

TABLE OF CONTENTS

Table of Contents

ACKNOWLEDGMENTS I

ABSTRACT II

TABLES AND FIGURES VII

ABBREVIATIONS..... VIII

1. Introduction 1

PART I THEORETICAL BACKGROUND 4

2. Stress..... 4

 2.1. Biological and psychological stress concepts..... 4

 2.2. Sympathetic nervous system & sympathetic-adrenal-medullary system. 9

 2.2.1. Measuring SNS/SAM activity 10

 2.3. Hypothalamus–pituitary–adrenal axis..... 11

 2.3.1. Measuring HPA axis activity with free salivary cortisol 14

3. Exercise..... 15

 3.1. Exercise and physical stress 15

 3.1.1. Stressors..... 16

 3.1.1.1. Acute physical stressors..... 16

 3.1.1.2. Passive physical stressors 16

 3.1.2. Sympathetic nervous system (SNS) activity 17

 3.1.3. Hypothalamic-pituitary-adrenal (HPA) activity 17

 3.2. Exercise and psychological stress..... 17

 3.2.1. Stressors..... 20

 3.2.1.1. Stroop Test 20

 3.2.1.3. Mental arithmetic tasks..... 21

 3.2.1.4. Reaction time tasks 21

 3.2.1.5. Public Speech..... 22

 3.2.1.6. Real life stressors..... 22

 3.2.1.7. Passive cognitive performance 22

 3.2.2. Sympathetic nervous system (SNS) activity 22

 3.2.3. Hypothalamic-pituitary-adrenal (HPA) activity 24

 3.2.4. Affective reactivity..... 24

 3.2.5. Overview of studies on physical activity and stress 24

 3.2.6. Summary: Conclusions for the experimental design 28

TABLE OF CONTENTS

PART II EMPIRICAL STUDIES 31

4. Stress reactivity of elite sportsmen compared to untrained men..... 31

4.1. Introduction 31

4.2. Methods..... 33

4.2.1. Participants 33

4.2.2. Procedure 34

4.2.3. Endocrine and Autonomic Measures 35

4.2.4. Psychological Measures..... 36

4.2.5. Statistical Analysis..... 36

4.3. Results..... 38

4.3.1. Description of the Study Groups..... 38

4.3.2. Cortisol Responses to Stress..... 39

4.3.3. Heart Rate Responses to Stress 40

4.3.4. Affective Responses to Stress..... 41

4.3.5. Role of Self-Efficacy for Group Differences in Stress Responses..... 43

4.4. Discussion 43

5. Effects of physical activity and competitiveness on stress reactivity..... 47

5.1. Introduction 47

5.2. Methods..... 50

5.2.1. Participants 50

5.2.2. Procedure 51

5.2.3. Physical fitness test..... 52

5.2.4. Psychosocial stress test..... 53

5.2.5. Measures of the SNS and HPA 53

5.2.6. Psychological Measures 54

5.2.6.1. Competitiveness..... 55

5.2.6.2. Primary and secondary appraisal & ways of coping 56

5.2.7. Statistical Analysis 56

5.3. Results..... 57

5.3.1. Study sample 57

5.3.2. Cortisol Responses to psychosocial stress..... 59

5.3.3. Heart Rate Responses..... 60

5.3.4. Affective Responses..... 60

5.3.5. Competitiveness..... 61

5.3.6. Self-efficacy 63

5.3.7. Trait anxiety 63

5.3.8. Primary and secondary appraisal & ways of coping 63

5.3.9. Associations between psychological parameters and stress response
..... 64

TABLE OF CONTENTS

5.3.9.1. Influence of competitiveness and trait anxiety on psychosocial stress reactivity	65
5.3.9.2. Influence of appraisal and ways of coping on psychosocial stress reactivity.....	65
5.4. Discussion	66
PART III GENERAL DISCUSSION	72
6. Summary of the results of the empirical studies.....	72
6.1. Stress reactivity of elite sportsmen compared to untrained men	72
6.2. Effects of physical activity and competitiveness on stress reactivity	73
7. Methodological considerations and limitations	73
8. Discussion of the results	76
9. Clinical implications and directions for future research	87
REFERENCES	89