

The Stress-Response

Mobilization of energy

Increased cardiovascular tone

Suppression of digestion

Suppression of growth

Suppression of reproduction

Enhancement of immune system

Analgesia, more efficient clotting

Sharpening of cognition, alertness,
pleasure

The Stress-Response and its Consequences

Adaptive Stress-Response

Mobilization of energy

Stress-related Disorder

- Myopathy
- Inefficient energy use
- Insulin resistance
- Increased fat deposition (especially abdominal)

The Stress-Response and its Consequences

Adaptive Stress-Response

Increased cardiovascular tone

Stress-related Disorder

- Hypertension
- Stress...abdominal fat...
inflammation...atherosclerosis
- Increased platelet viscosity

The Stress-Response and its Consequences

Adaptive Stress-Response

Suppression of digestion

Stress-related Disorder

Impaired capacity to repair ulcers

The Stress-Response and its Consequences

Adaptive Stress-Response

Suppression of growth

Stress-related Disorder

Psychogenic dwarfism

Increased risk of diabetes, hypertension
and obesity due to fetal metabolic
programming

Osteoporosis in adults

The Stress-Response and its Consequences

Adaptive Stress-Response

Suppression of reproduction

Stress-related Disorder

Females: irregular cycles, loss of cycles,
failure of implantation of a fertilized
egg

Males: decreased testosterone levels,
erectile dysfunction

Everyone: loss of libido

The Stress-Response and its Consequences

Adaptive Stress-Response

- Enhancement of immunity

Stress-related Disorder

Eventual immune suppression and
increased risk of some infectious
diseases

Accelerated telomeric aging

But a minimal cancer link

Stress effects on the hippocampus: the realm of memory

Impaired synaptic plasticity

Atrophy of dendritic networks of
communication

Fewer new neurons

Dead neurons!

Decreased overall hippocampal
volume

Result:

Impaired formation and retrieval of
long-term memories

The effects of chronic stress in the amygdala: the realm of fear and anxiety

More excitable neurons

More connections among neurons

Result:

**More anxiety, faster fear-
conditioning, slower habituation**

The effects of chronic stress in the mesolimbic dopamine system

Depletion of dopamine

Result:

Loss of the capacity for pleasure:
DEPRESSION

The effects of stress in the frontal cortex

Decreased connectivity in neural networks
by way of fewer dendritic branches and
spines

Recovery that produces a “different” frontal
cortex, cytoarchitecturally

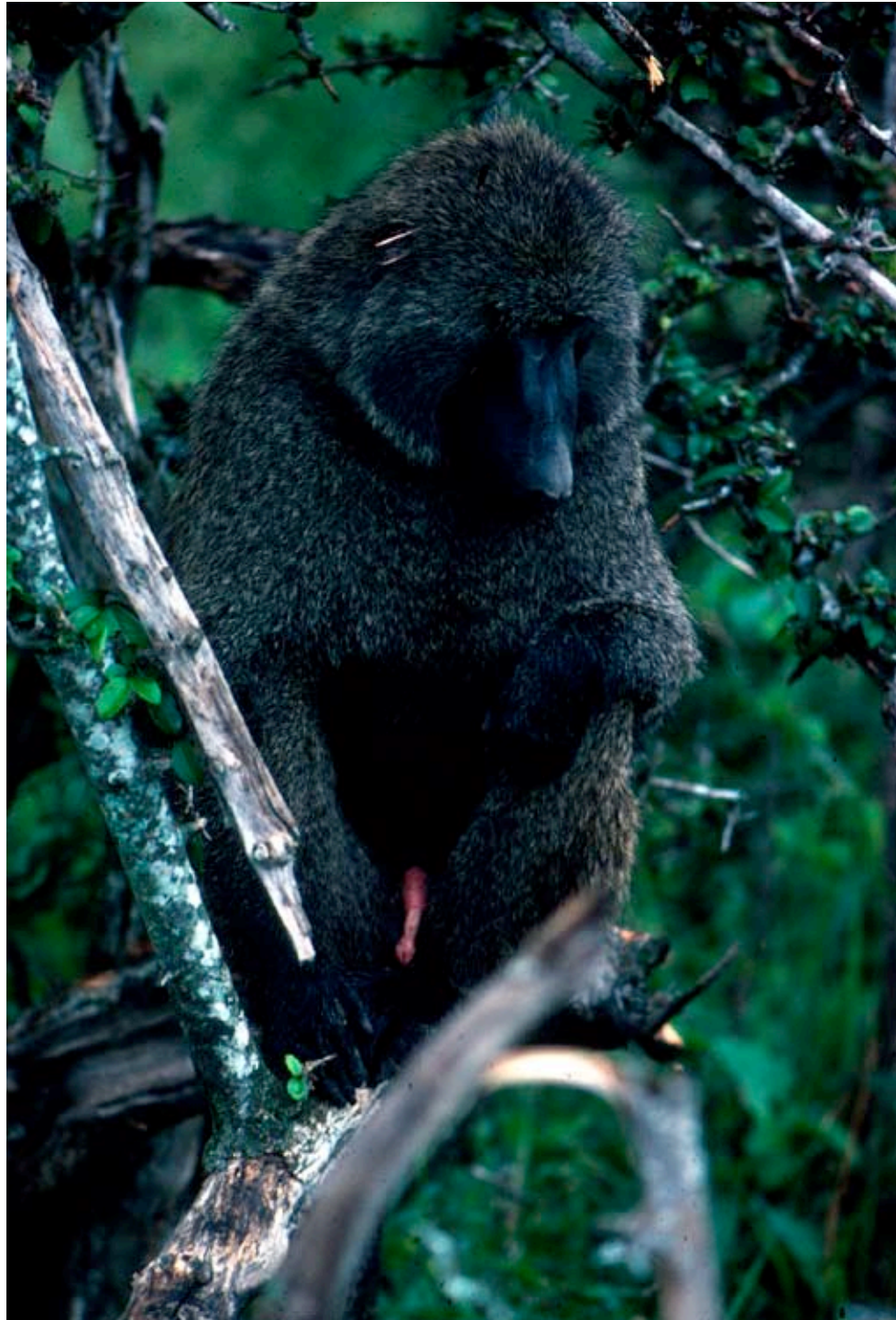
Result:

Dumb-Ass decisions that seem really insightful at the time you make them

Psychological Modifiers of the Stress-Response

- **Outlets for frustration**
- **Sense of predictability and of control**
- **A perception of life improving**
- **Social support**

(Weiss, Levine, Seligman)







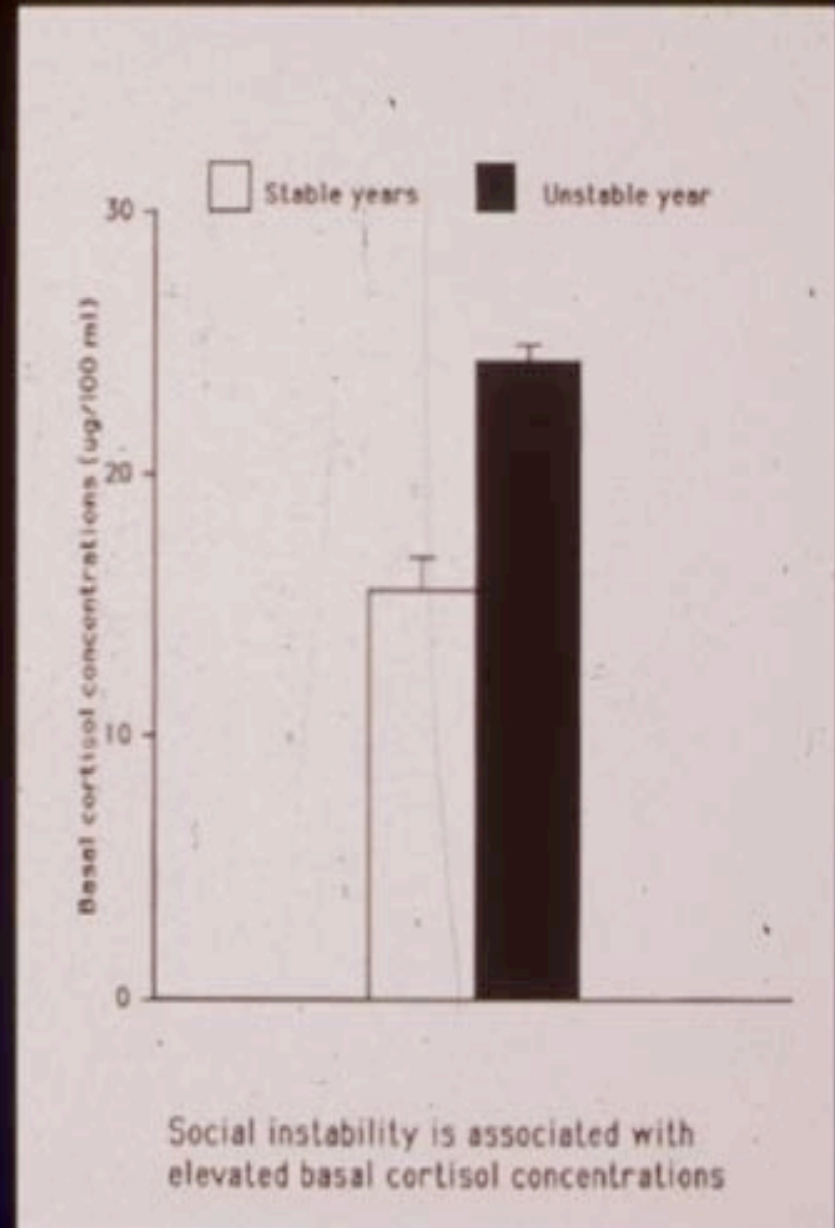
Physiologic correlates of low rank in baboons

- **Elevated blood pressure**
- **Reduced HDL cholesterol**
- **Testicular suppression**
- **Reduced IGF-I levels**
- **Reduced lymphocyte count**
- **Overactive benzodiazepine system**

(Sapolsky, Science 2005)

Rank is important, but.....

-- so is the society in which
the rank occurs

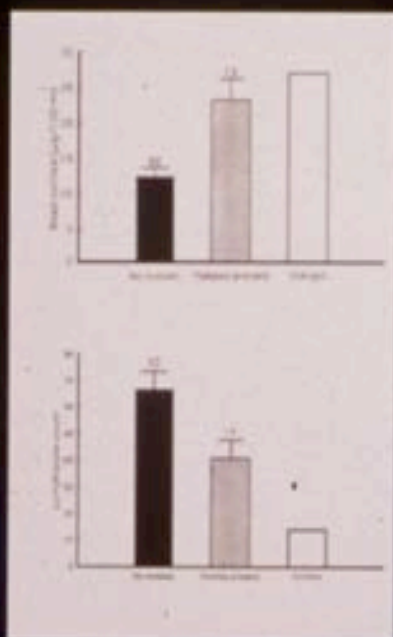


(Sapolsky, Am J Primatol, 1983)

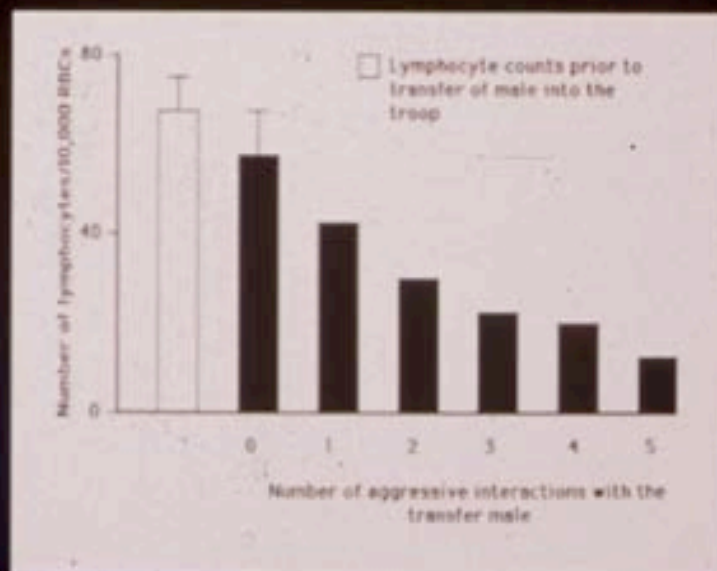
Rank is important, but.....

-- so is the society in which
the rank occurs

-- and the personal experience of both



(Alberts et al, Hormones Behav, 1992)



(Sapolsky, Psychoneuroendo, 1992)

Rank is important, but.....

- so is the society in which the rank occurs
- and the personal experience of both
- and personality



(Sapolsky, Scientific American, 1991; Sapolsky, Arch Gen Psychiatry, 1997)

