

# **It Started with Fatigue ... Airline Pilots under Pressure**



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# Content

- Commercial pilot working conditions
- Flight Time Limitations and real duty times
- My preliminary results:
  - Sample / demographics
  - Prevalence & severity of fatigue
  - Use of Screening Instruments: traps, artefacts, cave!
  - Pilot Fatigue and correlates in mental health dimensions

# Not presented

- Definitions
- Theory
- Attitudes of commercial pilots regarding
  - FTL (Flight Time Limitations)
  - Protection from fatigue
  - Severe fatigue in the cockpit
  - Fatigue reports
- Fatigue promoting factors
- New scales to measure pilot fatigue

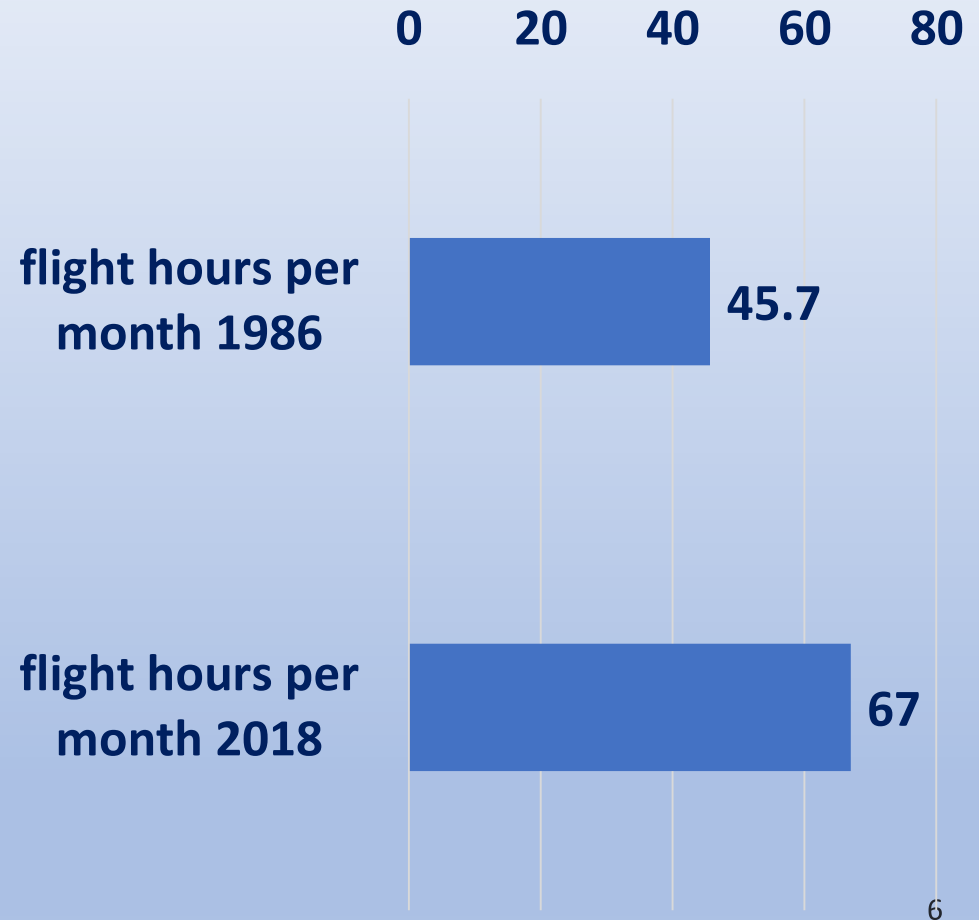
# Economic Pressure in Aviation

- Airline pilots' **protection from fatigue by flight time limitations (FTL)**
  - >> maximum flight/duty times,
  - >> minimum rest
- **Hard limits become goals of productivity**
- Fatigue: high risk among airline pilots
  - >> threat to aviation safety
  - >> can impair human performance
  - >> health risk ?

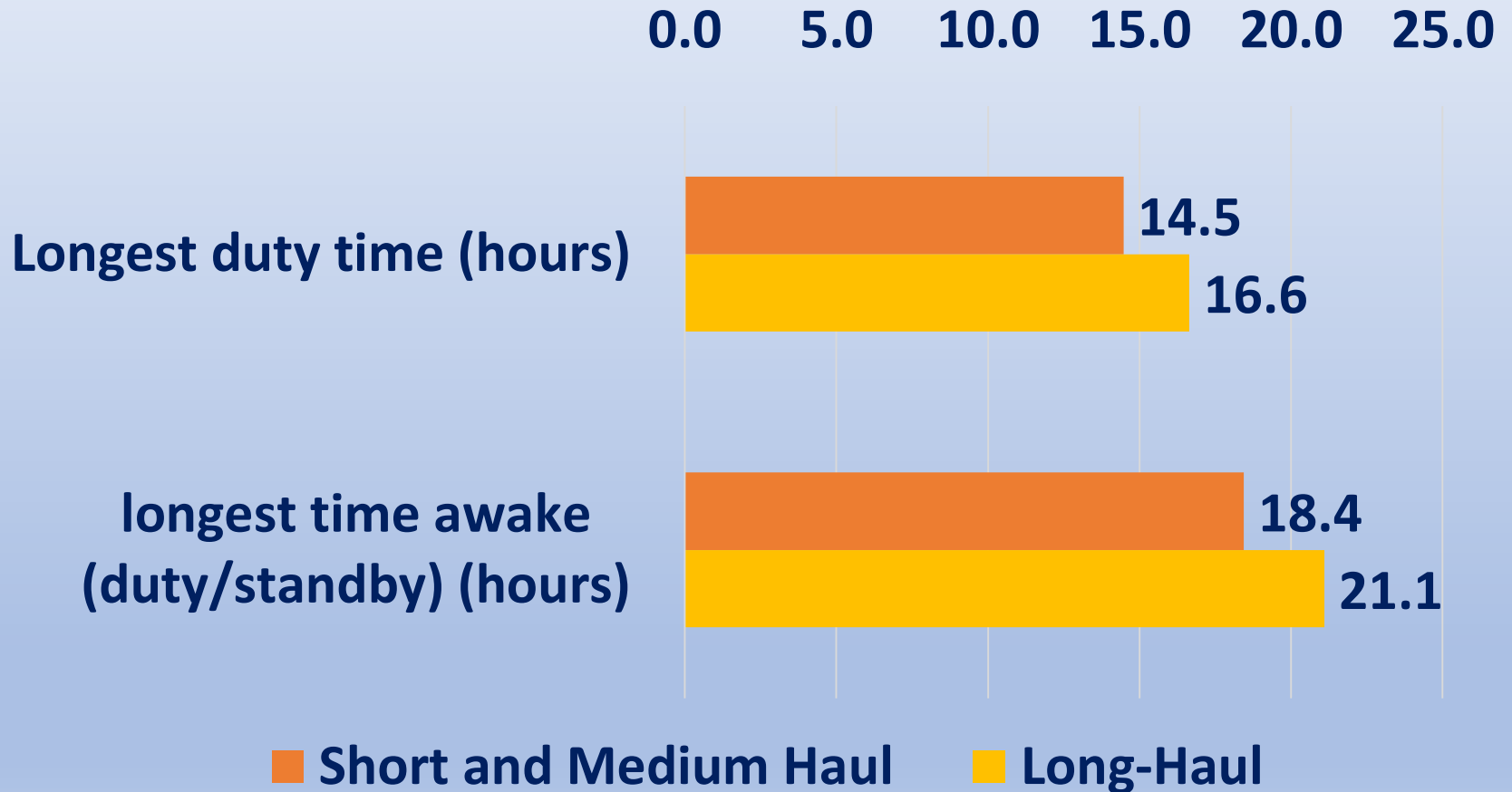


## Flight Hours / Month 1986 vs. 2018

- **Sloan & Cooper (1986):**  
Airline pilots:  
M=45.7 (SD=30)
- **Present study:**  
M=67 (SD=21)  
**+ 30%**



# Last 3 years



# Present Legal Flight Time Limitations

- Lack of scientific evidence
- **Maximum Flight Hours/Year**
  - 1400 hours/year in the United States
  - 900 hours/year in Australia and
  - 900 hours/year EASA



**Ph. D. Research  
Marion Venus (2018)  
Correlates of Flight Time  
Limitations, Fatigue,  
Employment Conditions in  
Airline Pilots' Mental Health and  
Wellbeing**

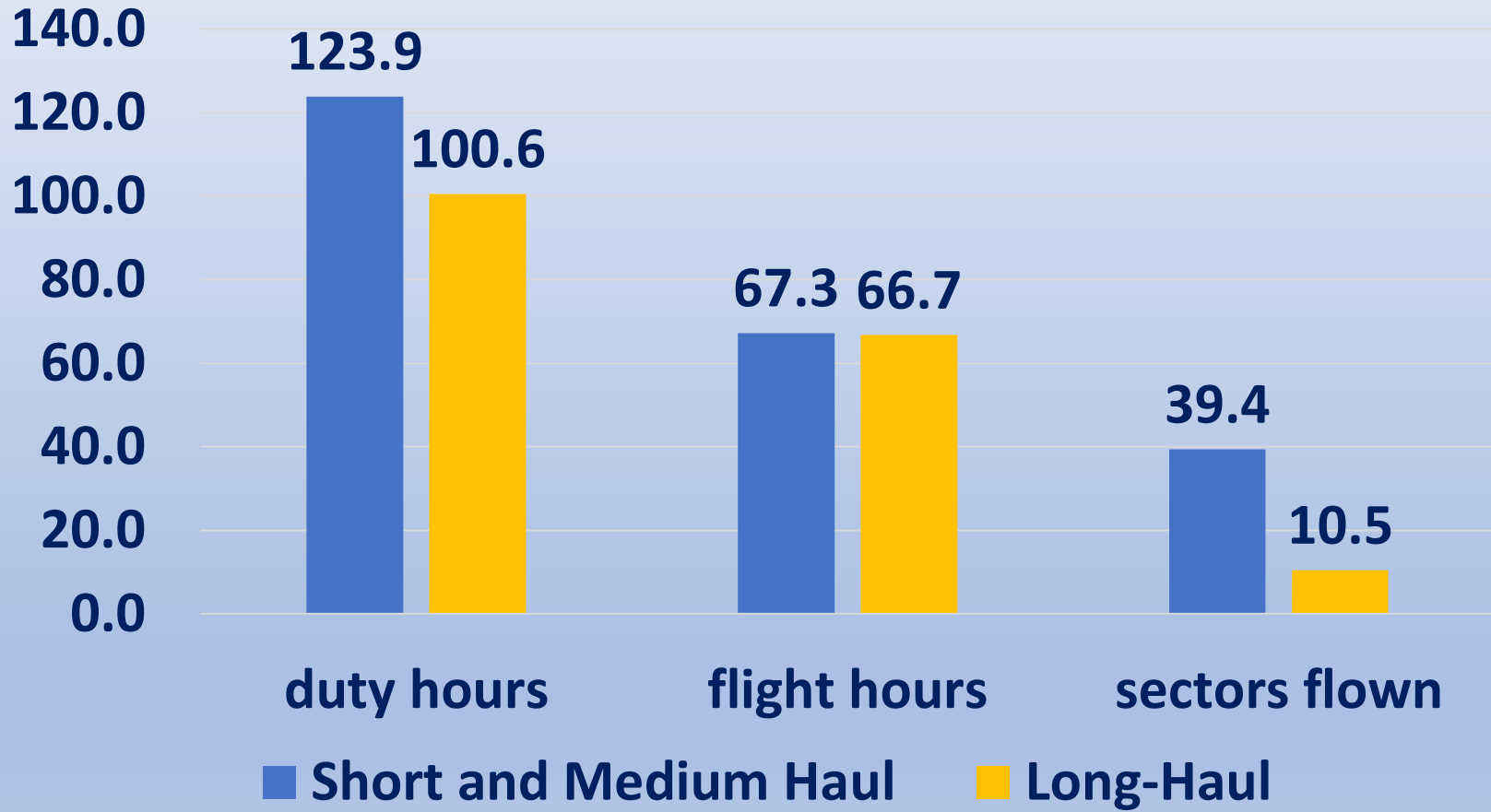
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# Demographics of N=197 (551) Commercial Pilots

- Age: M= 40.61 years (SD=10.4)
- 8% female airline pilots, 92% male
- 50% Captains
- 80% full time airline pilots
- Total of flight hours: M=8'798 (SD=5'754)
- 64% Legacy Carriers
- 60% Short-Haul
- 87% Contract with Airline

10

# Last Month:



# Present Study: Cross-Sectional Online Survey

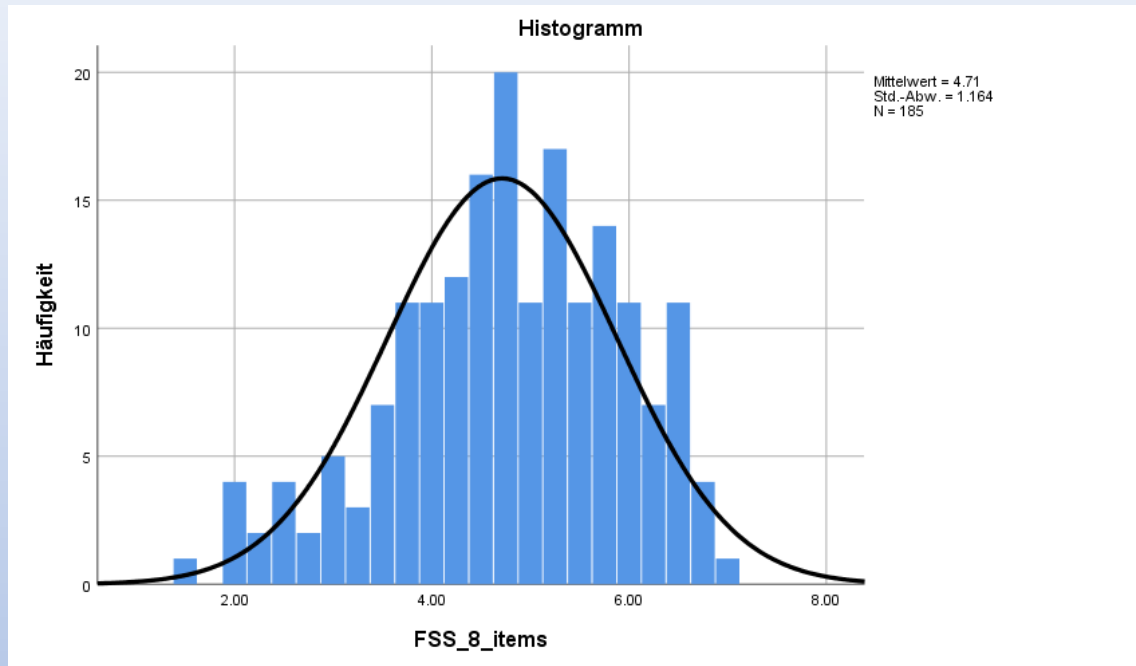
- approved by Ethics Committee Uni Bern
- Dependent Variables: **self assessment screening tools**
  - Wellbeing-Index (WHO-5)
  - Depression (PHQ-8)
  - Anxiety (GAD-7)
  - Common mental disorders (SRQ-20)
  - Fatigue Severity Scale (FSS)
  - Jenkins Sleep Scale (JSS)

# Hypothesis: Legal Framework:

- **H<sub>1<sub>0</sub></sub>** Pilots are not allowed to fly when fatigued
- **H<sub>1<sub>1</sub></sub>**
- **75% of short-haul pilots** (Jackson & Laurie, 2006)  
**to 90% active commercial pilots** (Reis, Mestre, Canhão, Gradwell, Paiva, 2016)  
**are severely fatigued (FSS > 4)**

# Fatigue Severity Scale (FSS)

- **Validation of the Fatigue Severity Scale in a Swiss Cohort** (Valko, Bassetti, Bloch, Held, Baumann, 2008)
- **fatigue specific self-report questionnaire**
- FSS scores
  - **4.66 ± 1.64** (mean ± SD) in patients with MS Multiple Sclerosis
  - 4.34 ± 1.64 in patients with Sleep-Wake disorders
  - **3.00 ± 1.08**
    - significantly lower FSS in **healthy subjects**,  
p<.001



# Fatigue Severity Scale FSS

- **M = 4.71**
- **SD=1.16**
- **92 % airline pilots  
FSS > 3**
- **53% FSS ≥ 4.71 (mean airline pilots)**
- **Patients with MS: M=4.66**

**$H1_1$  confirmed**

**9 of 10 airline pilots are  
fatigued**

**1 of 2 active pilots are  
severely fatigued**

**Fitness to Fly???**



**Is it?  
Or isn't it?**

**Traps for the  
mental fitness  
assessment of  
airline pilots**



# Clinical Psychological Diagnostic Process

- Consists of
  - thorough clinical interview
  - psychological questionnaires
  - feedback about results, additional questions (validation of results)
- Report
- **NO SHORTCUTS**

# Screening Instruments (e.g. PHQ8, GAD7)

- **NO (remote) diagnosis** (e.g. self assessment, Online Survey)
- **Positive screening results:**
  - **likely diagnosis of e.g. depression/anxiety,**
  - **requires confirmation by standardized clin. psych. diagnostics**
- **NO SHORTCUTS**
- **Cave ARTEFACTS (looks like ... but is not!)**

# PHQ-8 Self Assessed Depression Symptoms: M=6.00, SD=5.05 Over the last 2 weeks

0.00 0.50 1.00 1.50 2.00 2.50 3.00



## Self Assessed WHO-5 Wellbeing-Index: M=56.3 (SD=20), 0 = at no time / 5 = all the time

WHO5\_My daily life has been filled with things that interest me



WHO5\_I woke up feeling fresh and rested

WHO5\_I have felt active and vigorous

WHO5\_I have felt calm and relaxed

WHO5\_Over the last two weeks: I have felt cheerful and in good...

0.00 1.00 2.00 3.00 4.00 5.00

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# GAD7 Screening Instrument for Gen. Anxiety

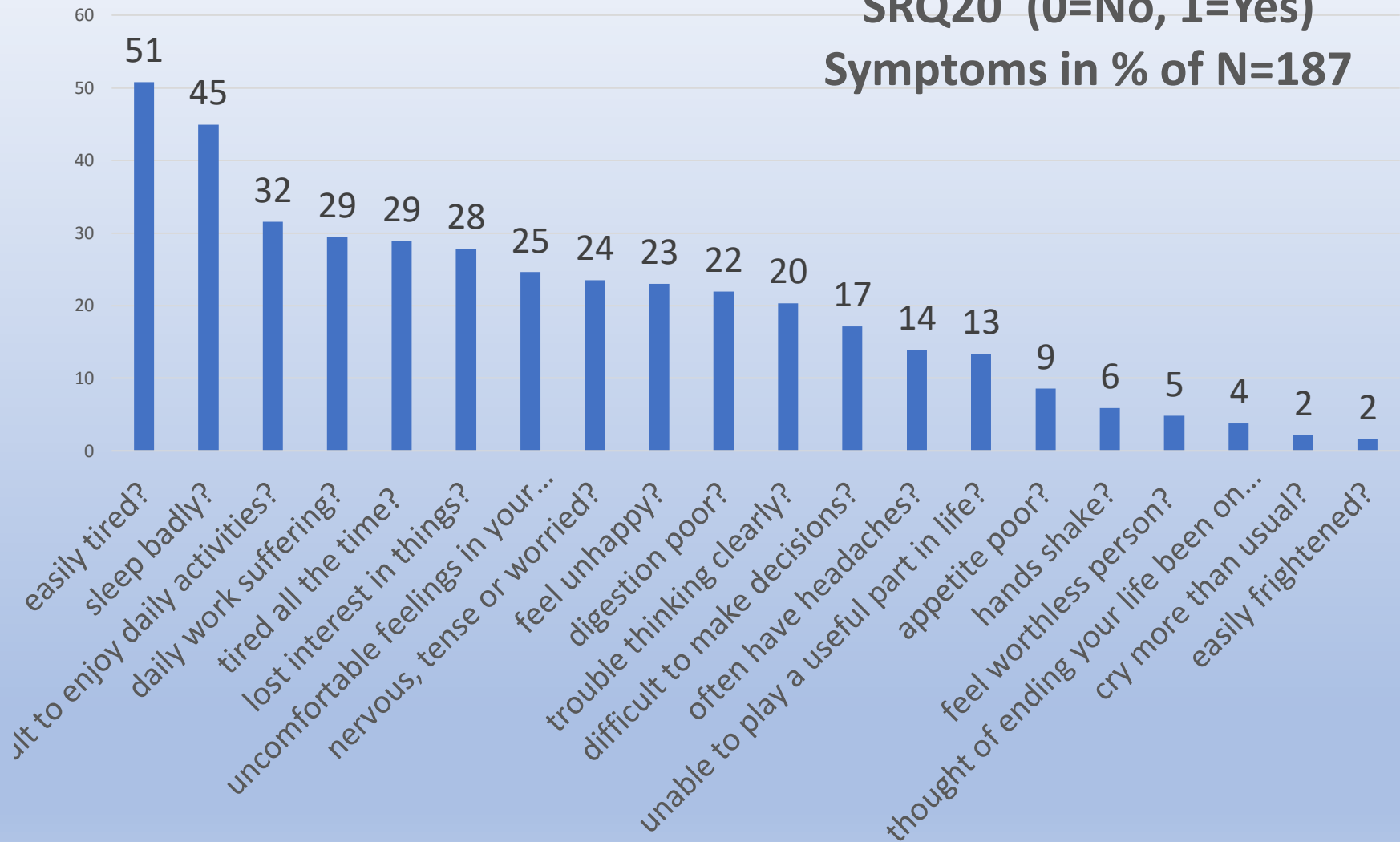
0.00 0.50 1.00 1.50 2.00 2.50 3.00



## PHQ-Stress: M=4.01 (SD=3.9; Range: 0-20)



## SRQ20 (0=No, 1=Yes) Symptoms in % of N=187





# Is it? Or isn't it?

- **Working Hypothesis:**
- It started with fatigue and turned out to be
- impaired wellbeing, exhaustion (not depression) and
- massive worries, concerns about loss of license, loss of career and job (not anxiety)



**Research question 2**  
**The more flight hours/month,**  
**the more common mental**  
**disorders**

Feijó, Luiz, Camara (2012)

**depression, anxiety**  
**in commercial pilots**

O'Hagan, Issartel, Nevill, and Warrington  
(2016)

Zwischensubjektfaktoren			
			N
<b>Workload Flight Hours Last Month</b>	1.00	<b>less than 70 flight hours</b>	68
	2.00	<b>70-80 flight hours</b>	50
	3.00	<b>more than 80 flight hours</b>	49

		Wert	F	Hypo- these df	Fehler df	Sig.	Partielle s Eta- Quadrat
Konst. Term	Pillai- Spur	0.987	2008.71 8	6	159	0.000	0.987
<b>Work- load</b>	<b>Pillai- Spur</b>	<b>0.018</b>	<b>0.249</b>	<b>12</b>	<b>320</b>	<b>0.995</b>	<b>0.009</b>

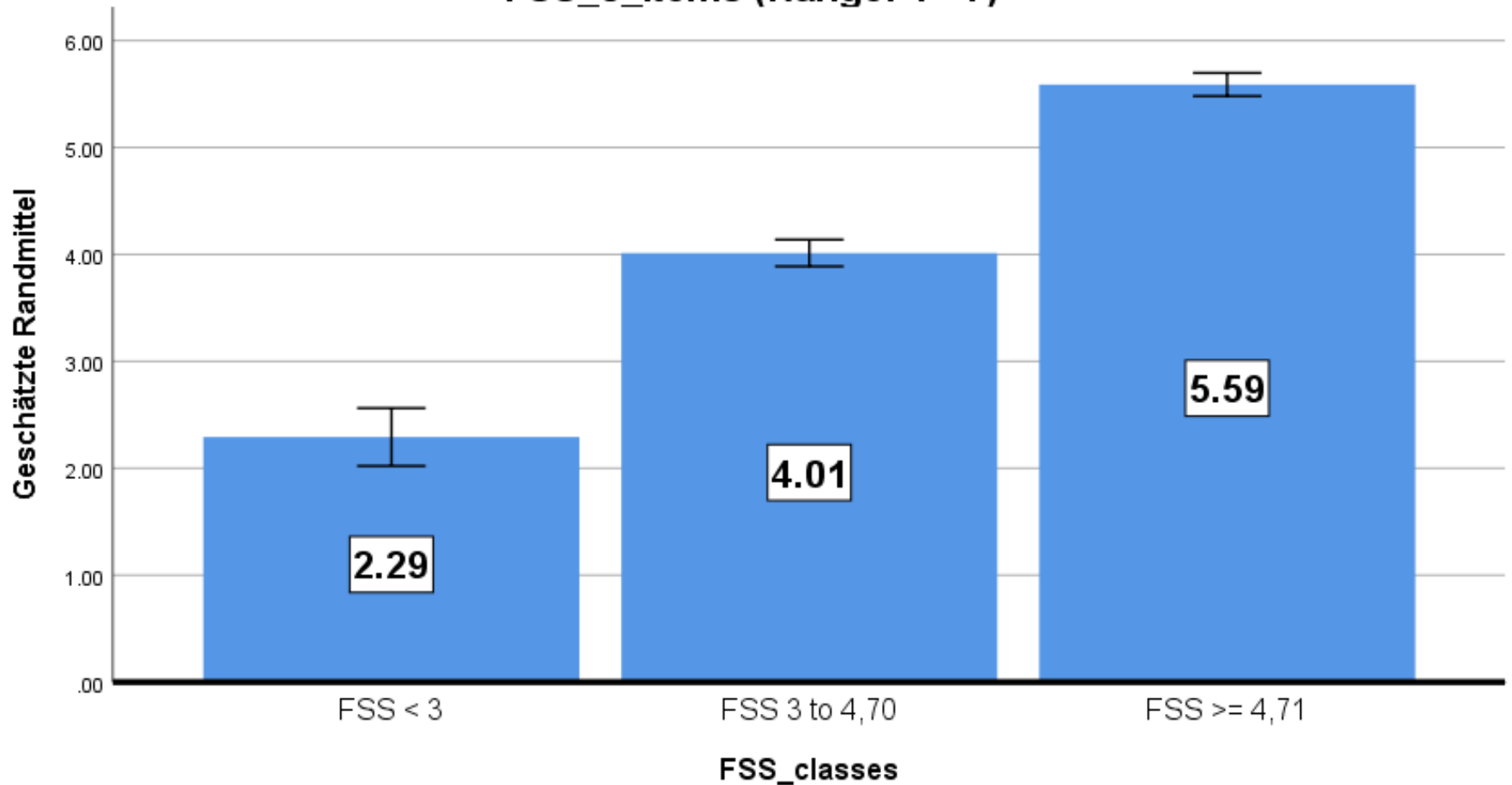
**>>> Take Fatigue  
instead of  
Flight Hours >>>**

**Research Question 3**  
**Not fatigued airline pilots**  
**are significantly healthier**  
(fewer common mental disorders,  
less „depression“, „anxiety“)  
**than fatigued pilots**

**GLM Comparison of 3 Groups**

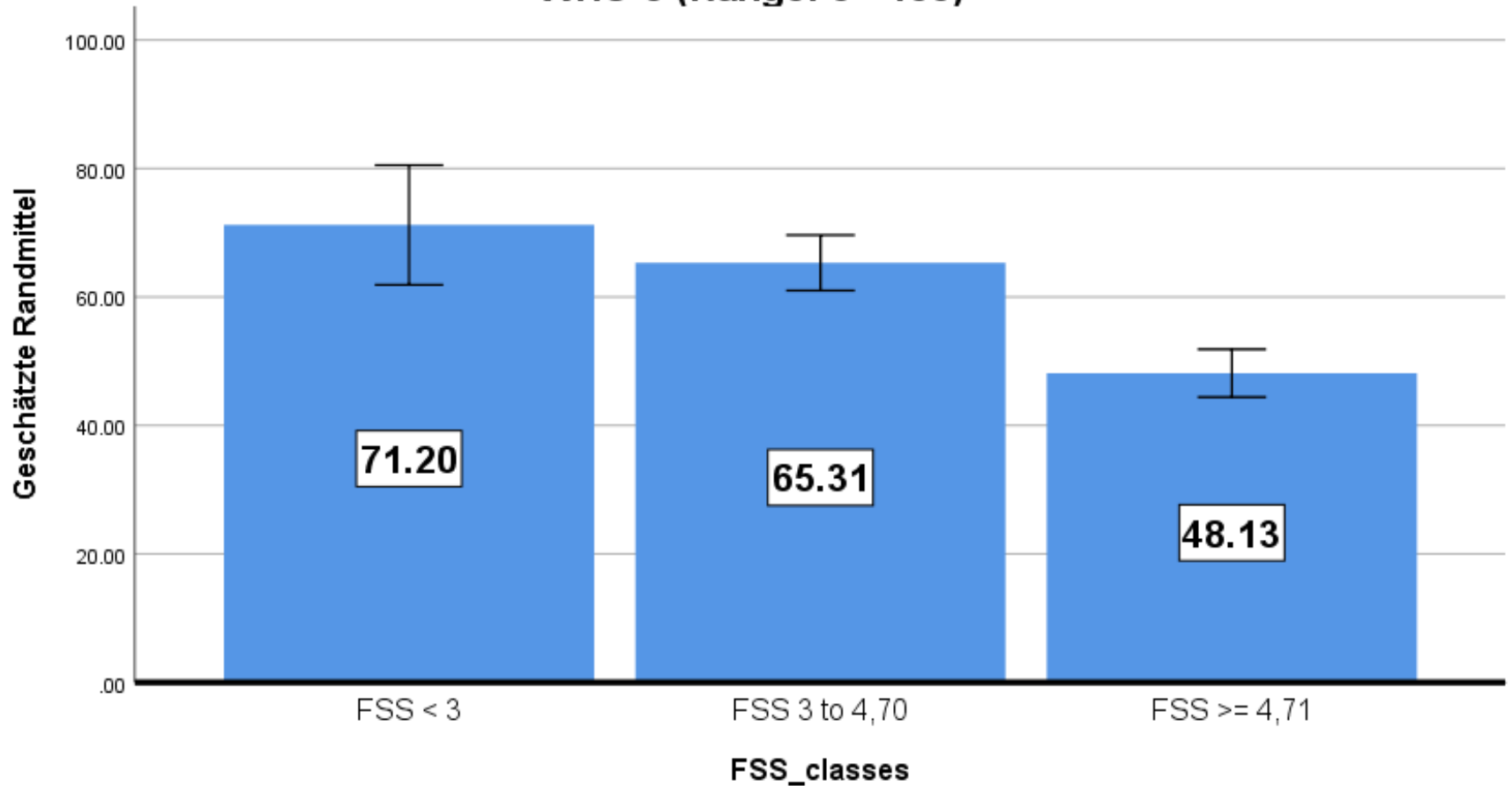
**Pilots not fatigued // Fatigued // Severely fatigued**

### FSS\_8\_items (Range: 1 - 7)



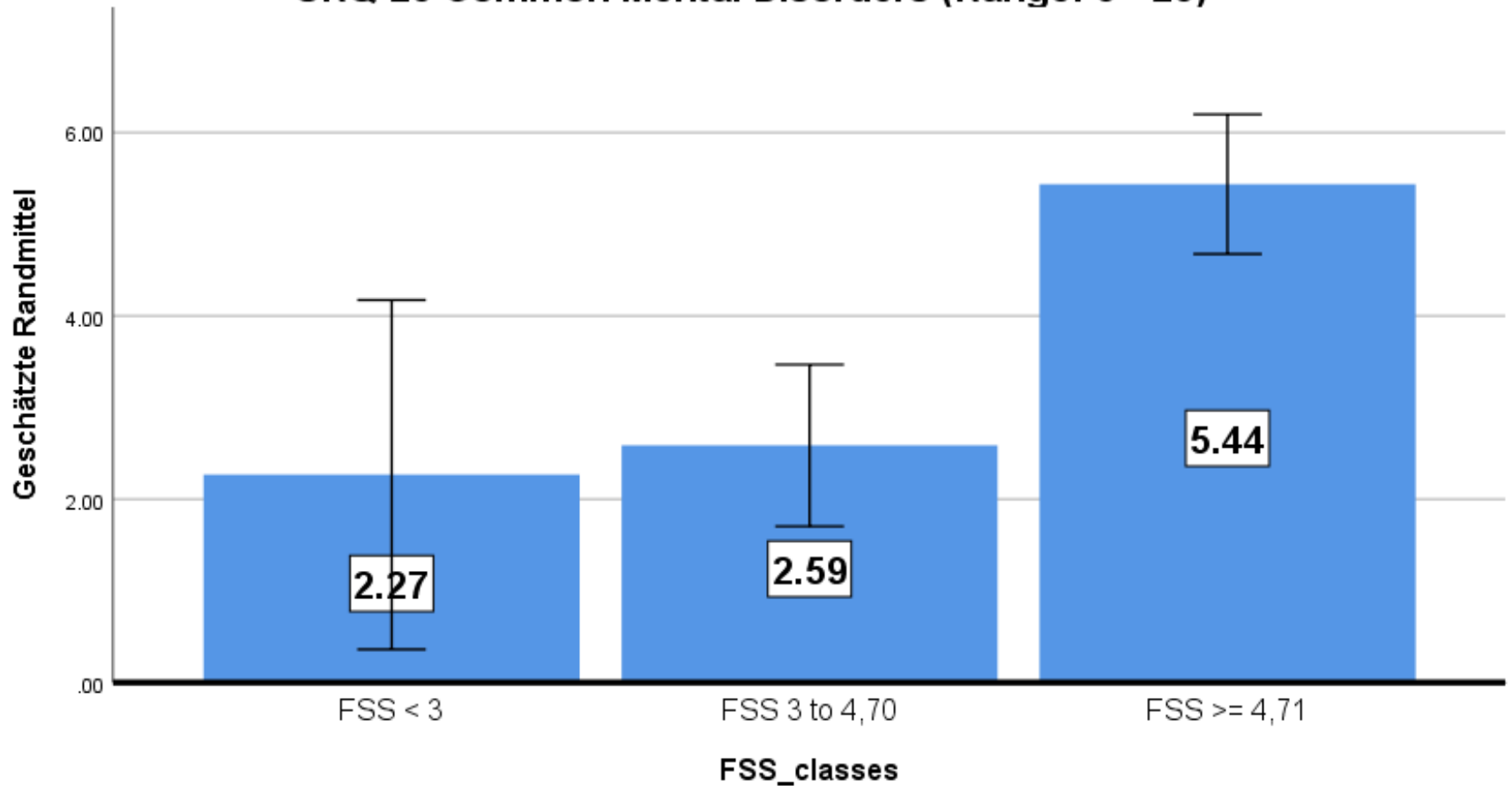
Fehlerbalken: 95% CI

## WHO-5 (Range: 0 - 100)



Fehlerbalken: 95% CI

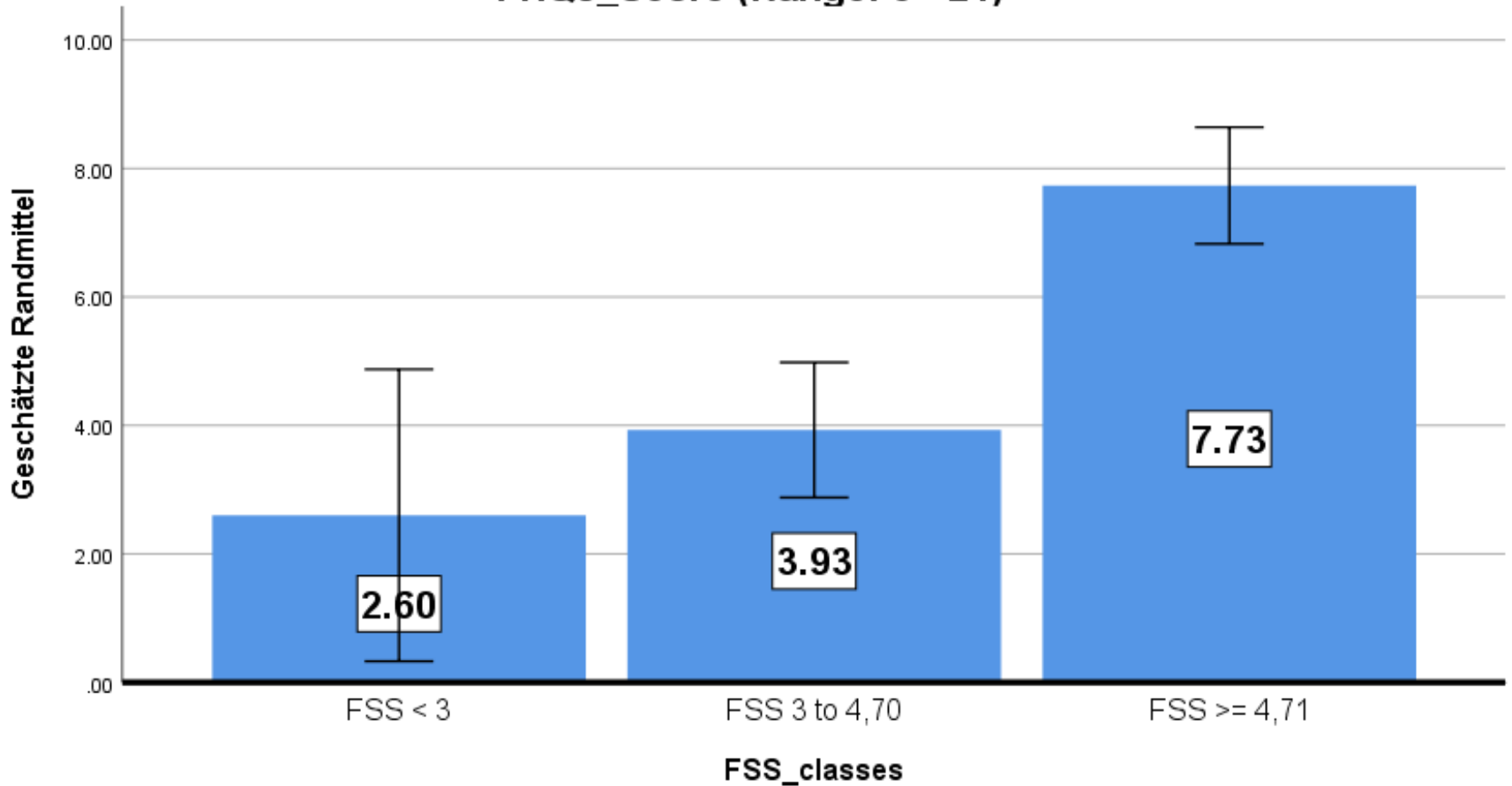
## SRQ-20 Common Mental Disorders (Range: 0 - 20)



Fehlerbalken: 95% CI

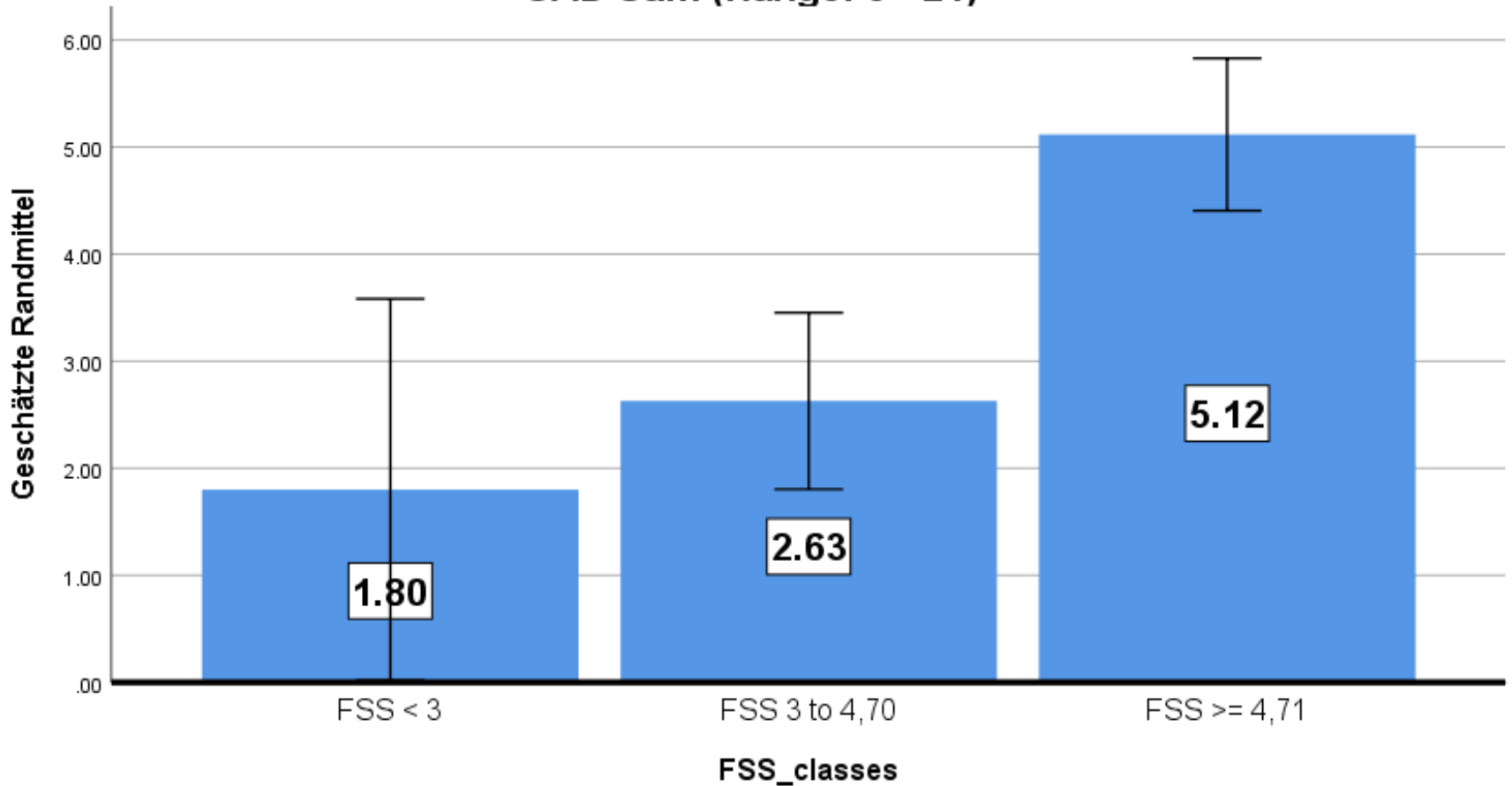


### PHQ8\_Score (Range: 0 - 24)



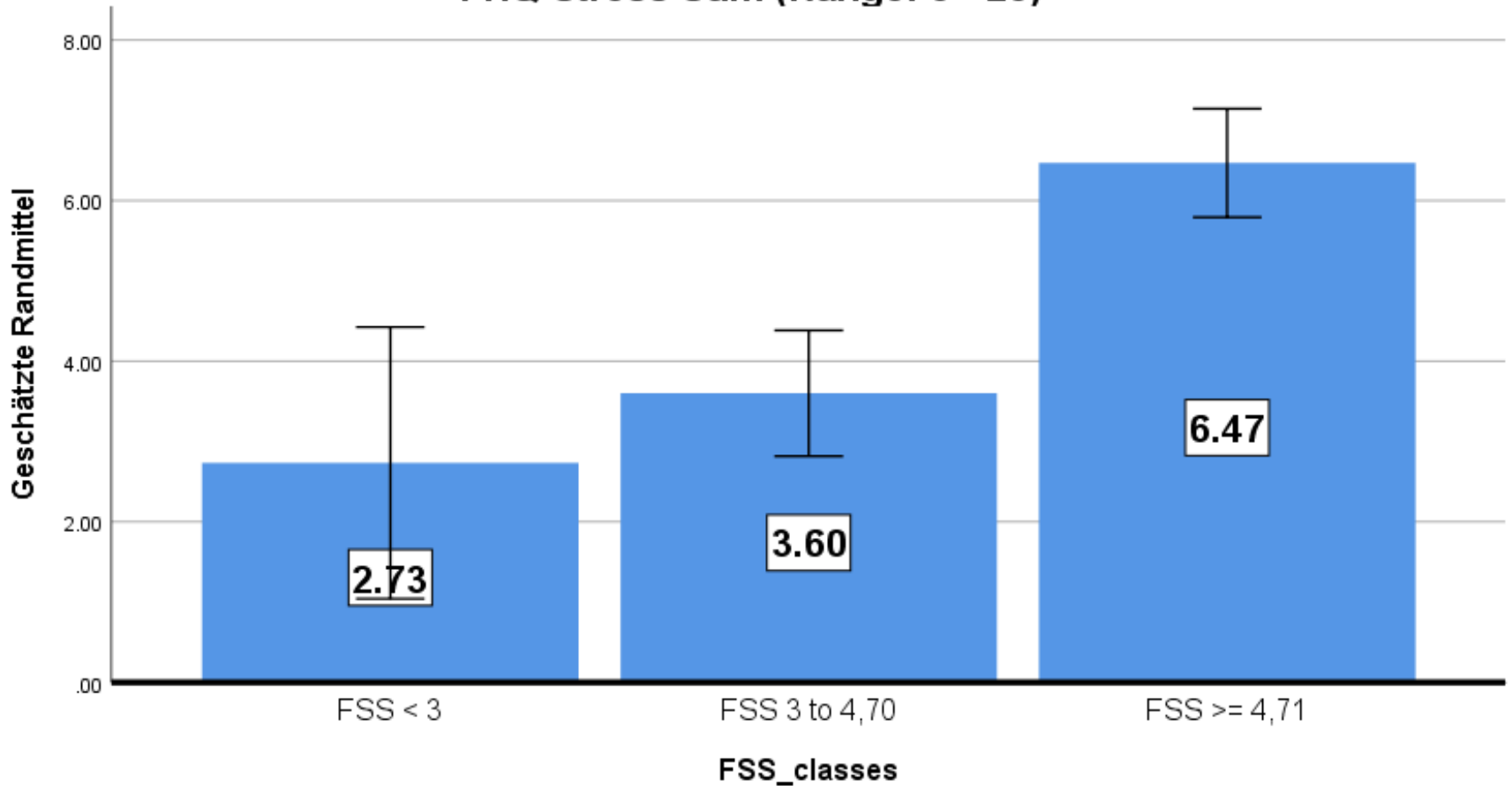
Fehlerbalken: 95% CI

### GAD Sum (Range: 0 - 21)



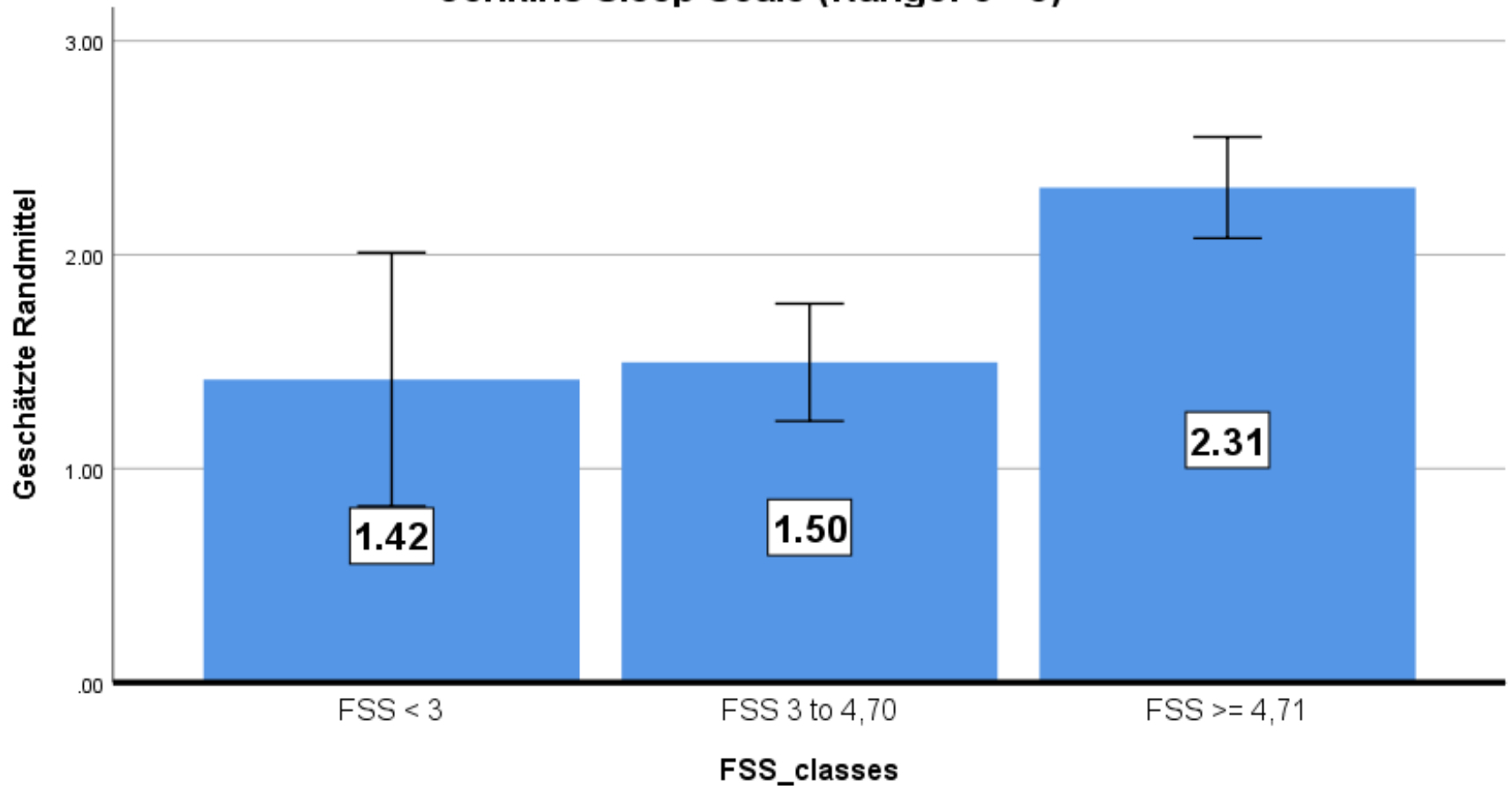
Fehlerbalken: 95% CI

## PHQ-Stress Sum (Range: 0 - 20)



Fehlerbalken: 95% CI

## Jenkins Sleep Scale (Range: 0 - 5)



Fehlerbalken: 95% CI

# **Conclusion**

## **It started with Fatigue ...**

# Take Away Message

- **92% commercial pilots more fatigued than the healthy population**
- **53% severely fatigued (FSS > 4,70)**
- **What's the role of fatigue in**
  - >> Burnout (Brezonakova, 2017)**
  - >> Depression**
  - >> Anxiety / massive fear to lose everything**
  - >> Common mental disorders?**

# **Trainings to cover the new EASA regulations after Germanwings**

**Commission Regulation (EU) 2018/1042,  
Part-MED**

- **Nov. 29<sup>th</sup>, 2018 (Zürich):** One day workshop: “Airline pilots’ health under pressure.” Mandatory for non aviation professionals.
- **Nov. 30<sup>th</sup>, 2018 (Zürich):** One day workshop Pilot Peer Support: with Marion Venus, Capt. Michael Gruber
- Two days workshop pilot assessment for a) pilot selection, b) full mental fitness assessment of airline pilots for Medical Class 1, (Feb. 2019).
- **Workshop Pilot Fatigue and Mental Health**
- **In-House Workshops, Policy Development**
- [www.venus-aviation.ch](http://www.venus-aviation.ch)