

**THE HUMAN COSTS AND BENEFITS OF WORK:
JOBLOAD, SELF-PERCEIVED PERFORMANCE,
AND EMPLOYEE WELLBEING**

Submitted by
Peta Miller

La Trobe University

November 2004

**THE HUMAN COSTS AND BENEFITS OF WORK:
JOBLOAD, SELF-PERCEIVED PERFORMANCE,
AND EMPLOYEE WELLBEING**

Submitted by

Peta Miller

Bachelor Applied Science (Occupational Therapy)
Graduate Diploma in Ergonomics

A thesis submitted in total fulfillment of the requirements for the degree of Doctor of
Philosophy

School of Human Biosciences
Faculty of Health Sciences
La Trobe University
Victoria 3086
Australia

November 2004

ACKNOWLEDGMENTS

I would like to gratefully acknowledge the help and guidance of my supervisor Associate Professor Wendy Macdonald in the completion of this thesis. I would also like to thank Dr John Schuijers for his help with preparation of chemicals and with the assaying of urine samples, Associate Professor Owen Evans for his advice on calculation routines for urine samples, and Associate Professor Errol Hoffmann for his assistance in proof reading of the final thesis. I am also very grateful for the financial assistance provided by the Australian Postgraduate Scholarship Scheme, which greatly enhanced my ability to undertake this research.

I would also like to sincerely thank all of the participants in this research, and their managers, for making this research possible; my colleagues for their patience and support; my husband Jonathon Miller, and my mother Dorothy Giles for their unfailing emotional support. Lastly I would like to thank my daughter Hilary for providing many cups of tea.

This thesis is dedicated to my wonderful mother, Dorothy Giles, and to the memory of my late father, Dr Ron Giles.

STATEMENT OF AUTHORSHIP

Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis submitted for the award of any other degree or diploma. No other person's work has been used without due acknowledgement in the main text of the thesis. The thesis has not been submitted for the award of any degree or diploma in any other tertiary institution.

The author acknowledges that assaying of urine samples for urinary free cortisol was undertaken by the Austin Rehabilitation Pathology Department.

The research procedures reported in this thesis were approved by the LTU Human Ethics Committee, Reference Number 99/19

Peta Miller

Student Number: 95262151

18 November 2004

A b s t r a c t

**THE HUMAN COSTS AND BENEFITS OF WORK: JOBLoad, SELF-
PERCEIVED PERFORMANCE, AND EMPLOYEE WELLBEING**

by Peta Miller

The primary purpose of this project was to investigate some relationships between workload and employee wellbeing. The necessary first stage was to formulate a theoretical framework – the JobLoad Model – to support a comprehensive and detailed investigation of the main factors that contribute to a job's workload. Building on the ergonomics concept of 'workload', this Model incorporates task- and job-level factors that have been identified within the research literatures of physical and cognitive ergonomics as important; additional constructs were added to take account of additional factors shown to be relevant to employee wellbeing, drawing on evidence from occupational health and organizational psychology literatures. Using this framework, available questionnaire-based measurement instruments for assessing workload and employee wellbeing were reviewed, new items were developed as required, and the JobLoad Index (JLI) was developed.

The JLI was used to collect data from public servants in two different workplaces, with participation rates of 63% and 73% respectively. Relationships were determined between major task, job and organisational environment factors, self-perceived performance adequacy, and various aspects of employee wellbeing including job satisfaction, physical discomfort and psychological fatigue, stress and arousal. For a sub-sample of participants in one of the two workplaces, levels of adrenaline, noradrenaline and cortisol were also measured from 24-hour urine collections.

The factors measured by the JLI accounted for a very substantial proportion of variance in these various dimensions of work-related wellbeing. The results provide potentially very useful insights into the relative influences of a wide range of work- and job-related variables on people's perceived abilities to cope with their job demands, and on several aspects of their wellbeing. Further, the importance of measuring multiple dimensions of wellbeing, and differentiating their separate sets of work-related determinants, was well demonstrated. Finally, and perhaps most significantly, this study has identified the powerful role that self-perceived performance plays as an intervening variable between job demands and people's work-related wellbeing.

TABLE OF CONTENTS

Chapter 1. INTRODUCTION AND STUDY AIMS

INTRODUCTION.....	1
STUDY AIMS.....	4

PART 1: THEORETICAL FOUNDATIONS

Chapter 2. WORKLOAD

THE ERGONOMICS CONCEPT OF ‘WORKLOAD’	7
WORK DEMANDS	12
COPING CAPACITY	24
JOB CONTROL AND VARIETY	29
SUMMARY	33

Chapter 3 WELLBEING AND PERFORMANCE

THE NATURE OF WELLBEING.....	35
AROUSAL	41
FATIGUE.....	45
PHYSICAL DISCOMFORT.....	46
WORNOUT.....	51
STRESS.....	51
JOB SATISFACTION	58
SELF-PERCEIVED PERFORMANCE CAPACITIES AND ADEQUACY.....	60
SUMMARY	64

PART 2: DEVELOPMENT OF MEASUREMENT INSTRUMENT

Chapter 4. MEASUREMENT REQUIREMENTS AND AVAILABLE MEASURES

INTRODUCTION.....	66
TASK AND JOB DEMANDS MEASURES FROM STRESS/HEALTH PSYCHOLOGY	71
MEASURES OF JOB PERFORMANCE	75
MEASURES OF WELLBEING	76
CONSTRUCTS TO BE INCLUDED IN THE JOBLoad INDEX.....	78

Chapter 5. STUDY DESIGN & DATA COLLECTION PROCEDURES

SELECTION OF STUDY SITES & APPROVAL PROCESS.....	81
PHASES OF THE STUDY	83
JOB DESCRIPTION.....	84
GENERAL METHODOLOGICAL PROBLEMS.....	89

Chapter 6. DATA PREPARATION AND DEVELOPMENT OF THE JOBLoad INDEX

DATA PREPARATION	90
DOMAIN – PERSONAL & NON-WORK RELATED FACTORS	93
DOMAIN – WORK DEMANDS.....	93
DOMAIN – SUPPORT	99
DOMAIN – CONTROL.....	101
DOMAIN – WORK- RELATED DISSATISFACTION	103
DOMAIN –SPPCA	104
DOMAIN FATIGUE	106
DOMAIN –PSYCHOLOGICAL STRESS	106
FINAL CONSTRUCT PREPARATION PRIOR TO MULTIVARIATE ANALYSIS	107
WORK DEMANDS	107
SUPPORT	108
CONTROL	108
ASPECTS OF WELLBEING	109
Chapter 7. DATA ANALYSIS APPROACH	
DATA ANALYSIS APPROACH.....	111
PART 3: RESULTS AND DISCUSSION	
Chapter 8. JOB DESCRIPTION	
BACKGROUND INFORMATION AND DEMOGRAPHICS.....	117
WORK DEMANDS AND JOB FACTORS	123
CONCLUSIONS	129
Chapter 9. BODILY DISCOMFORT	
UBPD RESULTS: SITE ONE	131
IDENTIFICATION OF FACTORS INFLUENCING UBPD	132
MULTIVARIATE ANALYSES	133
UBPD RESULTS: SITE TWO	138
IDENTIFICATION OF FACTORS INFLUENCING UBPD	139
MULTIVARIATE ANALYSES	140
OVERVIEW OF RESULTS: BOTH SITES.....	143
REVIEW AND DISCUSSION OF RESULTS	146
CONCLUSIONS	155
Chapter 10. WORNOUT	
RESULTS: SITE ONE.....	156
IDENTIFICATION OF FACTORS INFLUENCING WORNOUT.....	157
MULTIVARIATE ANALYSES	158

IDENTIFICATION OF FACTORS INFLUENCING WORNOUT.....	162
MULTIVARIATE ANALYSES.....	163
OVERVIEW OF RESULTS: BOTH SITES.....	166
REVIEW AND DISCUSSION OF RESULTS.....	169
MEASUREMENT ISSUES AND GENERAL FINDINGS.....	179
CONCLUSIONS.....	180
Chapter 11. STRESS	
RESULTS: SITE ONE.....	181
IDENTIFICATION OF FACTORS INFLUENCING STRESS.....	182
MULTIVARIATE ANALYSES.....	183
RESULTS: SITE TWO.....	188
IDENTIFICATION OF FACTORS INFLUENCING STRESS.....	188
MULTIVARIATE ANALYSES.....	189
OVERVIEW OF RESULTS: BOTH SITES.....	192
REVIEW AND DISCUSSION OF RESULTS.....	195
MEASUREMENT ISSUES.....	205
CONCLUSION.....	205
Chapter 12. AROUSAL	
RESULTS: SITE ONE.....	207
IDENTIFICATION OF FACTORS INFLUENCING AROUSAL.....	208
MULTIVARIATE ANALYSES.....	208
RESULTS: SITE TWO.....	212
IDENTIFICATION OF FACTORS INFLUENCING AROUSAL.....	212
MULTIVARIATE ANALYSES.....	213
OVERVIEW OF RESULTS: BOTH SITES.....	216
REVIEW AND DISCUSSION OF RESULTS.....	219
MEASUREMENT ISSUES.....	225
CONCLUSIONS.....	225
Chapter 13. JOB SATISFACTION	
RESULTS: SITE ONE.....	226
IDENTIFICATION OF FACTORS INFLUENCING JOB SATISFACTION.....	227
MULTIVARIATE ANALYSES.....	228
RESULTS: SITE TWO.....	233
IDENTIFICATION OF FACTORS INFLUENCING JOB SATISFACTION.....	233
MULTIVARIATE ANALYSES.....	234

OVERVIEW OF RESULTS: BOTH SITES.....	237
REVIEW AND DISCUSSION OF RESULTS.....	242
MEASUREMENT ISSUES	248
CONCLUSION.....	249
Chapter 14. STRESS HORMONES	
PARTICIPATION RATES	251
RESULTS: ADRENALINE.....	252
IDENTIFICATION OF FACTORS INFLUENCING ADRENALINE LEVELS.....	253
MULTIVARIATE ANALYSES	253
RESULTS: NORADRENALINE.....	257
IDENTIFICATION OF FACTORS INFLUENCING NORADRENALINE.....	257
MULTIVARIATE ANALYSES	258
RESULTS: CORTISOL.....	260
IDENTIFICATION OF FACTORS INFLUENCING CORTISOL LEVELS.....	262
MULTIVARIATE ANALYSES	262
OVERVIEW OF RESULTS AND DISCUSSION OF STRESS HORMONES: BOTH SITES	266
REVIEW AND DISCUSSION OF RESULTS.....	269
Chapter 15. SPPCA	
RESULTS: SITE ONE.....	279
IDENTIFICATION OF FACTORS INFLUENCING SPPCA.....	280
MULTIVARIATE ANALYSES	280
RESULTS: SITE TWO.....	286
IDENTIFICATION OF FACTORS INFLUENCING SPPCA.....	286
MULTIVARIATE ANALYSES	287
OVERVIEW OF RESULTS: BOTH SITES.....	291
REVIEW AND DISCUSSION OF RESULTS.....	294
MEASUREMENT ISSUES	308
CONCLUSIONS	309
Chapter 16. RELATIONSHIPS BETWEEN ASPECTS OF WELLBEING	
RELATIONSHIPS BETWEEN WELLBEING MEASURES IN TERMS OF THE WARR / DANIELS FIVE-AXIS MODEL.....	319
COMPARISON AND REVIEW OF WORK-RELATED PREDICTORS OF WELLBEING .	322
CONCLUSIONS	327
Chapter 17. SUMMARY, DISCUSSION AND CONCLUSIONS	
CONTENT OF THE JOBLLOAD INDEX.....	329

EXPLANATORY POWER OF THE JLI	337
JOB CONTROL AND VARIETY	355
ROLE OF SPPCA AS A PREDICTOR OF WELLBEING.....	360
CONCLUSIONS	362
FURTHER RESEARCH.....	363
REFERENCES AND BIBLIOGRAPHY	366
APPENDICES	
APPENDIX 5.1 HEC APPROVAL	403
APPENDIX 5.2 WORKLOAD QUESTIONNAIRES SITE ONE (NOT ACTUAL LAYOUT)	405
APPENDIX 5.3 WORKLOAD QUESTIONNAIRES SITE TWO (NOT ACTUAL LAYOUT)	417
APPENDIX 5.4 URINE COLLECTION INSTRUCTIONS & RECORDING SHEETS	426
APPENDIX 5.5 PROCEDURES FOR ASSAYING URINE SAMPLES AND ENTERING INFORMATION ONTO DATABASE.....	430
APPENDIX 6. DESCRIPTIVE DATA	
APPENDIX 6.1A DESCRIPTIVE STATISTICS SITE ONE.....	440
APPENDIX 6.2 DATA PREPARATION AND DEVELOPMENT OF THE JOB LOAD INDEX.....	455
APPENDIX 6.3 DESCRIPTIVE STATISTICS CONSTRUCTS.....	458
APPENDIX 7. ORGANIZATIONAL CONTEXT, SKILL REQUIREMENTS AND SUBJECT DEMOGRAPHY	
PARTICIPANT INFORMATION.....	460
WORK DEMANDS	461
SPECIFIC WORK DEMANDS	474
CONTEXTUAL DEMANDS AND IMPEDIMENTS	481
SUPPORT FACTORS	488
JOB CONTROL AND WORK VARIETY.....	494
SATISFACTION FACTORS.....	498
APPENDIX 8. WELLBEING	
SELF-PERCEIVED PERFORMANCE, WORNOUT, BODILY DISCOMFORT, STRESS, AROUSAL, JOB SATISFACTION AND FOR THE JOB TYPES AND LEVELS.....	504
PRELIMINARY MULTIVARIATE ANALYSES SITE ONE UBPD	521
PRELIMINARY MULTIVARIATE ANALYSES SITE TWO UBPD	530
PRELIMINARY MULTIVARIATE ANALYSES SITE TWO LBPD.....	540
FINAL MULTIVARIATE ANALYSES SITE ONE LBPD	545
BIVARIATE CORRELATIONS OF IVS AND LOWER BODY PART DISCOMFORT ...	546

MULTIVARIATE ANALYSES	547
FINAL MULTIVARIATE ANALYSES SITE TWO LBDP	551
RELATIONSHIPS BETWEEN LBDP SCORES AND OTHER CONSTRUCTS	552
MULTIVARIATE ANALYSES	552
PRELIMINARY MULTIVARIATE ANALYSES SITE ONE WORNOUT.....	565
PRELIMINARY MULTIVARIATE ANALYSES SITE TWO WORNOUT.....	572
PRELIMINARY MULTIVARIATE ANALYSES SITE ONE STRESS.....	578
PRELIMINARY MULTIVARIATE ANALYSES STRESS AT SITE TWO.....	585
PRELIMINARY MULTIVARIATE ANALYSES AROUSAL AT SITE ONE.....	596
PRELIMINARY MULTIVARIATE ANALYSES AROUSAL AT SITE TWO.....	607
PRELIMINARY MULTIVARIATE ANALYSES -JOB SATISFACTION AT SITE ONE..	614
PRELIMINARY MULTIVARIATE ANALYSES - JOB SATISFACTION AT SITE TWO	625
SUMMARIZED AND VERBATIM RESPONSES TO OPEN COMMENTS SECTION	636
RELATIONSHIPS BETWEEN ADRENALINE AND OTHER CONSTRUCTS	646
RELATIONSHIPS BETWEEN DAILY NORADRENALINE AND OTHER CONSTRUCTS	653
FURTHER EXPLORATORY ANALYSIS.....	660
RELATIONSHIPS BETWEEN CORTISOL AND OTHER CONSTRUCTS.....	661
BIVARIATE CORRELATIONS BETWEEN SPPCA SCORES AND OTHER CONSTRUCTS	671
MULTIVARIATE ANALYSES SPPCA SITE TWO	679