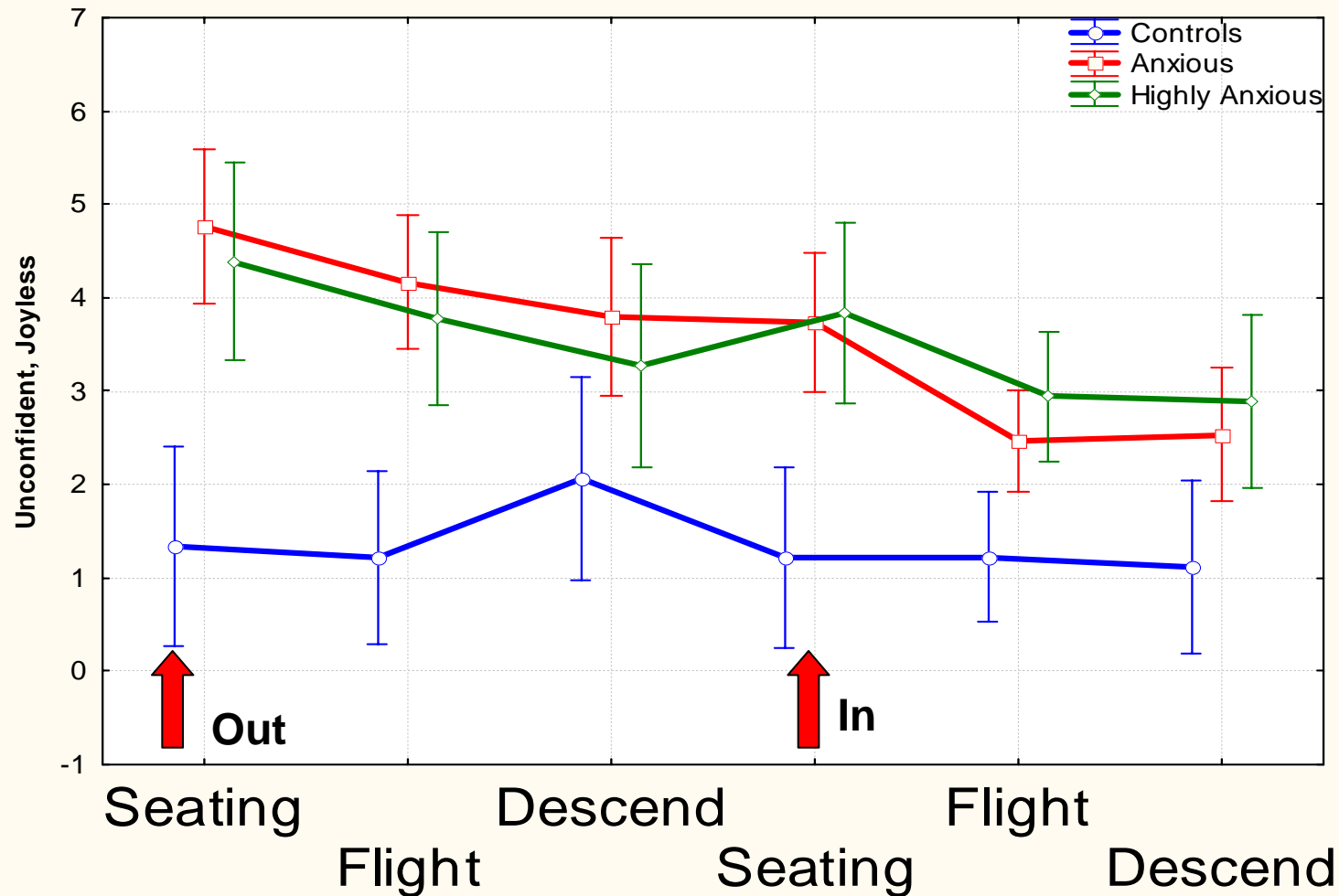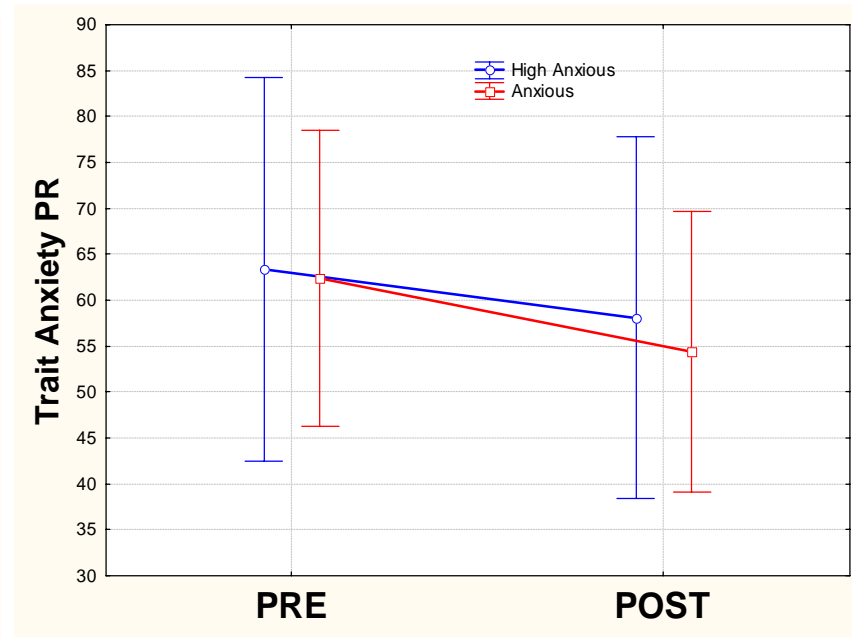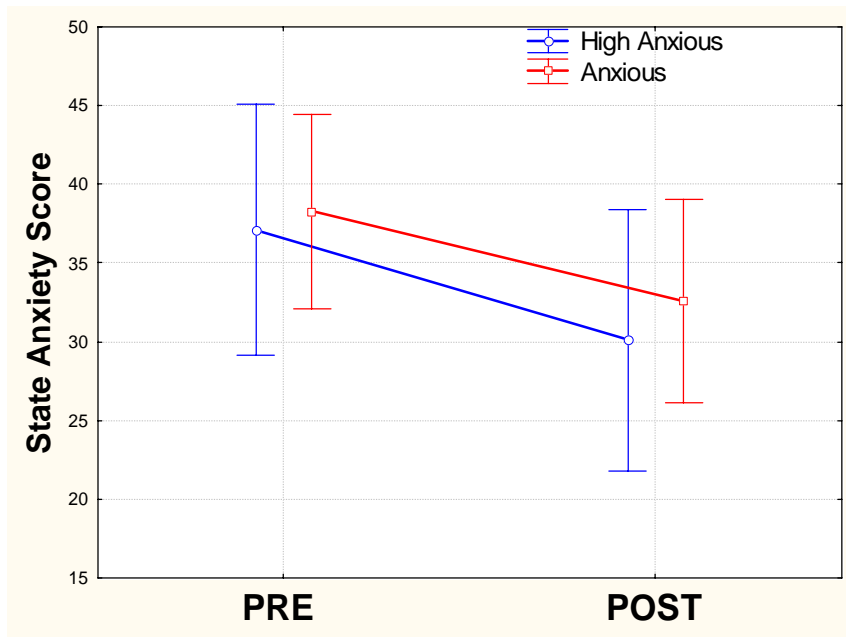
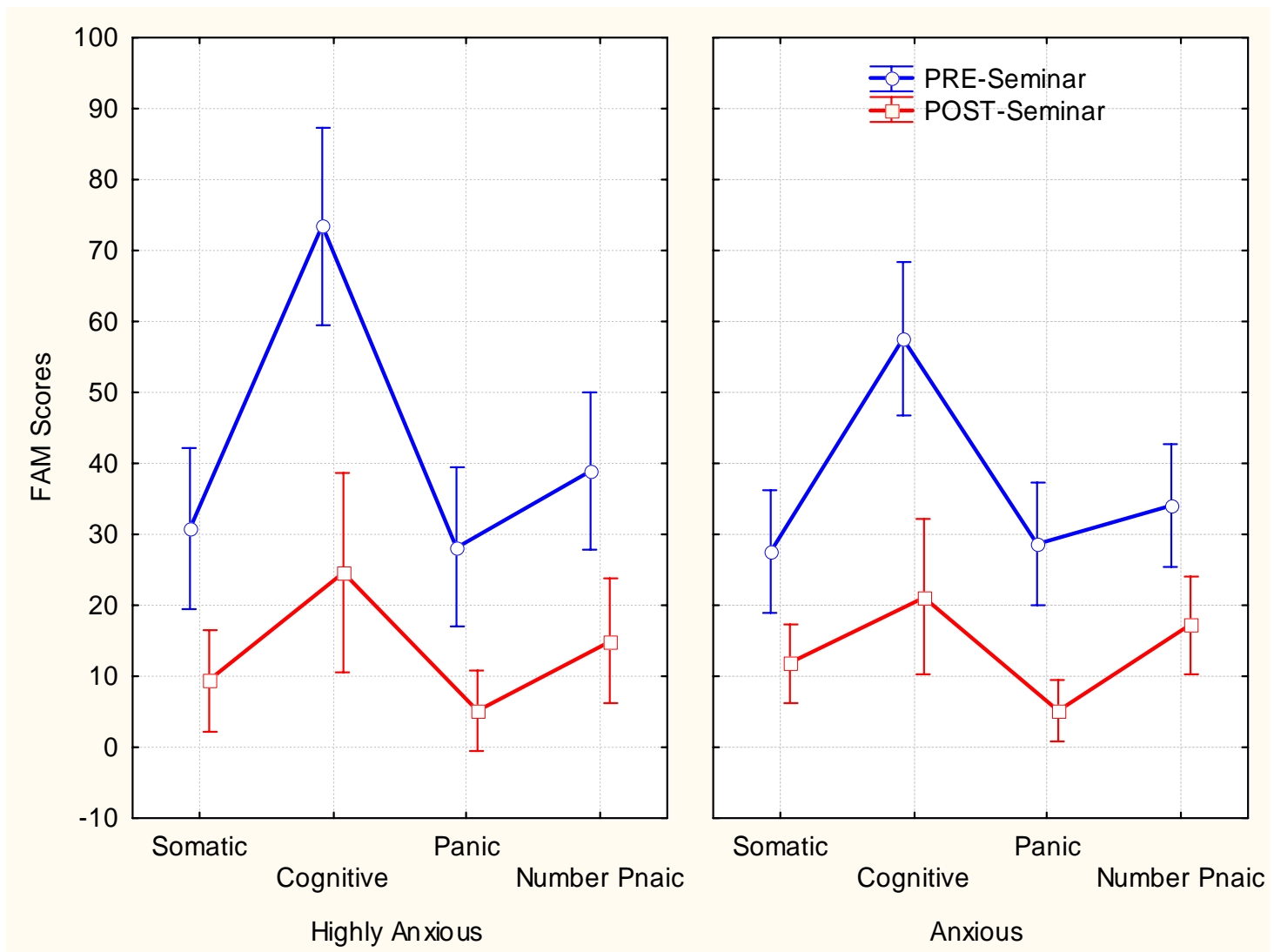# Moods: Physiological Sensation
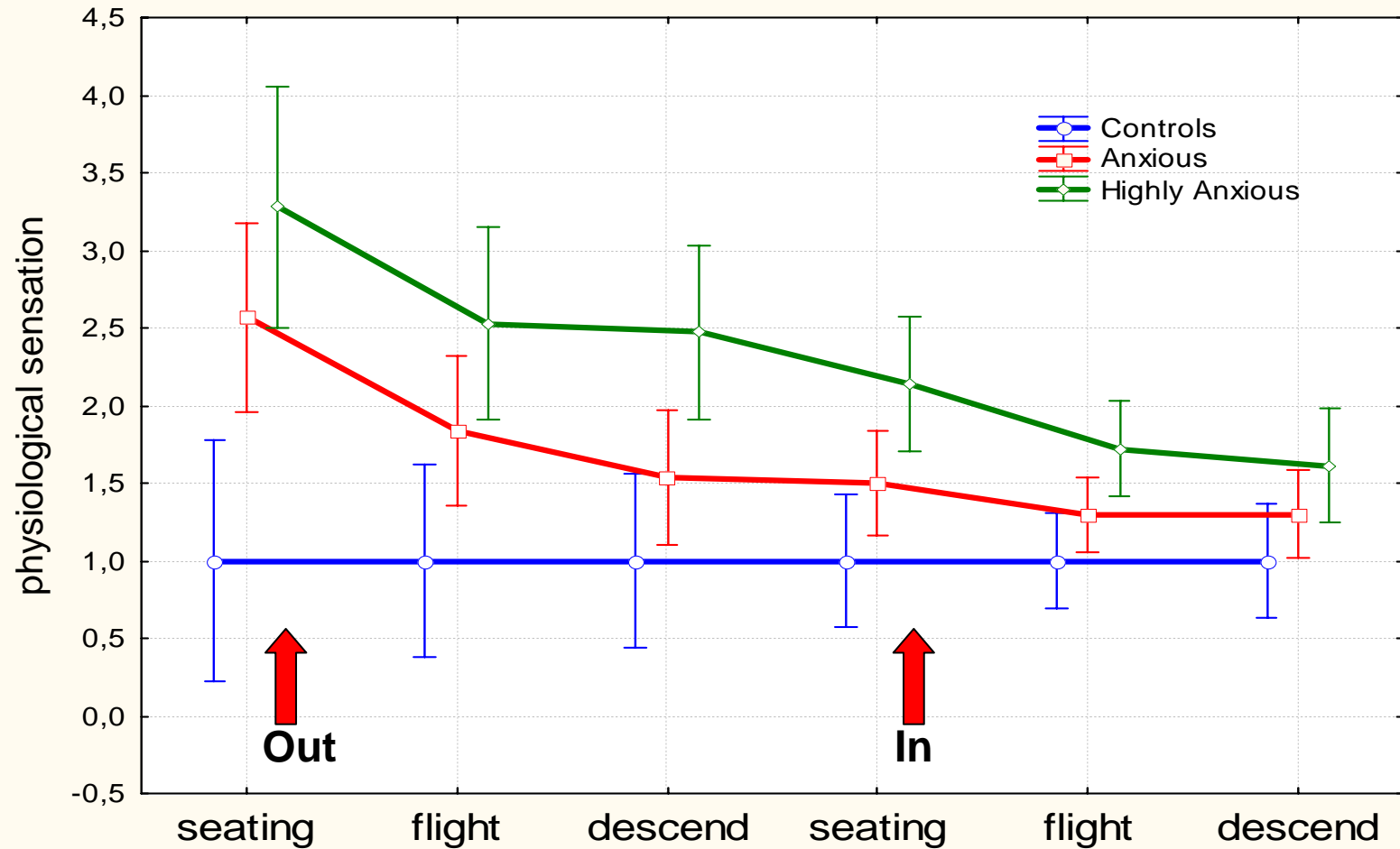
Moods: Diffuse fear
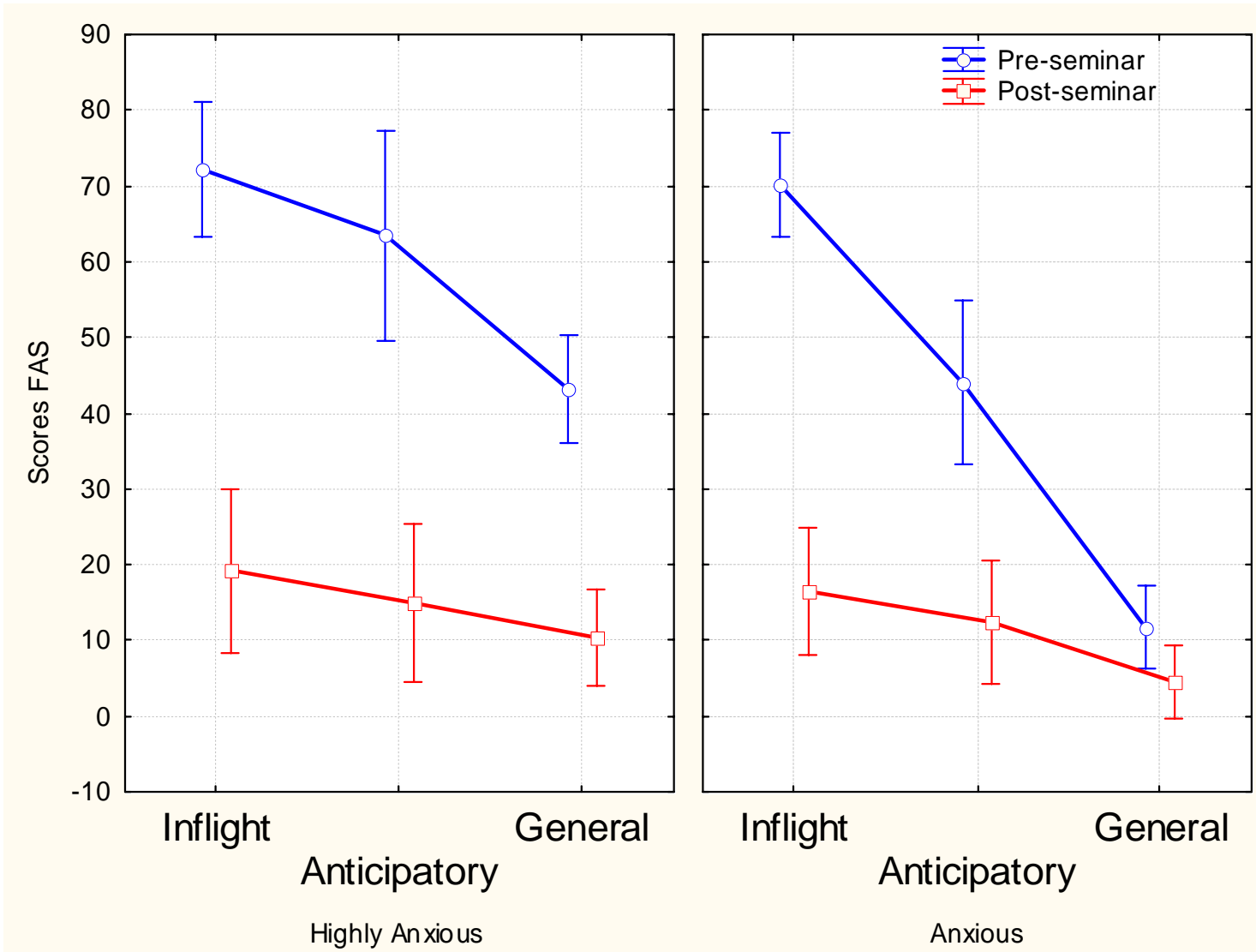
Moods: Unconfidence, Joyless

State-Trait-Anxiety pre-post Seminar

Flight Anxiety Modality (FAM) Questionnaire Pre-Post-Seminar

Flight Anxiety Situations Questionnaire (FAS) Pre-Post-Seminar)

Discussion

- Fear of flying is associated with higher HR
  - 15 bpm during 2nd flight
  - 20 bpm after 2nd flight
- Maximal HR appear during boarding (also in Controls where they displayed the same HR as Anxious)
- HR during start is associated with fear
  - Highly anxious show a remarkable acceleration of HR contrary to other groups
- HRV (pNN50) indicate a high sympathic activity in Controls at boarding which disappears during flight.
  - After 2nd flight a relaxation response appear in Controls only.
- HF (parasympathic impact) was most prominent in Controls – after start) and had in general the lowest influence in High Anxious.

Discussion

- Autonomic balance (LF/HF) indicate
    - a relative high sympathetic load during boarding in Controls
    - A rise of load during flight in High Anxious
- Cortisol indicated high stress in Anxious and High Anxious -- at least in the first flight.
- SpO2 indicate that oxygen saturation may be modulated by flight anxiety.
- Ratings of moods indicate a systematic decrease during flights and by flights.
- Comparing pre-post FAS and FAM there is clear evidence that participants of anti fear of flying seminar displayed a remarkable change in fear.
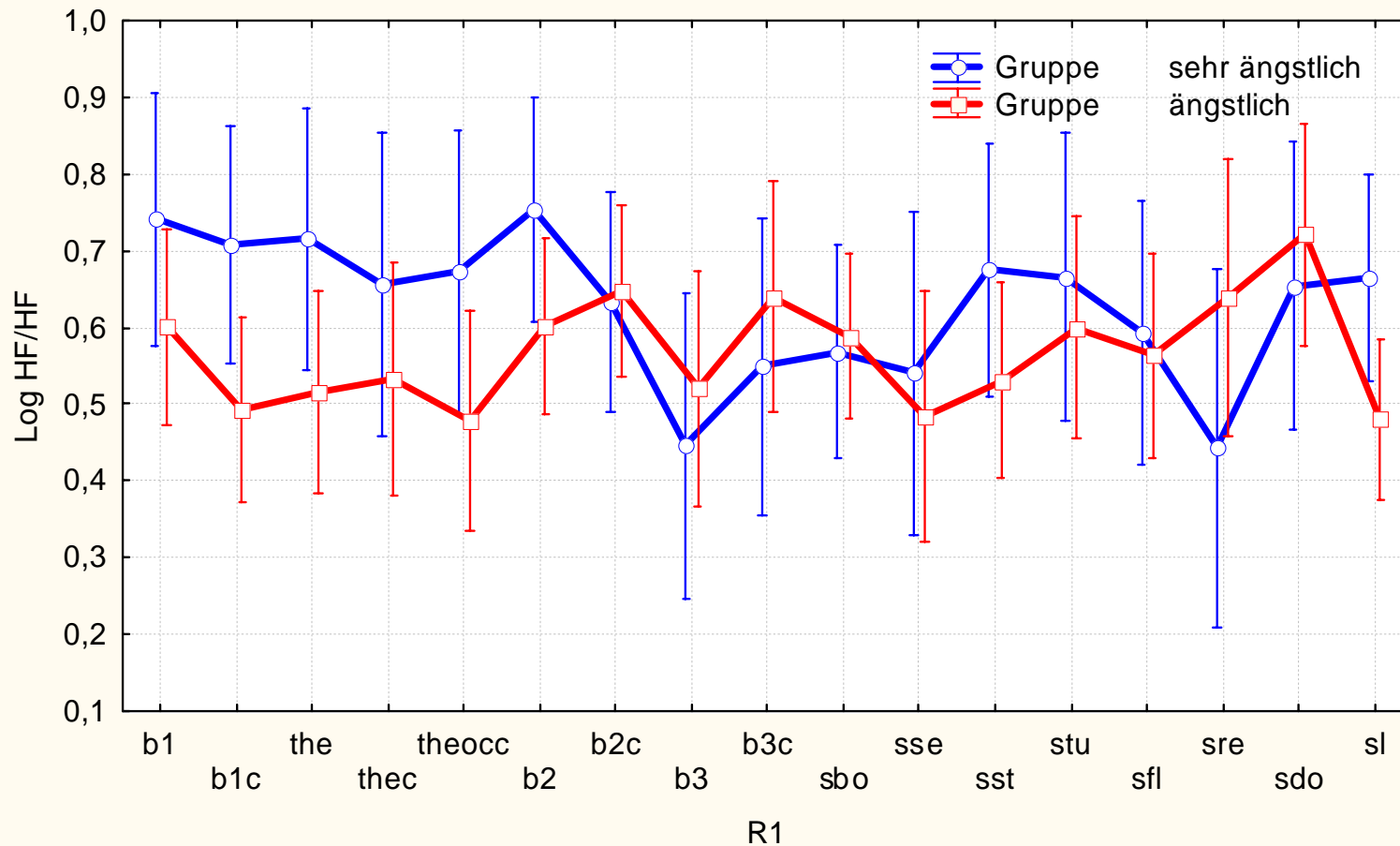
Thanks

- For your attention

ANOVA for LF/HF of 1st and 2nd day of seminar
Aktueller Effekt: F(16, 352)=2,2124, p=,00481
Means +/- 95% CI

ANOVA for mean HF% during 1st and 2nd seminar day,
+/- 95% CI

Aktueller Effekt: F(16, 352)=1,8380, p=,02532