ADVANCED MODELS OF INSOMNIA

Michael L. Perlis, Ph.D.
Associate Professor of Psychiatry
Department of Psychiatry
University of Pennsylvania

Director, The Upenn Behavioral Sleep Medicine Program

Visiting Professor: University of Glasgow & University of Freiburg
A FURTHER WORD ABOUT THE SPIELMAN 3-P MODEL

SLEEP EXTENSION
ADVANCED MODELS OF INSOMNIA

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MORIN MODEL 1993
LUNDH & BROMAN MODEL 2000
HARVEY MODEL 2002
PSYCHOBIOLOGIC INHIBITION MODEL 2002/2006
NEUROCOGNITIVE MODEL 1997
NEUROBIOLOGIC MODEL 2011
INTEGRATIVE MODEL 2006/2015

Dysfunctional Cognitions
- Worry Over Sleep Loss
- Rumination Over Consequences
- Unrealistic Expectations

Arousal
- Emotional
- Cognitive
- Physiologic

Consequences
- Mood Disturbances
- Fatigue
- Performance Impairments
- Social Discomfort

Maladaptive Habits
- Excessive time in Bed
- Irregular sleep schedule
- Daytime napping
- Sleep-incompatible activities

INSOMNIA
SLEEP

APPRaisal of sleep and daytime functioning

SLEEP COMPLAINT = INSOMNIA

Attributions of poor sleep and daytime functioning

Perfectionism: high personal standards concerning sleep and daytime functioning

Beliefs about sleep need, consequences of poor sleep, etc.
HARVEY 2002

Proposed evolution of Psychophysiological Insomnia from Adjustment Insomnia following the A-I-E pathway

- Stressful life event
- Psychological & physiological correlates of stress
- Selective attention toward stressors
- Arousal perpetuates sleep disturbance
- Inhibition of sleep-related de-arousal
- Recovery of normal sleep

ADJUSTMENT INSOMNIA

- SELECTIVE ATTENTION SHIFT
  - A1: Implicit shift toward sleep cues
  - A2: Explicit shift toward sleep cues

PSYCHOPHYSIOLOGIC INSOMNIA

- Explicit intention
- Sleep effort
A NOTE ABOUT COGNITIVE MODELS

IN THE CASE OF CHRONIC INSOMNIA

IS IT THE CASE THAT WORRY KEEPS ONE AWAKE

OR

THAT ONE WORRIES BECAUSE ONE IS AWAKE?
THE NEUROCOGNITIVE MODEL

SIMPLY RENDERED
SIMPLY RENDERED

(Images Not available)
NEUROBIOLOGIC MODEL 2011

Sleep-Wake Function in Insomnia

Physiological Processes

- Psychophysiological, Cognitive Arousal
- Circadian Rhythms
- Homeostatic Sleep Drive

Neural Circuits

- Cortico-Limbic Cognitive Affective Systems
- Hypothalamic Sleep-Wake Centers
- Brainstem Arousal Centers

Insomnia
INTEGRATIVE MODEL
PARALLEL PROCESS MODEL


Perlis M, Kloss J, and Ellis J. The Principles and Practice of Sleep Medicine, 6th edition Elsevier 2015
ETIOLOGY OF INSOMNIA - PARALLEL PROCESSES

GOOD SLEEP CONTINUITY
NORMAL SLEEP ARCHITECTURE
AS NEEDED TOTAL SLEEP

PREDISPOSING FACTORS
PERSONALITY TRAITS
POOR SLEEP HYGIENE
PRIOR INSOMNIA
SOCIAL FACTORS
ENVIRONMENT
RACE / GENDER / AGE
CONDITIONABILITY?

COGNITIVE BEHAVIORAL DOMAIN

PSYCHOSOCIAL STRESS
PERCEIVED OR REAL
THREAT TO LIFE OR WELL BEING

INCREASED SL, NWAK OR WASO
REDUCED TST
REDUCED SWS?
REM INSTABILITY?

DYSFUNCTIONAL BELIEFS
ABOUT SLEEP
SELECTIVE ATTENDING
ATTENTIONAL BIAS
TO & DETECTION OF
SLEEP "THREATS" &
DAYTIME CONSEQUENCES
APPRaisal OF SLEEP AND
DAYTIME FUNCTIONING
SLEEP RELATED WORRY
SLEEP PREOCCUPATION

REMAIN IN BED AWARE
NON SLEEP BEHAVIORS IN
THE SLEEP ENVIRONMENT
ENGAGEMENT OF SAFETY BEHAVIORS &
SLEEP EFFORT
EXTENDED SLEEP
OPPORTUNITY
ALTERED EXPOSURE TO
LIGHT DURING THE SLEEP
PERIOD

SLEEP STATE Misperception
PAVLOVIAN CONDITIONING

NORMAL SLEEP
ACUTE
SUBCHRONIC
CHRONIC

ADAPTIVE
MALADAPTIVE

NEUROCORTICAL & NEUROBIOLOGIC DOMAIN

FLIGHT-FIGHT RESPONSE
HYPERAROUSAL

HOMEOSTATIC &
CIRCADIAN
DYSREGULATION

ATTENUATION
MESOGRADE AMNESIA
OF SLEEP
LONG TERM CHANGES TO
HYPOTHALAMIC
SLEEP WAVE CENTERS
OX?
NY?
AC?
DA?
CORTISOL
ADRENOSINE
“We live with insomnia today because, at some point in our evolutionary history, insomnia allowed us to live”.

DEAN HANDELEY
SEPRACOR
CIRCA 2005
DINNER
“No matter how important sleep may be, it was adaptively deferred when the mountain lion entered the cave.”

SPIELMAN ET AL. 1991
IS INSOMNIA VESTIGIAL?

AN EVOLUTIONARY REMNANT?
MAYBE NOT
“WITH SIGNIFICANT LIFE STRESS AND THE FEARFUL SENSATION THAT THERE JUST ISN’T ENOUGH TIME – WHAT IS INSOMNIA BUT THE GIFT OF MORE TIME” ?
Michael Perlis PhD
Director, Upenn Behavioral Sleep Medicine Program
mperlis@upenn.edu
Figure 2

Proposed evolution of Psychophysiologic Insomnia from Adjustment Insomnia following the A-I-E pathway

Stressful life event

Selective attention toward stressors

Psychological & physiological correlates of stress

ADJUSTMENT INSOMNIA

Arousal perpetuates sleep disturbance

Failure to inhibit wakefulness

Selective attention SHIFT

A1 Implicit shift toward sleep cues

A2 Explicit shift toward sleep cues

PSYCHOPHYSIOLOGIC INSOMNIA

Explicit intention

Sleep effort
PERFORMANCE ASSESSED
ATTENTION BIAS

Figure 3
Stroop

<table>
<thead>
<tr>
<th></th>
<th>Early Group 0-3 months</th>
<th>Late Group 12-18 months</th>
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<tbody>
<tr>
<td>Cancer Words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep Words</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stroop Interference Index (ms)

± Indicates standard error of the mean
PERFORMANCE ASSESSED ATTENTION BIAS

Figure 5
ICB first

Figure 6
ICB second

PERFORMANCE ASSESSED
ATTENTION BIAS

Figure 4
Dot probe

Attention Bias (msec)

Group

PI  DSPS  GS