

Contents

Contributors	v
Preface	xi

CHAPTER 1 Sleep deprivation, effort allocation and performance	1
Stijn A.A. Massar, Julian Lim, Scott A. Huettel	
1. Introduction	2
2. Perspectives on sleep deprivation and effort	2
3. Neuroeconomic perspectives on effort	4
4. Sleep deprivation, subjective effort, and motivational reduction	6
5. Sleep deprivation and motivated performance	8
6. Sleep deprivation and effort-based decision-making	10
7. Neural correlates of effort-based decision-making	13
8. What makes performance under sleep deprivation effortful?	16
9. Limitations and practical relevance	18
10. Conclusion	19
References	20

CHAPTER 2 The impact of sleep deprivation on declarative memory	27
James N. Cousins, Guillén Fernández	
1. Introduction	27
2. Memory stages and sleep	28
2.1. Encoding	31
2.2. Consolidation	35
2.3. Retrieval	42
3. Limitations and future directions	44
References	46

CHAPTER 3 Adolescent sleep restriction effects on cognition and mood	55
Michelle A. Short, Michael W.L. Chee	
1. Introduction	55
2. Adolescent sleep restriction and cognitive functioning	56
3. Possible mechanisms underlying cognitive impairment	59
4. Adolescent sleep restriction and mood	60
5. Mechanisms underlying affective effects of sleep restriction	63

6. Gaps in the literature and future research directions.....	65
7. Concluding remarks	66
References	66
CHAPTER 4 Self-regulation and social behavior during sleep deprivation.....	73
Jillian Dorrian, Stephanie Centofanti, Ashleigh Smith, Kathryn Demos McDermott	
1. Introduction and overview.....	74
2. Behavioral regulation.....	75
2.1. Sleep deprivation and self-regulation of eating behavior... ..	76
2.2. Sleep loss, stress, and reward.....	78
3. Emotional regulation.....	83
4. Social behavior.....	87
4.1. Sleep deprivation, negative interaction, and withdrawal....	90
5. Toward an integrated theory of the impact of sleep deprivation on social cognition.....	95
6. Agenda for physical, psychological, and social health promotion in the face of sleep deprivation.....	97
7. Conclusions	102
References	102
CHAPTER 5 A dynamic attentional control framework for understanding sleep deprivation effects on cognition.....	111
Paul Whitney, John M. Hinson, Amy T. Nusbaum	
1. Introduction.....	112
2. PFC functions and SD.....	113
3. A dynamic attentional control framework.....	114
4. “Complex cognition” and SD reconsidered.....	119
5. Conclusions.....	121
Acknowledgments.....	122
References	122
CHAPTER 6 Unraveling the genetic underpinnings of sleep deprivation-induced impairments in human cognition.....	127
Brieann C. Satterfield, Benjamin Stucky, Hans-Peter Landolt, Hans P.A. Van Dongen	
1. Introduction.....	128
2. Pharmacogenetics to elucidate molecular-genetic contributions to sleep deprivation and cognition.....	130
2.1. System perturbations with pharmacological interventions and sleep deprivation.....	131

2.2. Theory-driven selection of gene targets: Proof of concept...	132
2.3. Selective sampling: Proof of concept.....	133
2.4. System perturbation, theory-driven genotyping, and deep phenotyping.....	135
3. Sleep deprivation, individual differences, and cognitive endophenotyping.....	136
3.1. Genetically explained phenotypic variance.....	136
3.2. Statistical focus on between-subject variance.....	137
3.3. Cognitive endophenotyping.....	138
3.4. Challenges of inferring genetic mechanisms.....	138
4. Biomarker panels and statistical tools.....	139
4.1. Data-driven and theory-driven statistical approaches.....	139
4.2. Exploratory statistical techniques: Proof of concept.....	140
4.3. LASSO and cvLASSO.....	141
4.4. Stability selection LASSO.....	143
4.5. Hierarchical inference.....	144
4.6. Group LASSO.....	144
5. Conclusion.....	149
Acknowledgments.....	149
References.....	150

CHAPTER 7 Functional connectivity and the sleep-deprived brain..... 159

Michael W.L. Chee, Juan Zhou

1. Resting state functional connectivity (rsFC) and its measurement.....	159
2. An overview of resting state fMRI analysis techniques.....	160
3. Functional connectivity alterations following sleep deprivation.....	163
4. Dynamic functional connectivity and behavioral correlates.....	167
5. Functional connectivity changes in other neuropsychiatric conditions compared to sleep deprivation.....	169
6. Importance of sleep during functional connectivity studies.....	170
7. Future directions.....	171
References.....	171

CHAPTER 8 Basic and applied science interactions in fatigue understanding and risk mitigation..... 177

Glenn Gunzelmann, Stephen M. James, Jo Lynn Caldwell

1. Background.....	178
2. Effects of sleep related fatigue on ground combat operations.....	180

2.1. Fatigue and interpersonal interactions.....	181
2.2. Fatigue and decisions to shoot.....	183
3. Applying computational modeling to fatigue risk management in air operations.....	184
3.1. Cognitive architectures and models of sleep and fatigue.....	187
4. Countermeasures to reduce the deleterious effects of sleep loss.....	190
5. Conclusion.....	194
Acknowledgments.....	195
References.....	195
Further reading.....	204