

Chapter 13: Stress and Workload

Stressors

- Stress is an emotional state of heightened arousal
 - can impair performance
 - potentially disrupt behavior
 - have negative consequences for health

Stressors

- Include environmental, psychological, and life factors
- Four effects of stressors:
 - Produces psychological experience
 - Produces observable physiological change
 - Degrades performance (generally)
 - Result in long term negative consequences for health
- Effects can be direct or indirect

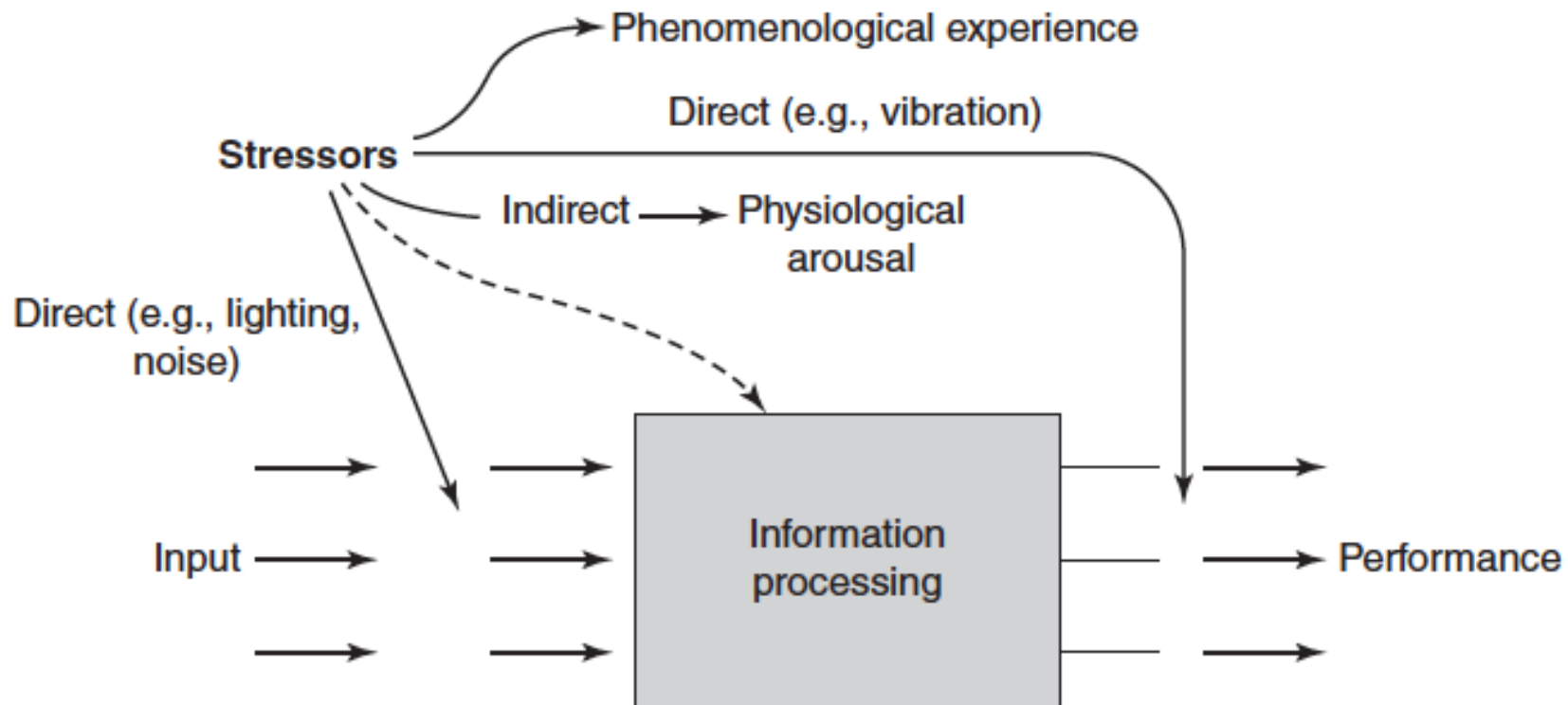


Figure 13.1 A representation of stress effects

Types of stressors: environmental

- Direct effect stressors whose physical magnitude can be measure
- Includes:
 - Noise
 - Lighting
 - Motion
 - Temperature
 - Air quality

Types of stressors: psychological

- Stressors resulting from the perceived threat of harm or loss of esteem, of something of value, or of bodily function through injury or death.
- Amount of stress related to cognitive appraisal
- Can produce an increase in physiological arousal

Types of stressors: life

- Created by issues on the job and in the worker's personal life
- Includes:
 - Poor labor-management relations
 - Job security
 - Marital issues
 - Death of a loved one

Stress Remediation

- Design solutions
 - Display design
 - Reduce working memory load
- Training
 - Emergency procedures
 - Stress inoculation
- Organizational solutions
 - Addressing the internal cause of stress within the organization
 - Implementing stress management programs
 - Provide counselors

Workload Overload

- Stress can be imposed by the amount of work that needs to be done in a limited amount of time
- Timeline analysis computes ratio of time required (TR) to time available (TA) to complete a task (Parks & Boucek, 1989)
- Assumes that workload is proportional to the ratio of the time occupied performing tasks to time available: TR/TA

Overload region
($TR/TA > 1$)

Reserve capacity region
($TR/TA < 1$)

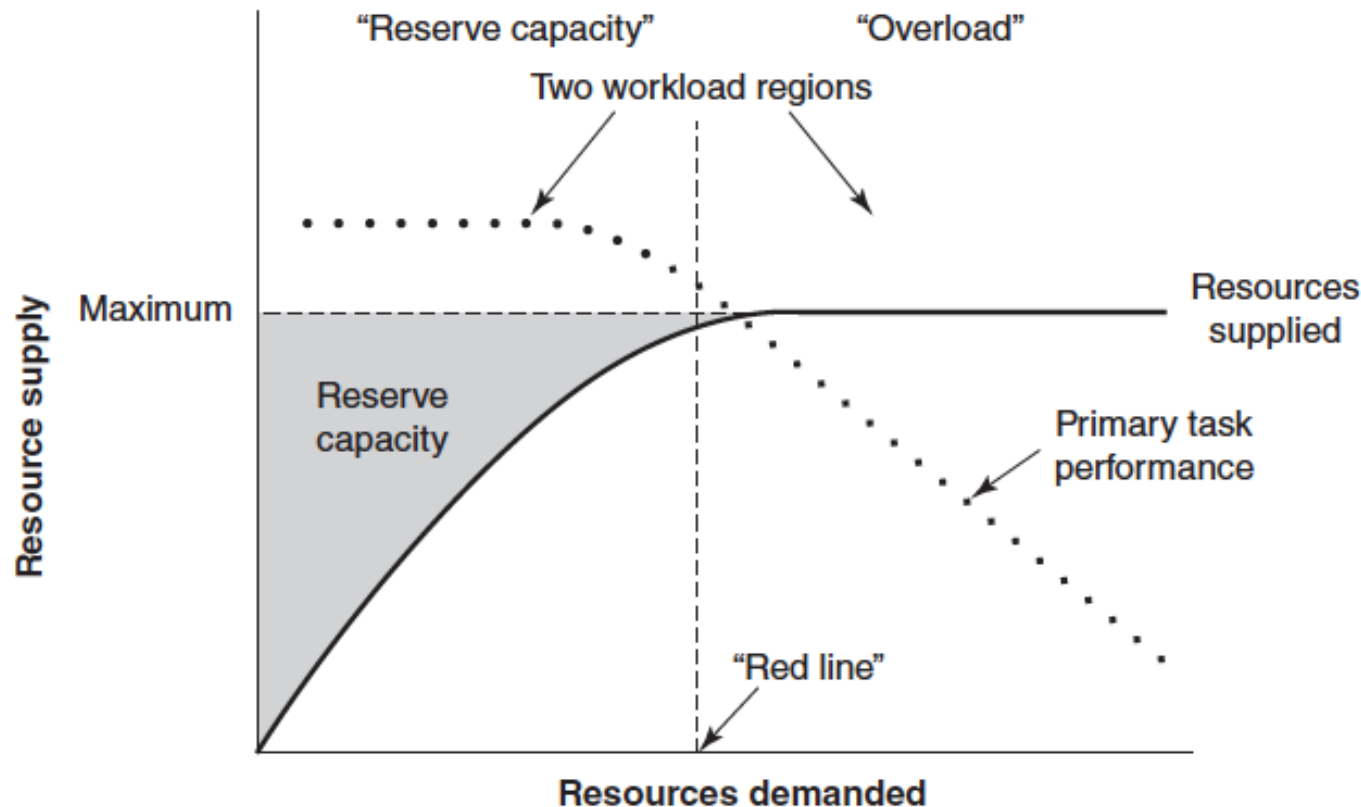


Figure 13.4 Schematic relationship among primary-task resource demand, resources supplied, and performance, indicating the "red line" of workload overload.

Resources and Mental Workload

- Mental workload characterizes the demands of tasks imposed on limited information processing resources
 - Mental workload measures
 - Primary task
 - Secondary tasks
 - Subjective measures
 - Physiological measures
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Fatigue and Sleep Disruption

- High mental workload and sleep disruption can lead to fatigue
- Fatigue degrades performance and attentiveness
- Vigilance task and higher level cognitive tasks are particularly sensitive to fatigue and sleep disruption.
- Shift work can result in circadian disruption due to the both the longer shifts and early working hours

Remediation to sleep disruption

- Get more sleep (even a few hours are beneficial)
- Napping
- Build up sleep credits
- Develop a sleep management program