

Contents

Chapter 1	Definitions and models.....	1
1.1	Emotion.....	1
1.1.1	A look at emotion research.....	1
1.1.2	Methods in emotion research.....	3
1.1.3	Evolutionary aspects.....	3
1.2	Concepts related to emotion.....	4
1.2.1	Motivation.....	4
1.2.2	Stress.....	5
1.3	Work load: Theoretical background.....	6
1.3.1	Total work load.....	6
1.3.2	Physical work load.....	7
1.3.3	Emotional work load.....	8
1.3.4	Mental work load.....	9
1.4	Summary.....	9
Chapter 2	Basic physiological principles.....	11
2.1	Nervous control of the heart.....	11
2.1.1	Parasympathetic fibers (nervus vagus).....	11
2.1.2	Sympathetic nerves.....	11
2.1.3	Central control of the cardiovascular and respiratory systems...	12
2.1.4	Afferent fibers in the ANS.....	13
2.1.5	Epinephrine and norepinephrine from the adrenal medulla.....	13
2.2	Neurophysiology of emotion.....	14
2.3	Summary.....	15
Chapter 3	Methods.....	17
3.1	Freiburg Monitoring System (FMS).....	17
3.1.1	Apparatus.....	17
3.1.2	ECG leads.....	18
3.1.3	Physical activity.....	19
3.1.4	On-line analysis of additional heart rate (AHR).....	19
3.1.5	Other ECG parameters.....	21
3.1.5.1	<i>Heart rate variability (MSSD)</i>	21
3.1.5.2	<i>P-wave amplitude</i>	23
3.1.5.3	<i>ST-segment amplitude and ischemic episodes</i>	23
3.1.6	Assessment of behavior and subjective state.....	24
3.1.7	Baseline.....	26
3.1.8	Data analysis.....	26

3.2	Samples monitored with the FMS.....	27
3.2.1	Patients.....	27
3.2.2	Healthy subjects.....	27
3.3	Reliability of the FMS.....	28
3.3.1	Short-term reliability.....	28
3.3.2	Long-term reliability (stability coefficients).....	29
3.4	Validity of the FMS.....	33
3.4.1	Within-subject correlations.....	33
3.4.2	Induction of emotional arousal in laboratory experiments.....	35
3.4.2.1	<i>Funny and erotic movies</i>	35
3.4.2.2	<i>"The silence of the lambs"</i>	36
3.4.3	Testing hypotheses of expected differences between segments.....	37
3.4.3.1	<i>Daytime versus nighttime</i>	37
3.4.3.2	<i>Sitting versus standing versus walking</i>	38
3.4.3.3	<i>Working time versus leisure time</i>	39
3.4.3.4	<i>Staying at school/university versus staying at home</i>	39
3.4.3.5	<i>Social contacts with peers versus social contacts with strangers</i>	40
3.4.3.6	<i>High versus low TV consumption</i>	40
3.5	Special aspects of AHR.....	41
3.5.1	Distribution.....	41
3.5.2	Age dependency of AHR.....	43
3.5.3	AHR: Emotional or mental work load?.....	45
3.5.3.1	<i>Reaction time paradigm</i>	45
3.5.3.2	<i>Reciting a neutral text or discussing an emotional theme</i>	46
3.6	Discussion.....	49
3.7	Summary.....	51
Chapter 4	Interoception.....	53
4.1	Some findings from the literature.....	53
4.2	Cardiac perception in healthy subjects.....	55
4.2.1	Perception of AHR in healthy subjects.....	55
4.2.2	The influence of cognitive schemas on perception.....	57
4.3	Cardiac perception in patients.....	58
4.3.1	Perception of AHR in patients.....	58
4.3.2	Asymptomatic and symptomatic myocardial infarction.....	59
4.3.3	Discussion of the AMI and SMI results.....	62
4.3.4	Emotional arousal, ischemic episodes, and angina pectoris.....	64
4.3.5	Interoception in patients with cardiac neurosis and controls.....	67

4.4	Discussion.....	70
4.5	Summary.....	71
Chapter 5	Perception of emotions.....	73
5.1	Frequency and quality of emotions.....	73
5.2	Emotional differences between true and random feedbacks and for different social contacts.....	78
5.3	Physiological profiles of different emotions.....	79
5.4	Accuracy of the perception of emotional arousal.....	80
5.5	Influence of personality dimensions on emotions reported...	81
5.6	Discussion.....	82
5.7	Summary.....	84
Chapter 6	Stress and strain at the workplace.....	87
6.1	Work load in train drivers, bus drivers, and dispatchers....	87
6.1.1	Work load in train drivers.....	87
6.1.2	Work load in bus drivers.....	94
6.1.3	Work load in dispatchers.....	97
6.2	Work load in white and blue collar workers.....	101
6.3	Work load in university students.....	104
6.3.1	First study.....	104
6.3.2	Replication study.....	108
6.4	Work load in schoolboys.....	111
6.5	Discussion.....	115
6.5.1	Train drivers, bus drivers, and dispatchers.....	115
6.5.2	White and blue collar workers.....	116
6.5.3	University students.....	117
6.5.4	Schoolboys.....	118
6.6	Summary.....	118
Chapter 7	Stress and strain during leisure time.....	121
7.1	Work versus leisure time in train drivers, bus drivers, and dispatchers.....	121
7.2	Work versus leisure time in white and blue collar workers..	123
7.3	Effects of television viewing in schoolboys.....	127

7.4	Driving a car.....	131
7.4.1	White and blue collar workers.....	131
7.4.2	Male university students.....	135
7.5	Stress at the amusement park.....	139
7.6	Discussion.....	142
7.7	Summary.....	144
Chapter 8	Physiological monitoring during the night.....	147
8.1	Hypotheses.....	147
8.2	Results.....	148
8.3	Discussion.....	157
8.4	Summary.....	157
Chapter 9	General discussion.....	159
9.1	Methodological considerations.....	160
9.2	Interoception and emotions.....	163
9.3	Stress and strain.....	166
9.3.1	Stress at the workplace.....	166
9.3.2	Stress during leisure time.....	168
9.4	Monitoring during sleep.....	169
9.5	Conclusions.....	169
Summary.....		173
References.....		177
Authors index.....		193
Subject index.....		197