

The Biology of Human Starvation

Ancel Keys 1950

Thirty-six subjects who were intelligent, psychologically sound, and physically healthy were put on diets of about half their usual caloric intake (amounts of conservative restriction for obesity treatment) for 6 months after being observed eating normally for the previous 3 months

Physical Changes

- Decreased heart volume
- Slowed pulse rate
- BMR reduced by 40%
- Voluntary movements became slower
- Subjects felt older and behaved older

Personality Changes

- Increase in apathy and depression
- Sensitivity to noise
- General feeling of ineffectiveness
- Loss of ambition and narrowing of interests
- Increased neuroticism and hysteria (often seen as a woman's problems)
- Almost 20% of subjects showed severe "character neuroses"
- Two subjects bordered on psychoses including violence and hysteria

Food Preoccupation

- Increased interest and preoccupation with food (talking, preparing, etc)
- Heightened craving for food
- Food dislikes disappeared
- Became possessive about food
- Increased gum chewing, smoking, drinking of coffee and tea, and nail biting
- Purchased useless items and/or hoarded money
- Some escaped and binged with feelings of guilt (some followed by vomiting)

Social Activities

- Responsiveness, tolerance, happiness, and good humor gradually disappeared what humor remained was sarcastic
- Reluctance to participate in group activities
- Self-centered and egocentric
- Food central topic of conversation
- Not able to control emotions

Effects of Refeeding

Allowed limited access 1,877 to 4,158 kcal

- Still overly concerned with food
- Many became even more irritable and depressed and augmentative
- Slump in morale lost interest in earlier humanitarian interests
- Thirst increased
- Hunger pains more intense
- Appetites insatiable even on the highest caloric levels
- Continued to eat even when stuffed
- Gained fat tissue rapidly
- Lean tissue recovered more slowly
- Sleepiness and headaches increased for some

Allowed free access to food at week 13

- Ate an average of 5,212 kcal
- Ate nearly continuously then slept or ate
- By week 15 increase of social behavior at meals
- By week 20 all felt nearly normal with food
- By week 33 10 of 14 were eating normal amounts
- Slowly humor sociability returned.

The subjects were all college aged men