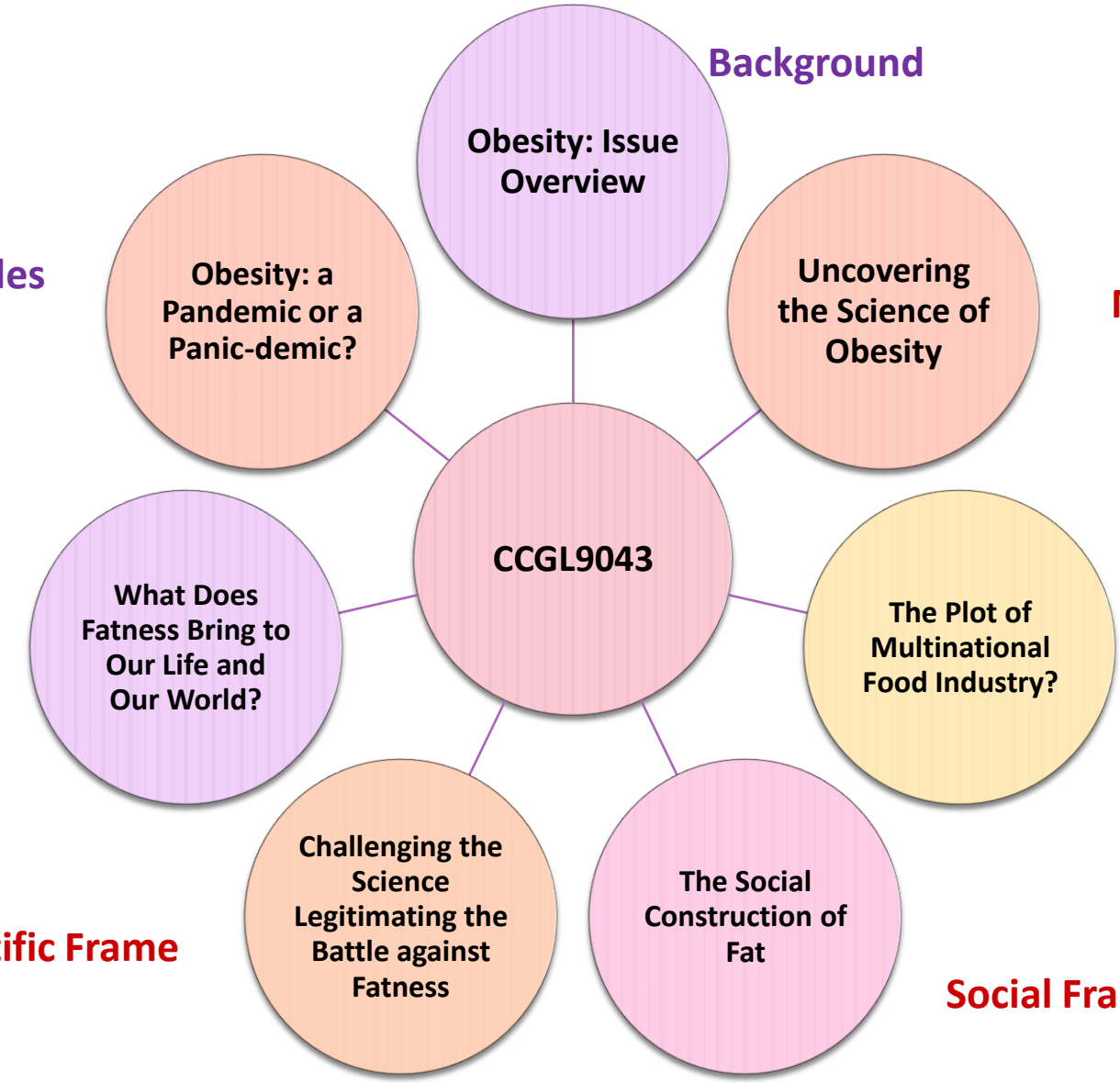
Part IV
The Social Construction of Fat

CCGL9043

Obesity: Beyond a Health Issue

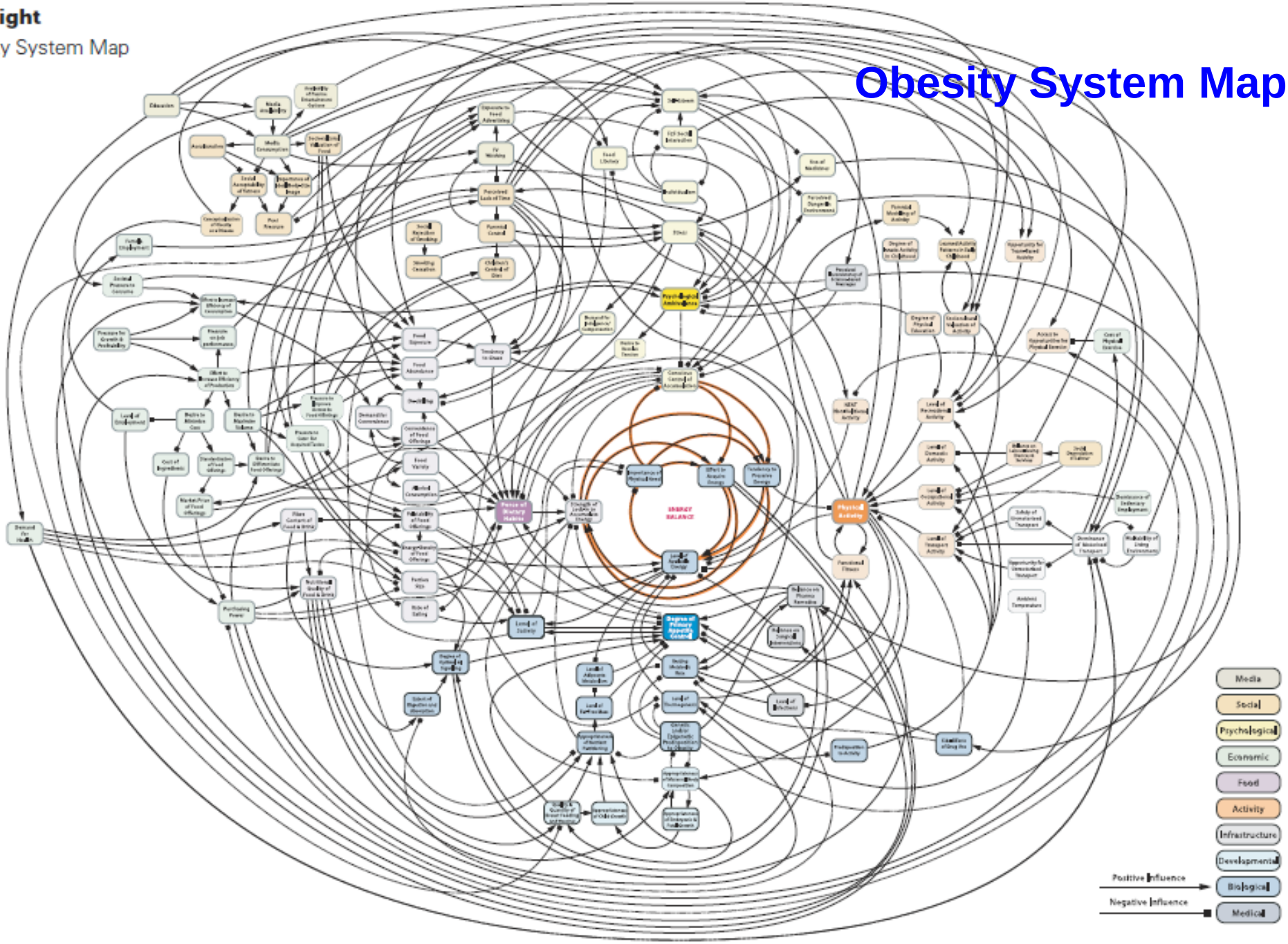
Course Outline



Foresight

Obesity System Map

Obesity System Map



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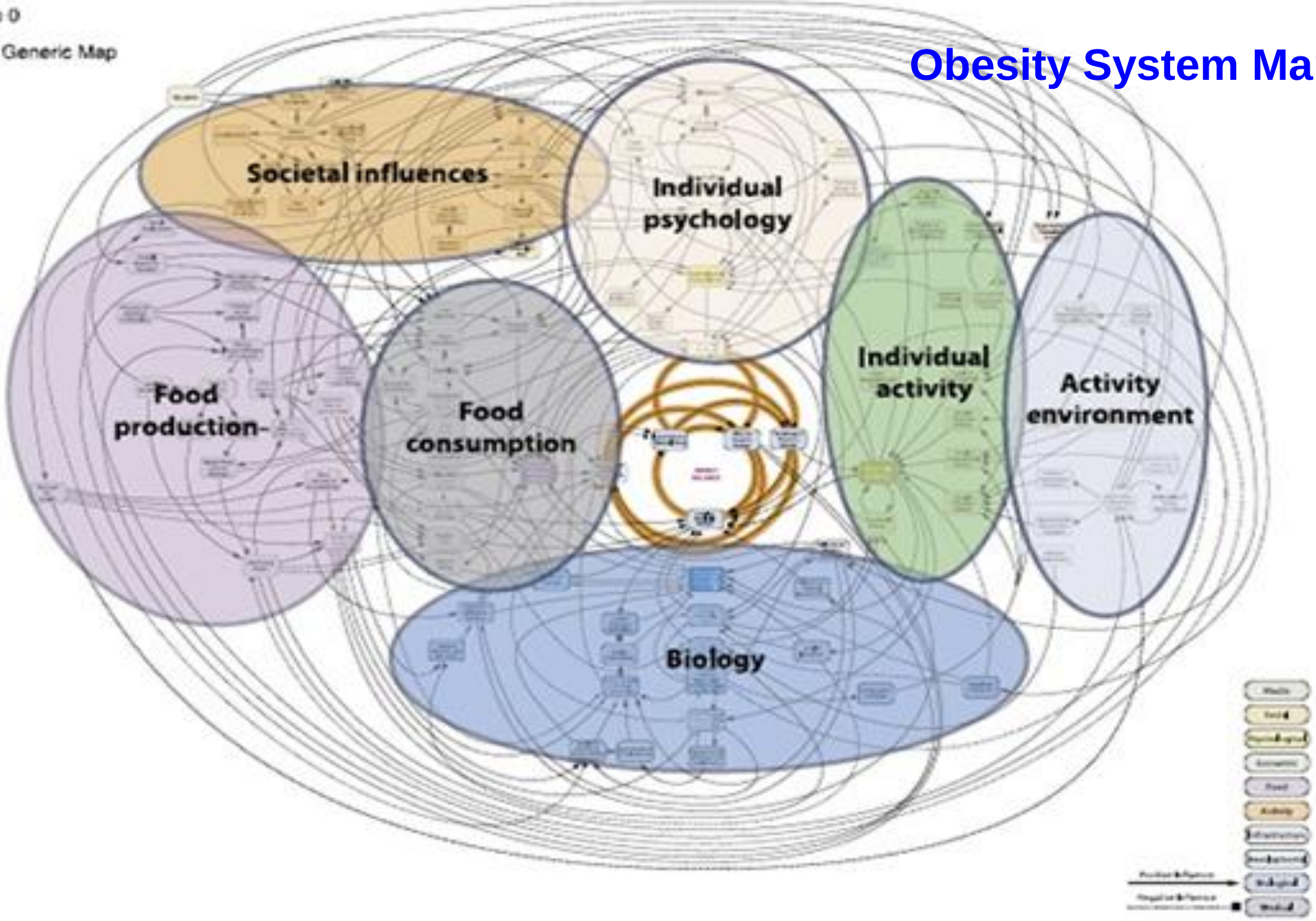
Map 0

Full Generic Map

Obesity System Map



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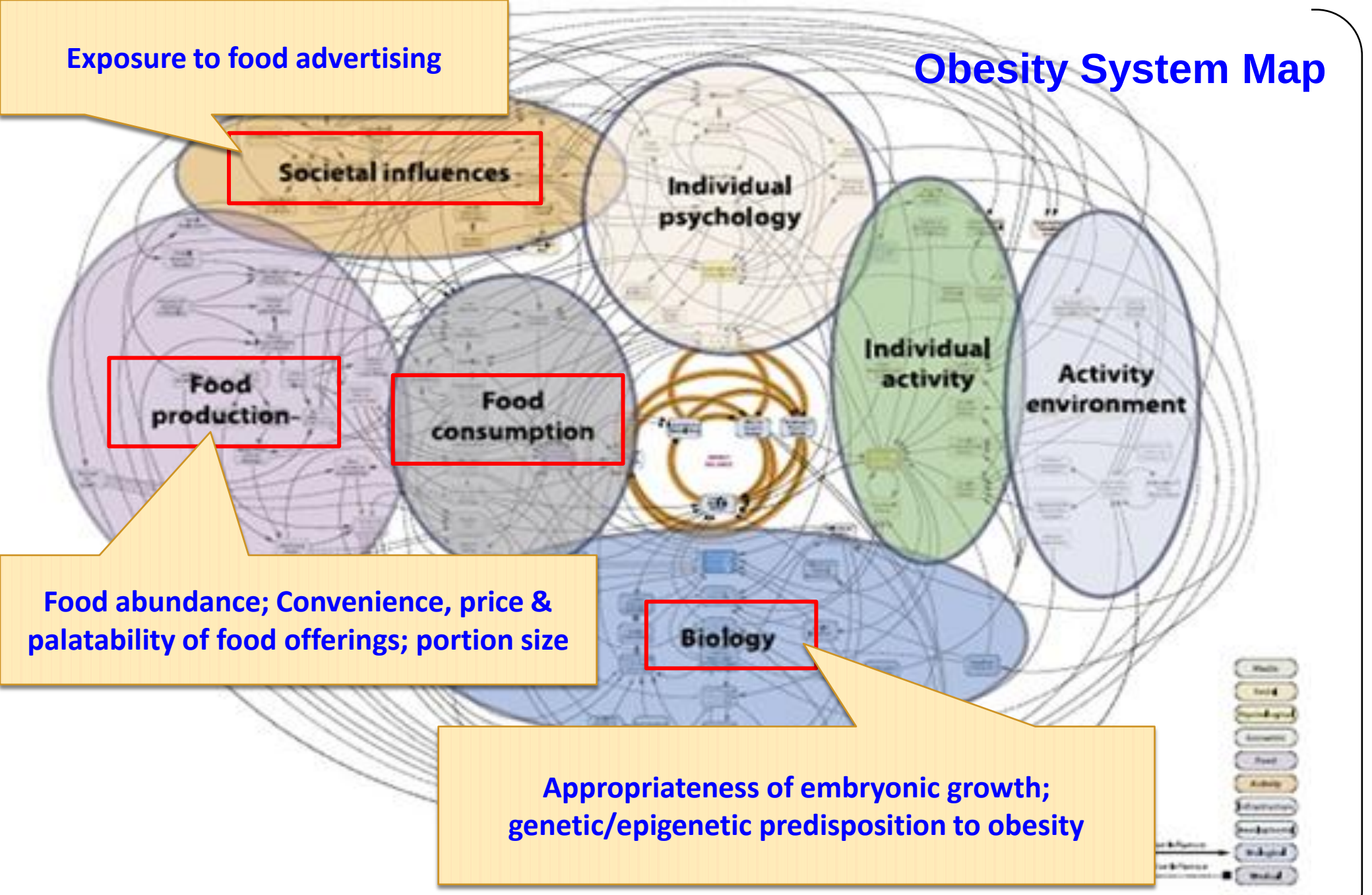
Obesity System Map



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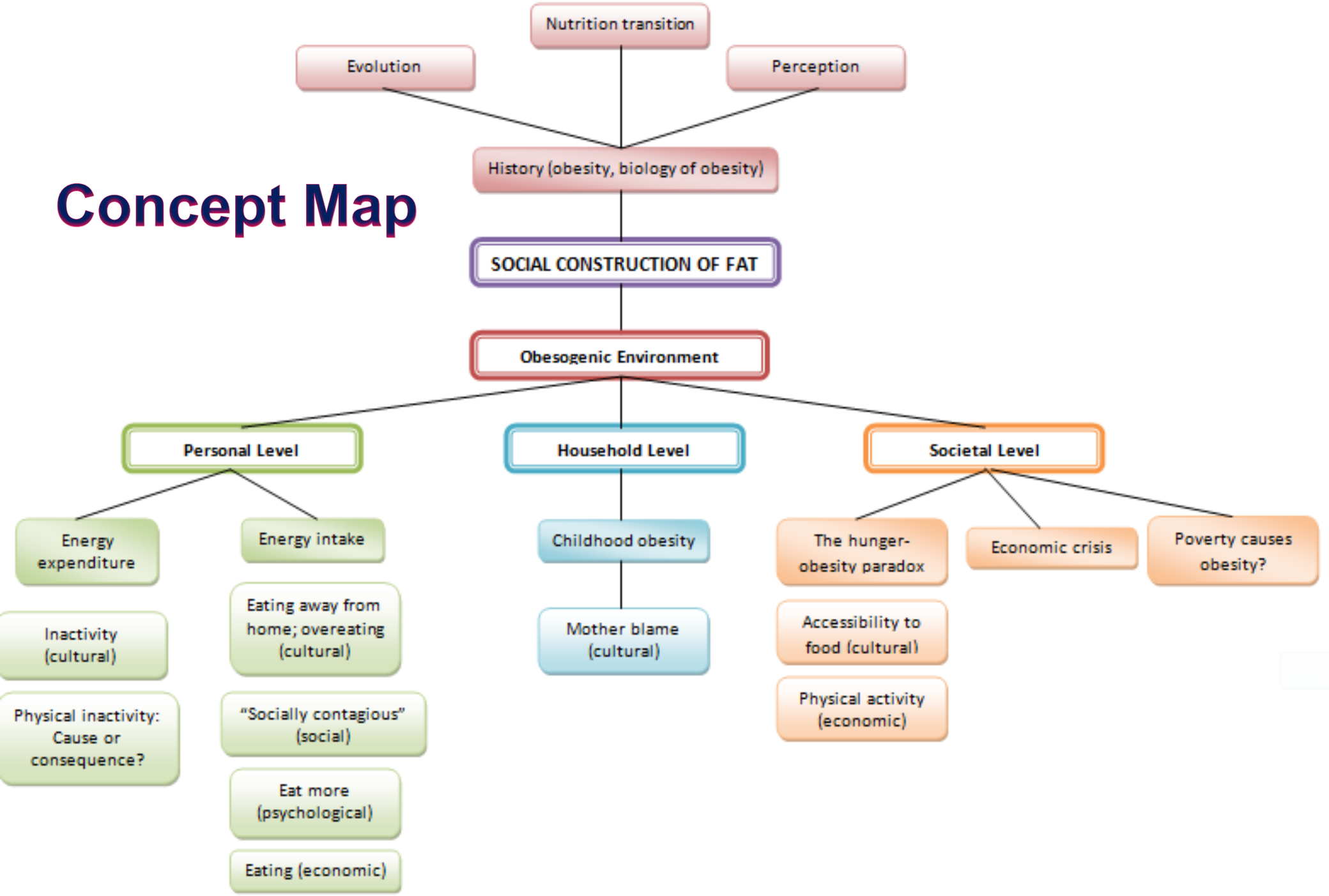
Concept Map


Nutrition transition
Evolution
Perception
History (obesity, biology of obesity)
SOCIAL CONSTRUCTION OF FAT
Obesogenic Environment
Personal Level
Household Level
Societal Level
Energy expenditure
Energy intake
Childhood obesity
The hunger-obesity paradox
Economic crisis
Poverty causes obesity?
Inactivity (cultural)
Eating away from home; overeating (cultural)
Mother blame (cultural)
Accessibility to food (cultural)
Physical inactivity: Cause or consequence?
"Socially contagious" (social)
Physical activity (economic)
Eat more (psychological)
Eating (economic)

History of Obesity

Venus of Willendorf, a Palaeolithic figurine found in Austria

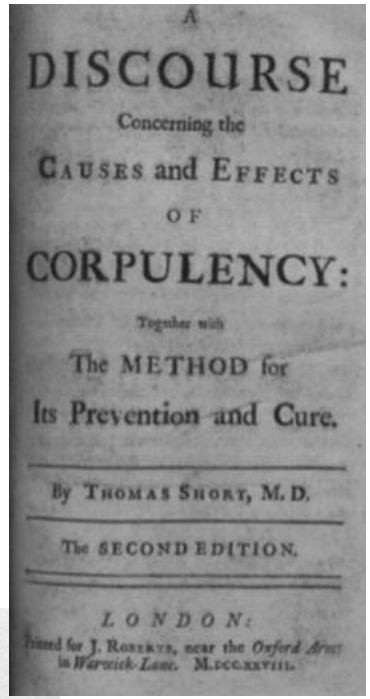
Stone relief from the tomb of the nobleman Mereruka at Saqqara, Egypt (c. 2350 B.C.)

‘Obesity was already a fact of life’ for Palaeolithic humans (Beller, 1977)

The Natural History Museum, Vienna.
Robert Partridge, The Ancient Egypt Picture Library.
Beller, A. S. (1977). *Fat and thin. A natural history of obesity*. Farrar, Straus and Giroux..

History of the Biology of Obesity

- **18th century**: 'I believe no age did ever afford **more instances of corpulency** than our own' Short (1727).


A
DISCOURSE
Concerning the
CAUSES and EFFECTS
OF
CORPULENCY:
Together with
The METHOD for
Its Prevention and Cure.
By THOMAS SHORT, M.D.
The SECOND EDITION.
LONDON:
Printed for J. ROBERTS, near the Oxford Arms in Warwick-Lane. M.DCC.XXVIII.

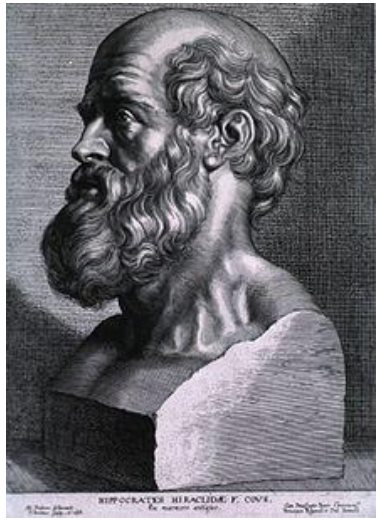
- **Early 19th century:** *Wadd (1829) presented* 12 cases, two of whom had been examined ***post mortem*** *and were found to have* ***extensive*** **accumulations of fat**.

Illustration from Wadd's monograph *(1829)*

- **1850s**: The **adipocyte** was recognized as a specific cell-type

The Wellcome Trust's History of Medicine Archive.
Short, T. (1727). *A Discourse Concerning the Causes and Effects of Corpulency: Together with the Method for Its Prevention and Cure. By Thomas Short, MD*. J. Roberts, near the Oxford Arms in Warwick Lane.
Wadd, W. (1829). Comments on corpulency. *London, J. Ebers*.

History of the Biology of Obesity: Treatment for Obesity



- The health hazards associated with obesity were well known to the **Ancient Greek** physician Hippocrates, who stated that '**sudden death** is more common in those who are naturally fat than in the lean'.

- The **17th century** Tibetan medical treatise entitled *The Blue Beryl* recognized obesity as a condition that required treatment through weight loss.
  - 'overeating … causes **illness** and shortens **lifespan**'.
  - The vigorous massage of the body with pea flour, and eating the gullet, hair and flesh of a wolf as the treatment for obesity.

- **18th century**: The treatment of obesity required **restoration of the body's natural balance** and **removal of secondary causes**, ideally by **living** where the air was not too moist or soggy and avoiding flat, wet countries, cities and woodlands. **Exercise** was considered as important and that the **diet** should be 'moderate, spare and of the more detergent kind' (Short, 1727).

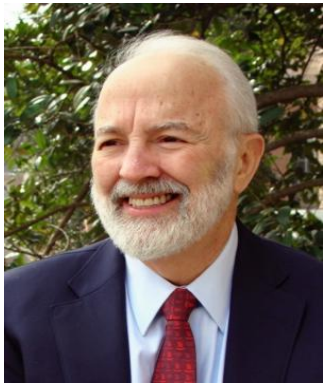
Nutrition Transition

Hunter Gatherers

Peasant Farmers

People in modern affluent societies

"Nutrition transition" was coined by Popkin to explain **global changes in diet**.



Barry Popkin
University of North Carolina

Stages of the Nutrition Transition

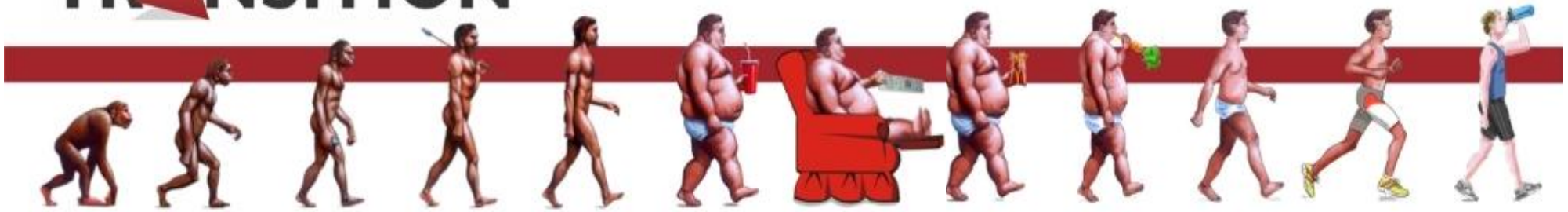
Urbanization, economic growth, technological changes for work, leisure, & food processing, mass media growth

Pattern 1 Paleolithic man/ Hunter-gathers	Pattern 2 Settlements begin/ Monoculture period/ Famine emerges	Pattern 3 Industrialization/ Receding Famine	Pattern 4 Noncommunicable Disease	Pattern 5 Desired societal/ Behavioral Change
• Wild plants & animals • water • Labor intensive	• Cereals dominate • water • Labor-intensive	• Starchy, low variety, low fat, high fiber • water • Labor-intensive work job/home	• Increased fat, sugar, processed foods • caloric beverages • Shift in technology of work and leisure	• Reduced fat, increased fruit, veg, CHO, fiber • Increase water, Reduce caloric beverage intake • Replace sedentarianism w/ purposeful activity

Identify the 4 major change…

Global diet dynamics: factors and driving forces (01:11 – 6:26)

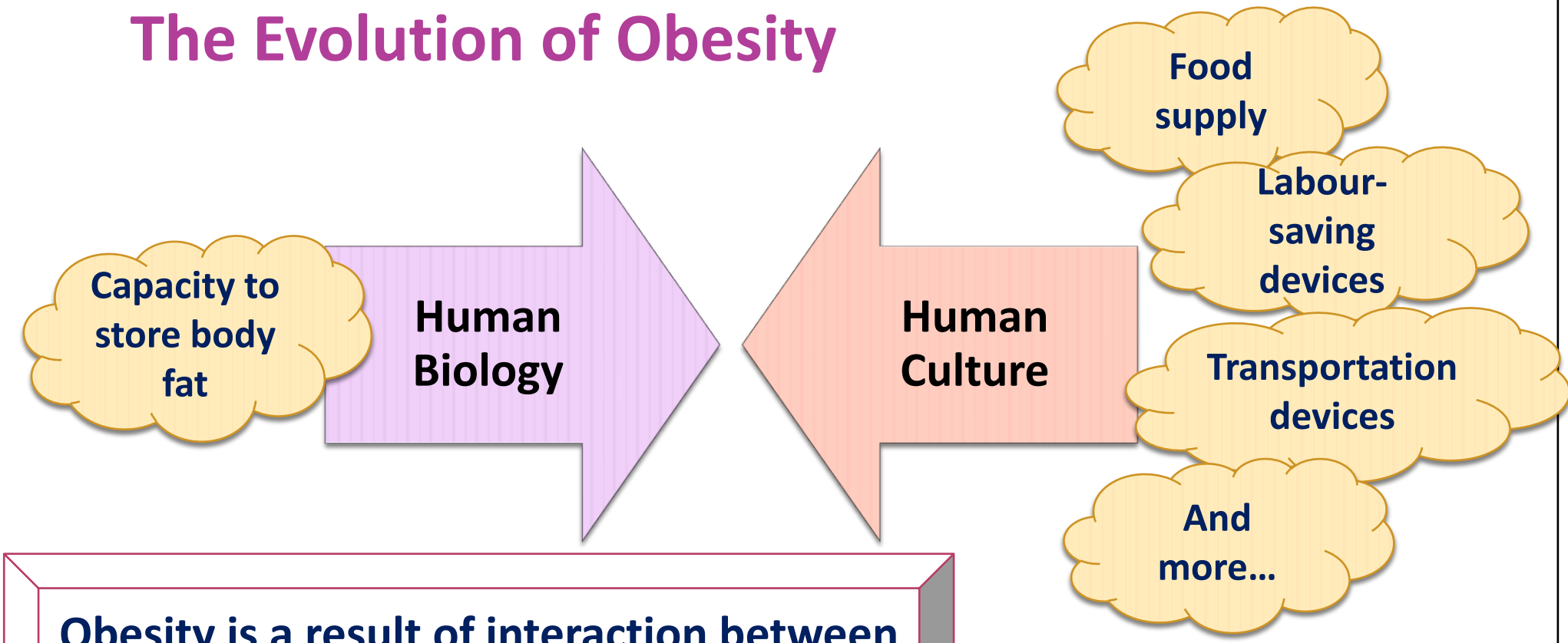
https://www.youtube.com/watch?v=qjA00kaEGqQ



Source: Popkin 2002 revised 2006.

http://www.cpc.unc.edu/projects/nutrans/whatis

The Evolution of Obesity



Obesity is a result of interaction between human biology and human culture over the long period of human evolution.

Which one do you expect to have changed more rapidly?

Perception of Fatness

SLOPPINESS

WEALTH

POWER

ATTRACTIVE

UNATTRACTIVE

LAZINESS

OUT OF CONTROL

FIGHTING OFF INFECTIOUS DISEASE

DESIRABLE

LAX MORAL FIBRE

UNFEMININE

FERTILE

Perception of Fatness

SLOPPINESS

WEALTH

POWER

ATTRACTIVE

UNATTRACTIVE

LAZINESS

OUT OF CONTROL

FIGHTING OFF INFECTIOUS DISEASE

DESIRABLE

LAX MORAL FIBRE

UNFEMININE

FERTILE

Transition in the Perception of Fatness

FERTILE

ATTRACTIVE

FIGHTING OFF INFECTIOUS DISEASE

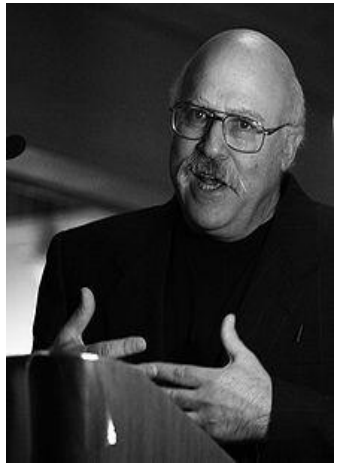
DESIRABLE

POWER

WEALTH

"There is a transition from viewing people that were stout as a good thing to viewing people as corpulent or obese, which is a bad thing"

Prof. Steve Shapin



LAX MORAL FIBRE

UNATTRACTIVE

LAZINESS

SLOPPINESS

UNFEMININE

OUT OF CONTROL

What accounts for such a shift?

http://www.thecrimson.com/article/2006/12/6/fat-studies-cram-into-classrooms-fat

The Societal Shift in the Perception of Fatness

Economy

- Shifted to an industrial one
- Fat no longer was a sign of prestige

Science

- Able to arrive at an exact measure of human beings
- Developed weight loss prescription

Fashion

- Desire for thinner, freer, more modern body
- A cultural obsession with weight

A cultural obsession for weight was firmly established.

Weight Loss Ads

WASH AWAY FAT AND YEARS OF AGE

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The new discovery. Results quick and amazing—nothing internal to take. Reduce any part of body desired without affecting other parts. No dieting or exercising. Be as slim as you wish. Acts like magic in reducing double chin, abdomen, ungainly ankles, unbecoming wrists, arms and shoulders, large busts, or any superfluous fat on body. Sold direct to you by mail, post paid, on a money-back guarantee. Price 2/- a cake or three cakes for 4/-; one to three cakes usually accomplish the purpose. Send postal or money order to-day. Surprising results. **LA-MAR LABORATORIES, Ltd., 48, Rupert Street (1101), London. W.1.**

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My New Obesity Food Quickly Reduces Weight to Normal, Requires No Starvation Process on Your Part, and Is Absolutely Safe.

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You can safely and speedily reduce your surplus flesh in any part of the body, and thus improve your figure, by wearing

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They are very comfortable and never fail to accomplish the desired result. They are worn by the Royalty of Europe and the Society of America.

Neck and Chin Bands, as shown in cut, $3.00
Chin only 2.00

Also union suits, jackets, stockings, etc., for the purpose of reducing the flesh anywhere desired. Invaluable to those suffering from **Rheumatism.** Write at once for further particulars.

DR. JEANNE WALTER, Patentee
Suite 1148, 45 W. 34th Street, New York
San Francisco: 166 Geary Street

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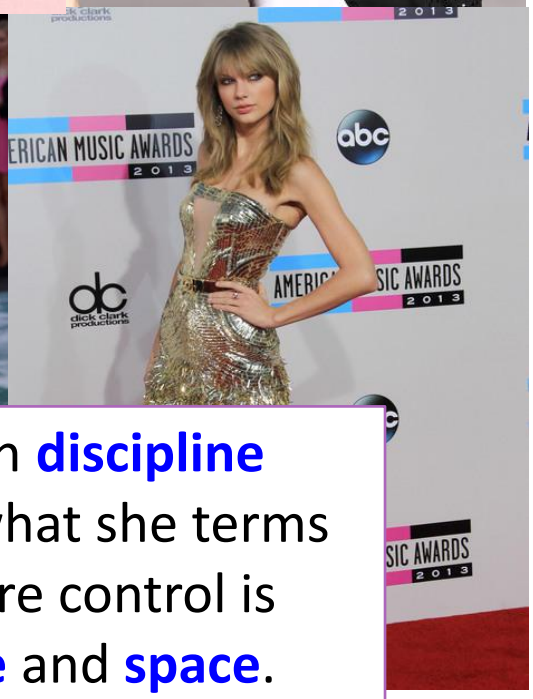
507 Fifth Ave. Suite 1004 New York

Fashion History in the Early 20th Century

Celebrities at Different Eras of Time

Lillian Russell, 1905-1922

Mae West, 1893-1980



Marilyn Monroe, 1926-1962

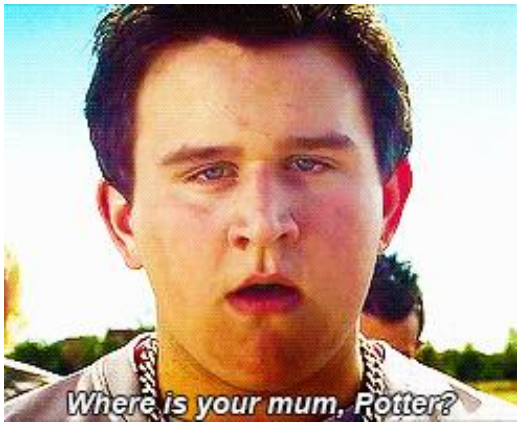
Bartky (1988, p. 71) explains that women **discipline themselves** and their bodies to create what she terms **"the ideal feminine body-subject,"** where control is directed at the body in the areas of **time** and **space**.

Bartky, S., 'Foucault, femininity and the modernization of patriarchal power' in I. Diamond & L. Quinby (eds), *Feminism and Foucault: Reflections on Resistance*, Boston: Northeastern University Press, 1988.

Movies & Cartoons for Children

- Even in animated movies for children, the good protagonists are **incredibly thin**... while the antagonists are often ‘thick’ and on the bigger side.

An innate aspect of human nature?

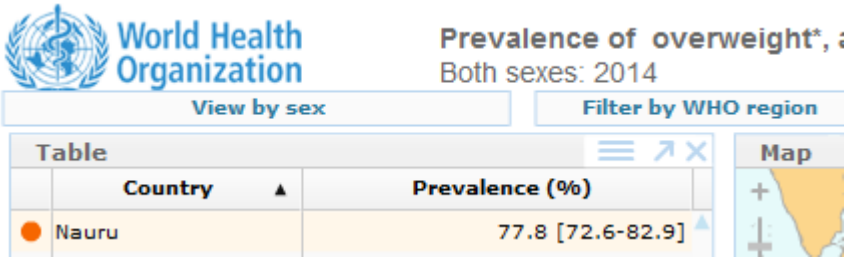


Big is Beautiful

- "Nauruans were plump, and that they **admired big, fat people** and put girls on a diet to fatten them and so make them more attractive" (Diamond, 2003, p. 600).

- Obesity traditionally has been regarded as **a sign of high social position and wealth** among Pacific Islanders (Ringrose & Zimmet, 1979, p. 1340).

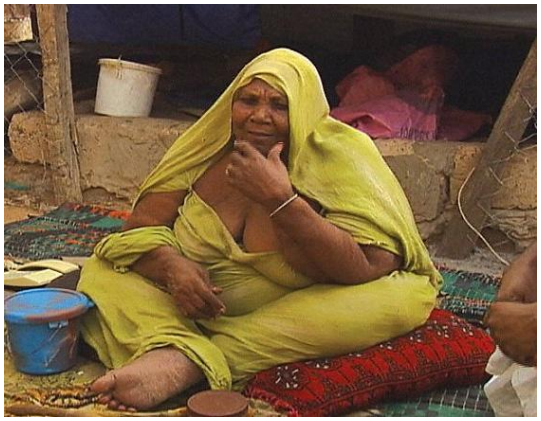
Extended reading: **"I have seen so many funerals for such a small island": The astonishing story of Nauru, the tiny island nation with the world's highest rates of type 2 diabetes**
http://www.diabetes.co.uk/in-depth/i-have-seen-so-many-funerals-for-such-a-small-island-the-astonishing-story-of-nauru-the-tiny-island-nation-with-the-worlds-highest-rates-of-type-2-diabetes/



Diamond, J. (2003). The double puzzle of diabetes. Nature, 423, 599-602.
Ringrose, H., & Zimmet, P. (1979). Nutrient intakes in an urbanized Micronesian population with a high diabetes prevalence. *The American Journal of Clinical Nutrition, 32, 1334-41.*
http://gamapserver.who.int/gho/interactive_charts/ncd/risk_factors/overweight/flash/atlas.html

Big is Beautiful

- Young Mauritanian girls are traditionally **force-fed** and fattened for the sake of beauty and marriage.
- At the **'fattening farms'**, older women or the girls' aunts or grandmothers will administer **pounded millet**, **camel's milk** and water in sickening quantities
- Girls are force fed about **14000 - 16000 calories a day**
- The practice of **'gavage'** tortures girls into swallowing large amounts of food and liquid, and consuming their vomit if they were to reject it



Force feeding in Mauritania - CBC TV report (2:46-7:53)
https://www.youtube.com/watch?v=T2CDvlwJ--s

Summary

- History of Obesity
- History of the Biology of Obesity
- Stages of the **Nutrition Transition**
- Evolution of Obesity
  - Obesity is a result of interaction between **human biology** and **human culture** over the long period of human evolution.
- Transition in the **Perception of Fatness**
  - Stout as a good thing to corpulent or obese as a bad thing
  - “the ideal feminine body-subject”
  - Big is Beautiful (e.g. Nauru and Mauritania)

“Obesogenic Environment”

The term **‘obesogenic environment’** was coined by Swinburn *et al.* who argued that the **physical, economic, social and cultural environments** of the majority of industrialized nations encourage **positive energy balance** of their populations.

Is the Environment Causing the Obesity Epidemic?

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive medicine*,*29*(6), 563-570.

Social Construction of Fat at Personal Level

THE LANCET

Coronary risk factors in people from the Indian subcontinent living in West London and their siblings in India

Deepak Bhatnagar, Inder S Anand, Paul N Durrington, Deven J Patel, Gurpreet S Wander, Michael I Mackness, Francis Creed, Barbara Tomenson, Y Chandrashekhar, Melanie Winterbotham, Reginald P Britt, Julian E Keil, George C Sutton

Summary

Several reports have shown that migrants from southeast Asia tend to have an increased risk of coronary heart disease when settled in their new country. We compared coronary risk factors in a randomly selected group of 247 migrants from the Indian subcontinent of Punjabi origin living in West London and 117 of their siblings living in the Punjab in India.

The West London cohort had a greater body mass index ($p<0·001$), systolic blood pressure ($p=0·0087$), serum cholesterol ($p<0·001$), apolipoprotein B ($p<0·001$), lower high-density lipoprotein cholesterol ($p<0·05$) and higher fasting bloo
Punjab. Ins
assessment
West Londo
Indians in West London had lower β cell function than those in the Punjab ($p<0·001$). Serum lipoprotein (a) concentrations were similar in both the West London and

Introduction

Several reports show that migrants from the Indian subcontinent have an increased risk of coronary heart disease (CHD).[1] Often their CHD risk rises above that of the society to which they have migrated[2] despite the fact that their serum total cholesterol is similar to or lower than that of the indigenous population.[3] Other coronary risk factors such as cigarette smoking are also similar. McKeigue and co-workers have suggested that the excess mortality rates of CHD that occur in an immigrant Indian population, which cannot be fully explained on the basis of conventional risk factors, may be partly due to

CHD risk factor that has not been investigated in migrant Indians. Serum Lp(a) is largely unaffected by diet or

Punjabi people

West London

"In conclusion, body weight, serum cholesterol, and blood pressure are increased in Indians, who migrate to the UK."

Bhatnagar D, Anand IS, Durrington PN, Patel DJ, Wander GS, Mackness MI, Creed F, Tomenson B, Chandrashekhar Y, Winterbotham M. Coronary risk factors in people from the Indian subcontinent living in West London and their siblings in India. *Lancet, 1995;345:405–409.*

Case Study: The Pima Indians

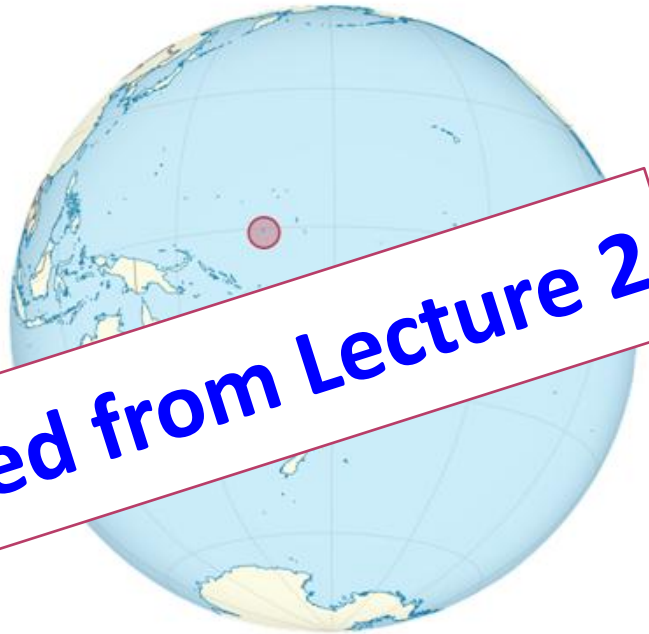
"The Pima Indians, who live in Arizona, are famous for being fatter and more diabetes prone than any other group in the world, with the exception only of the Nauru islanders of the West Pacific."

the "thrifty" genes, once an advantage, are now a liability

ANNALS OF MEDICINE

THE PIMA PARADOX

The Pima Paradox *The New Yorker*, February 2, 1998 P. 44



Extracted from Lecture 2

The Desert's Perfect Foods
https://www.youtube.com/watch?v=7OzB0jfiBE8

Effects of Traditional and Western Environments on Prevalence of Type 2 Diabetes in Pima Indians in Mexico and the U.S.

LESLIE O. SCHULZ, PHD[1]
PETER H. BENNETT, MB, FRCP[2]
ERIC RAVUSSIN, PHD[3]
JUDITH R. KIDD, PHD[4]
KENNETH K. KIDD, PHD[4]
JULIAN ESPARZA, MS[5]

"The much lower prevalence of … obesity in the Pima Indians in Mexico than in the U.S. indicates that even in populations genetically prone to these conditions, their development is determined mostly by environmental circumstances…"

OBJECTIVE — Type 2 diabetes and
We studied the effects of different enviro
the U.S.

RESEARCH DESIGN AND METHODS — Adult Pima-Indian and non-Pima populations in the Sierra Madre mountains of Mexico were examined using oral glucose tolerance tests and assessments for obesity, physical activity, and other risk factors. Results were compared with those from Pima Indians in Arizona. Both Pima populations were typed for DNA polymorphisms to establish their genetic similarity.

RESULTS — The age- and sex-adjusted prevalence of type 2 diabetes in the Mexican Pima Indians (6.9%) was less than one-fifth that in the U.S. Pima Indians (38%) and similar to that of non-Pima Mexicans (2.6%). The prevalence of obesity was similar in the Mexican Pima Indians (7% in men and 20% in women) and non-Pima Mexicans (9% in men and 27% in women) but was much lower than in the U.S. Pima Indians. Levels of physical activity were much higher in both Mexican groups than in the U.S. Pima Indians. The two Pima groups share considerable genetic similarity relative to other Native Americans.

styles associated with unfavorable environments.

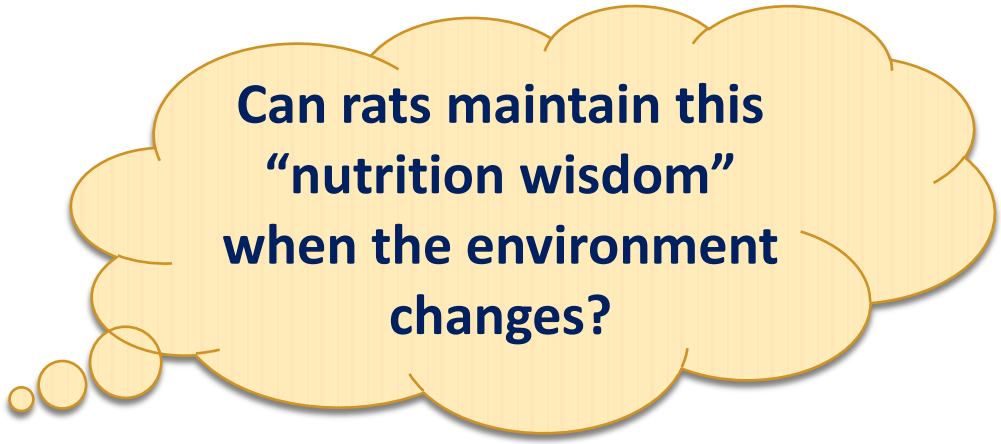
To elucidate the nature and contribution of environmental influences on type 2 diabetes, we studied two groups of Pima Indians in Mexico and in the U.S. The high prevalence of type 2 diabetes in the Pima Indians in the U.S. is well established (5,6), but the prevalence among their counterparts living in Mexico was previously unknown. The Pima Indians in the U.S. reside mainly in the desert regions of Arizona and have the world's

Ravussin E, Valencia ME, Esparza J, Bennett PH, Schulz LO. Effects of a traditional lifestyle on obesity in Pima Indians. *Diabetes Care, 1994;17:1067–1074;* *Lindsay RS, Cook V, Hanson RL, Salbe AD, Tataranni A,* Knowler WC. Early excess weight gain of children in the Pima Indian population. *Pediatrics, 2002;109:E33.*

“Nutritional wisdom”

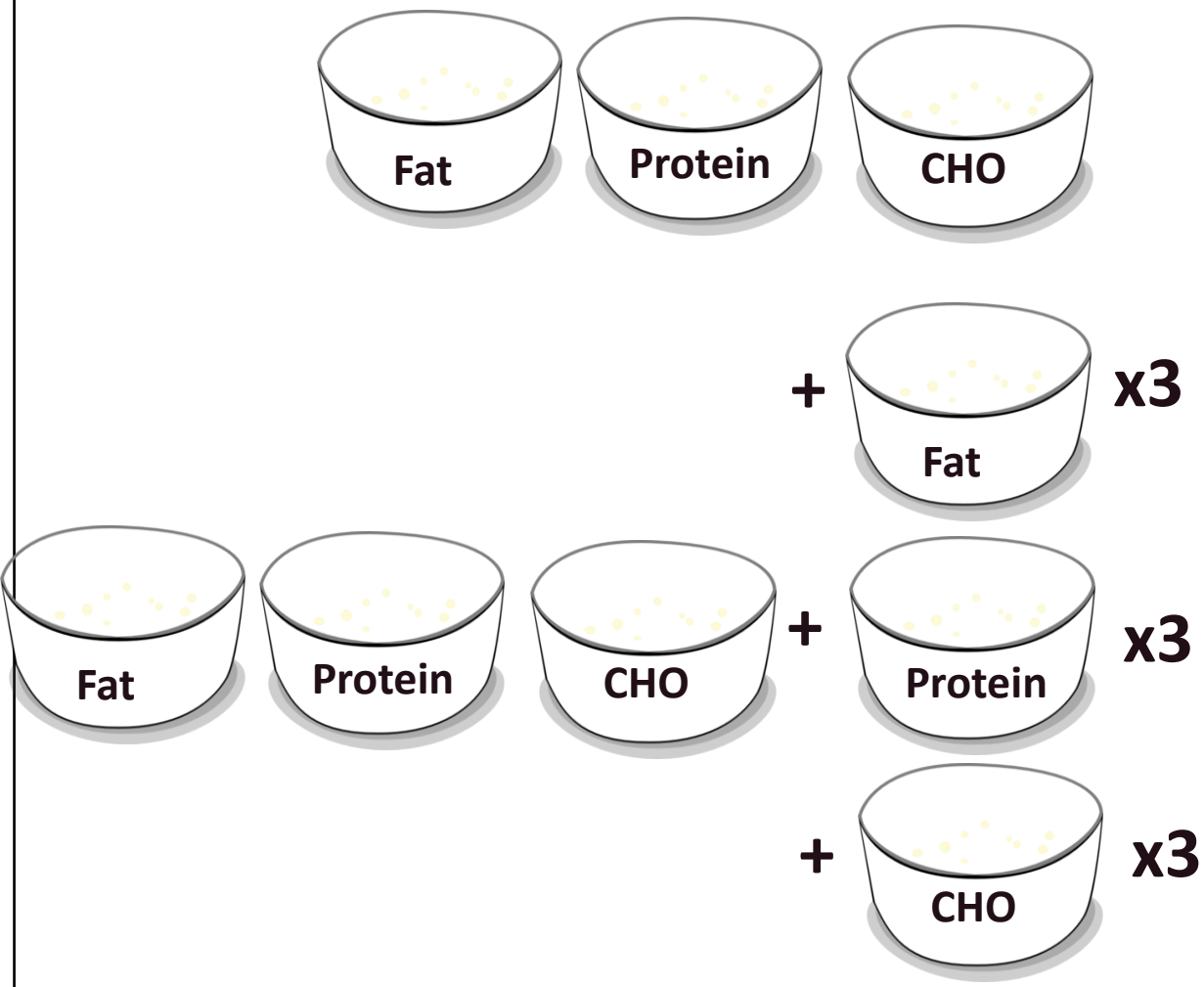
- This “nutritional wisdom” is generally considered to be the **physiological basis of food selection**, although it can be tempered by other factors such as taste hedonics, past experience, and social communication.

- Demonstrations that rats can **select sufficient nutrients** to grow normally were seminal support for the notion of nutritional wisdom.



Tordoff MG. Obesity by choice: the powerful influence of nutrient availability on nutrient intake. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology, 2001;282:R1536–1539.*

Obesity by choice?



8 days

7 of 8 grew as expected

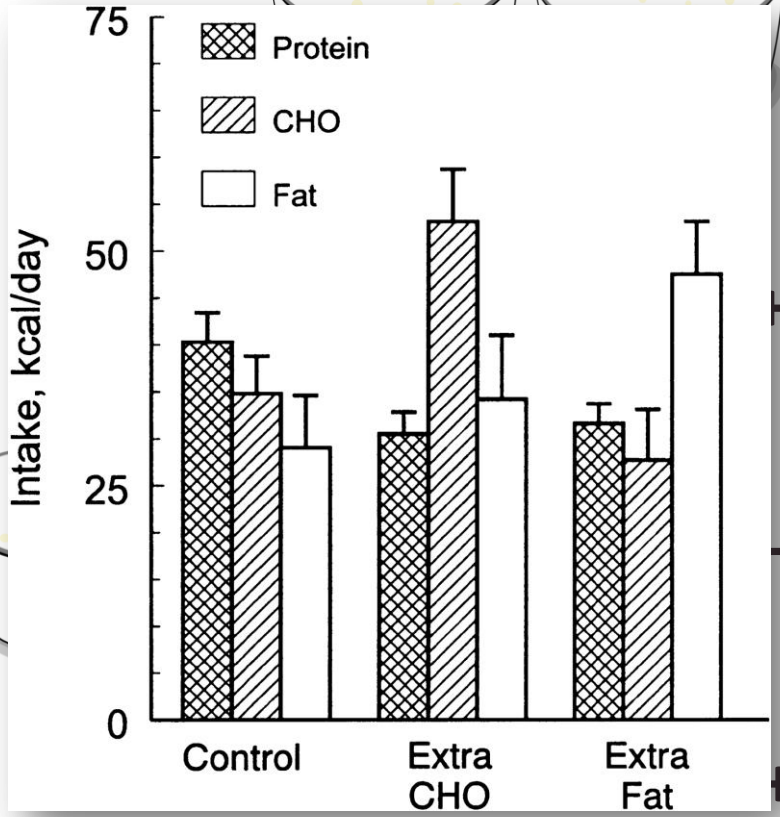
4 of 7 failed to thrive

All 8 grew as expected

3 of 7 failed to thrive

Tordoff MG. Obesity by choice: the powerful influence of nutrient availability on nutrient intake. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology, 2001;282:R1536–1539.*

Obesity by choice?



- Providing rats with extra cups of CHO or fat thus led to life-threatening **protein malnutrition**, even though protein was freely available in their cages.
- Nutritional wisdom vanished as the environment grew toxic.

7 of 8 grew as expected

7 failed thrive

grew pected

x3

CHO

3 of 7 failed to thrive

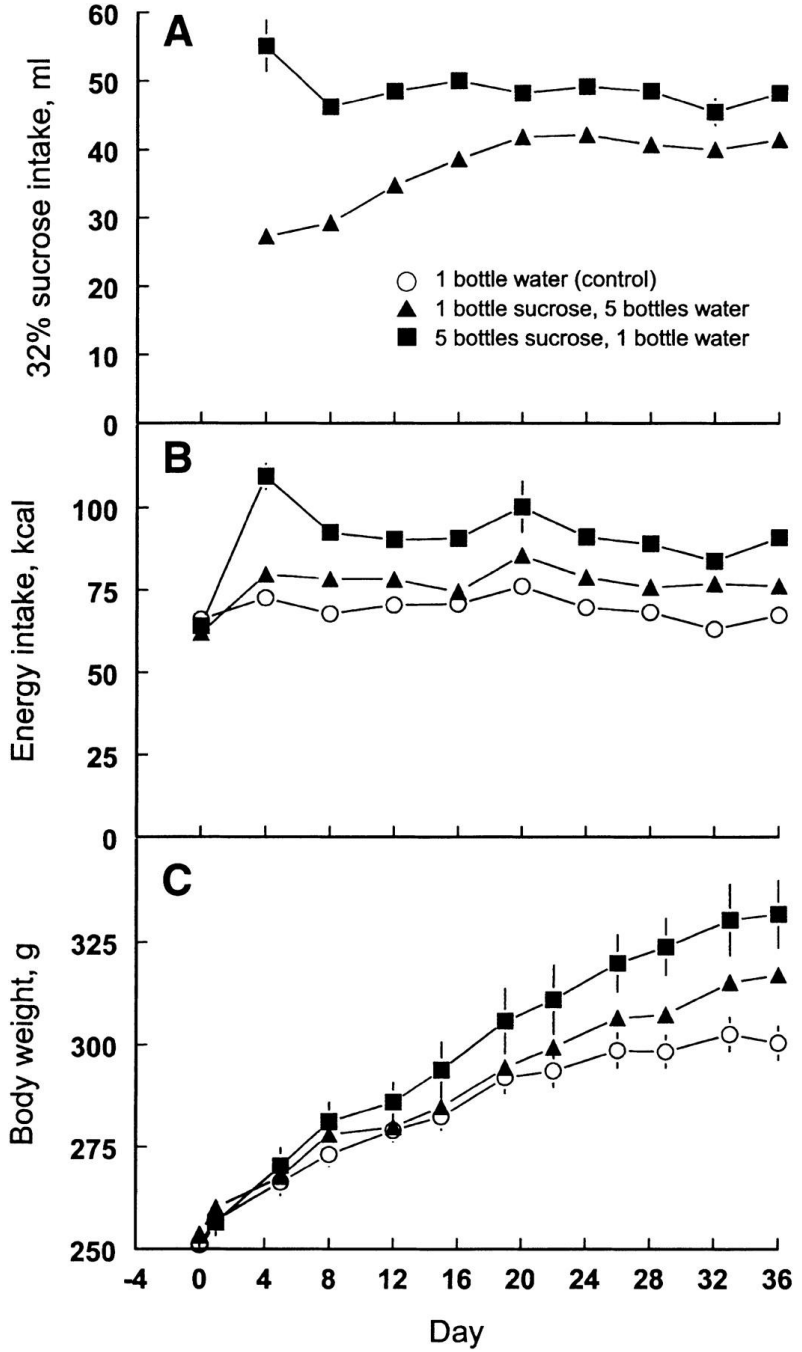
Tordoff MG. Obesity by choice: the powerful influence of nutrient availability on nutrient intake. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology, 2001;282:R1536–1539.*

Obesity by choice: the powerful influence of nutrient availability on nutrient intake

- Group 1: Only water (controls)
- Group 2: 5 bottles of water and 1 bottle of sucrose
- Group 3: 1 bottle of water and 5 bottles of sucrose

The rats with five bottles of sucrose **drank more** than did the rats with only one bottle. Overall they consumed **more energy** than did the other groups.

They gained significantly **more weight** than did controls after **8 days** and significantly more weight than did rats with only one bottle of sucrose after **16 days**.



Am J Physiol Regulatory Integrative Comp Physiol 282: R1536–R1539, 2002;
10.1152/ajpregu.00739.2001.

report

Obesity by choice: the powerful influence of nutrient availability on nutrient intake

MICHAEL G. TORDOFF
Monell Chemical Senses Ce

Received 10 December 2001; acce

Given the simultaneous rise in the incidence of human obesity with the spectacular increase in the availability of nutritionally questionable foods, it appears that changes in availability rather than physiological mechanisms are more likely to be responsible for the poor diet choice, overeating, and obesity displayed by many humans.

Tordoff, Michael G. Obesity by choice: ence of nutrient availability on nutrient in *Regulatory Integrative Comp Physiol* 282: R 10.1152/ajpregu.00739.2001.—The consum by rodents is markedly influenced by the number of contain- ers of each nutrient provided. Most rats given a choice from separate sources of protein, carbohydrate, and fat thrived if given one cup of each but half failed to thrive if given one cup of each and three extra cups of carbohydrate or fat. Rats given five bottles of sucrose solution and one bottle of water became fatter than rats given five bottles of water and one of sucrose. These studies in rats may point to a model for human obesity, in which the availability of food can override physiological controls of ingestion.

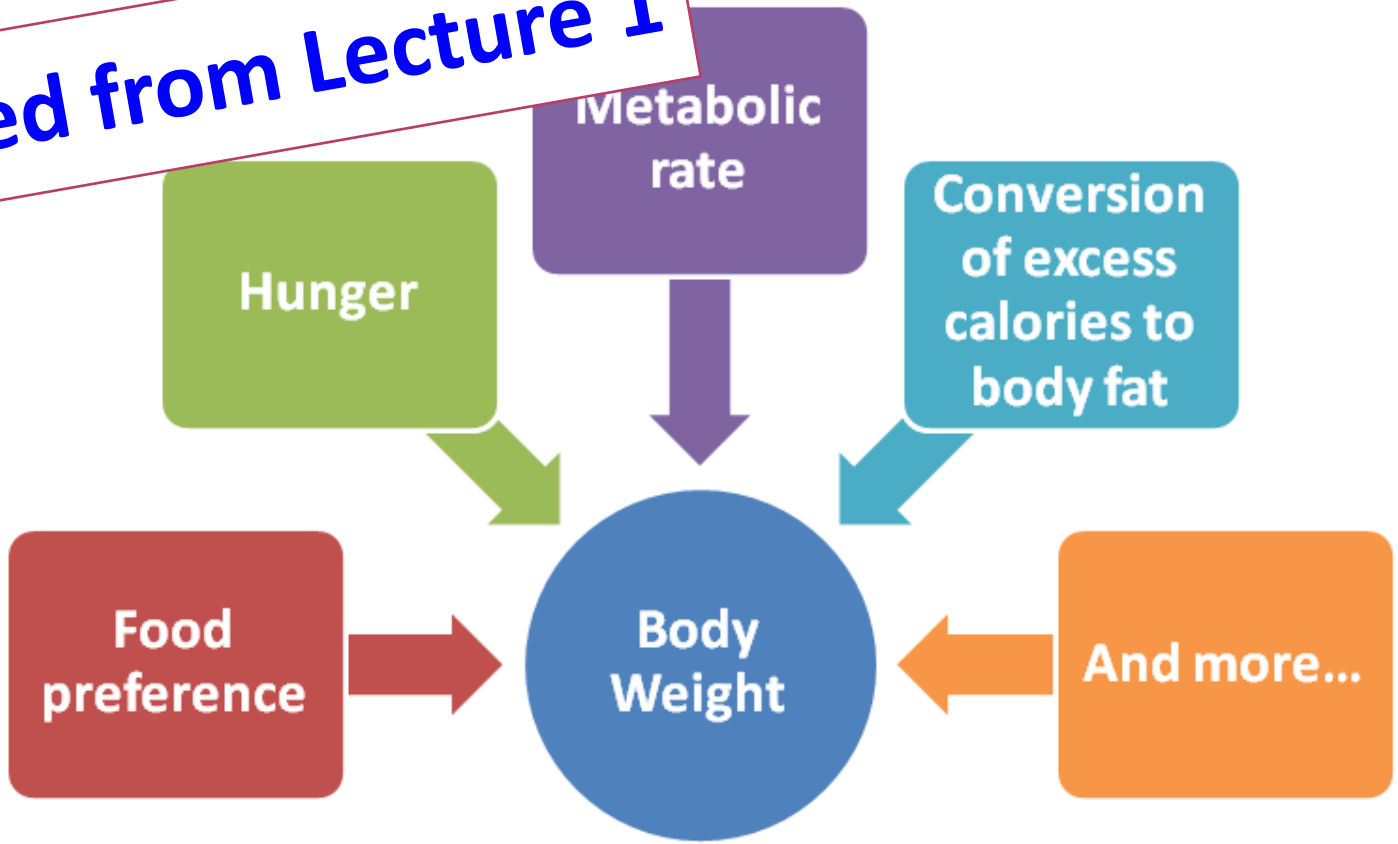
diet selection; diet-induced obesity; food intake; rats

water to drink until the rats were ~10 wk old, when the experiment began. Each rat was housed in a 20 × 18 × 25-cm stainless steel cage designed for conducting diet selection experiments (11). Food was available from stainless steel cups (7 × 7 × 3 cm) with spill-proof lids that were placed in each corner and at the center of the longest sides of the cage.

Sources of protein (casein), CHO (a mixture of cornstarch, dextrin, and sucrose), and fat (a mixture of Crisco vegetable shortening and safflower oil) each contained micronutrients and vitamins as described elsewhere (16). Body weights and intakes of each source were measured (to the nearest 0.1 g, corrected for spillage) every day. Fresh fat was provided

Genetic effect on body weight

Extracted from Lecture 1



25 % to 40% of the variability in population body weight can be explained by genes, but still, 60% or more of the influence can be attributed to the environment (epigenetics).

The Environment Must Change!!!

- "The current epidemic of obesity is **caused largely by an environment** that promotes excessive food intake and discourages physical activity." (Hill & Peters, 1998)

- "[T]here has been **no real change in the gene pool** during this period of increasing obesity. The root of the problem, therefore, must lie in **the powerful social and cultural forces** that promote an energy-rich diet and a sedentary lifestyle." INSTITUTE OF MEDICINE OF THE NATIONAL ACADEMIES

- The WHO agrees with scientists who study this process that **the changing environment** is responsible.

Hill JO, Peters JC. Environmental contributions to the obesity epidemic. *Science, 1998;280:1371–1374.*
Institute of Medicine. *Weighing the Options: Criteria for Evaluating Weight Management Programs. Washington,* DC: National Academy Press, 1995.
World Health Organization. *Obesity: Preventing and Managing the Global Epidemic. Geneva, Switzerland:* World Health Organization, 1998

Extracted from Lecture 1

"[T]here has been **no real change in the gene pool** during this period of increasing obesity. The root of the problem, therefore, must lie in **the powerful social and cultural forces** that promote an energy-rich diet and a sedentary lifestyle."

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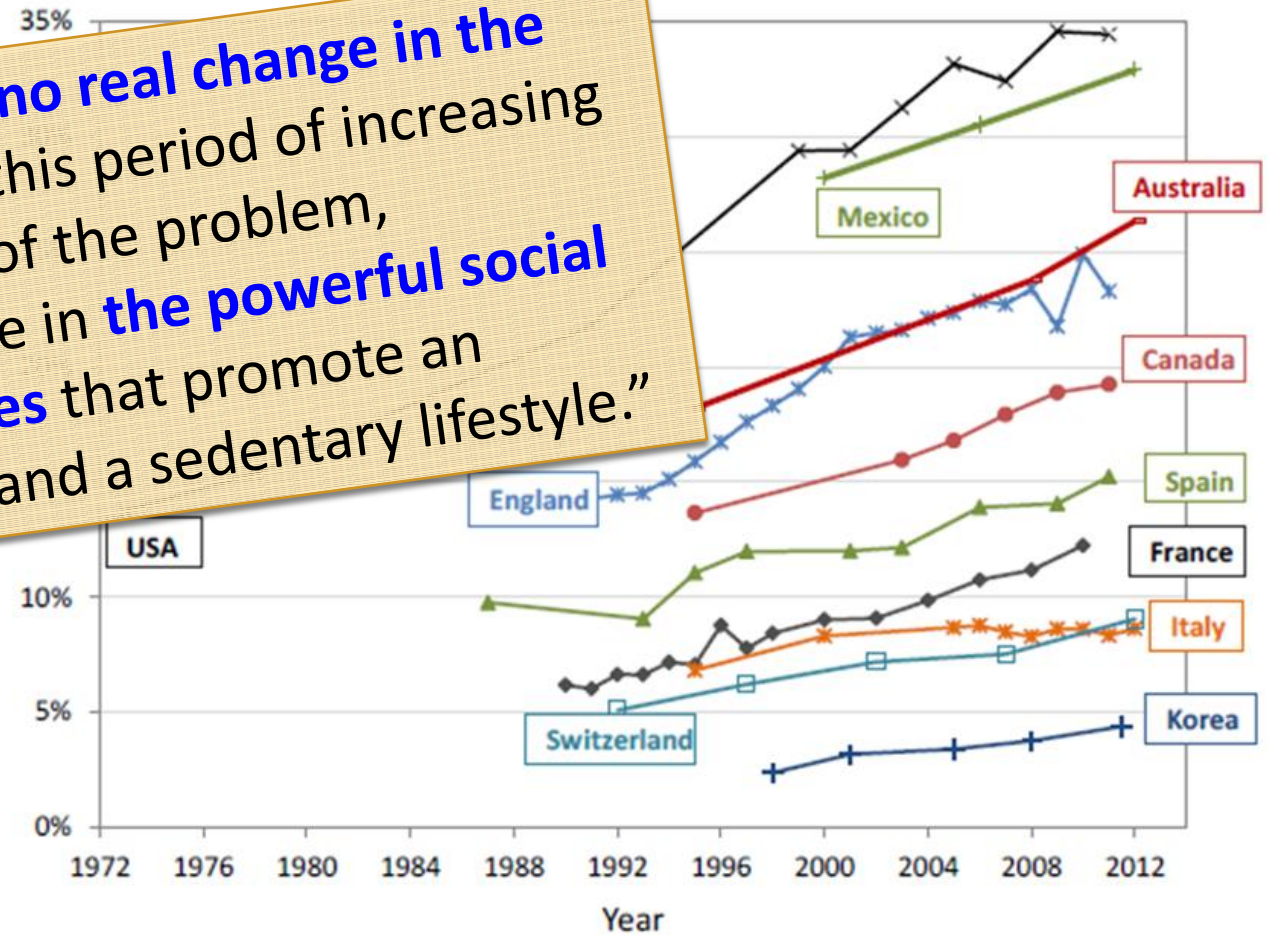
Obesity Trend Among Nations

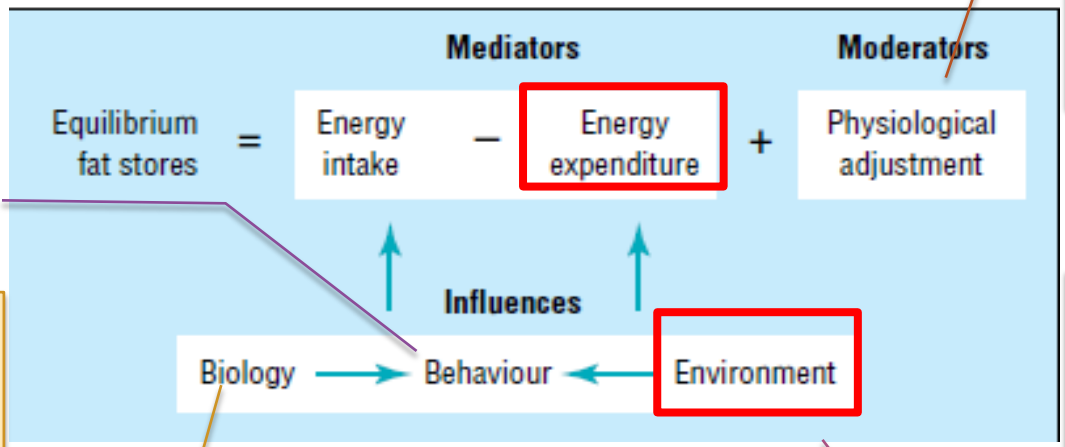


http://www.oecd.org/els/health-systems/Obesity-Update-2014.pdf

Institute of Medicine. *Weighing the Options: Criteria for Evaluating Weight Management Programs. Washington,* DC: National Academy Press, 1995.

An ecological paradigm for understanding obesity

The result of complex psychological factors, including habits, emotions, attitudes, beliefs, and cognitions



The *metabolic* changes that follow a disequilibrium in energy balance and that minimise large fluctuations in body weight

Influence body fat levels include age, sex, hormonal factors, and genetics

Influence on the amount and type of food eaten and the amount and type of physical activity taken

The ecological paradigm proposes three main influences on equilibrium levels of body fat — biological, behavioural, and environmental—mediated through energy intake or energy expenditure, or both, but moderated by physiological adjustments during periods of energy imbalance.

Egger, G., & Swinburn, B. (1997). An" ecological" approach to the obesity pandemic. *BMJ: British Medical Journal*, *315*(7106), 477.

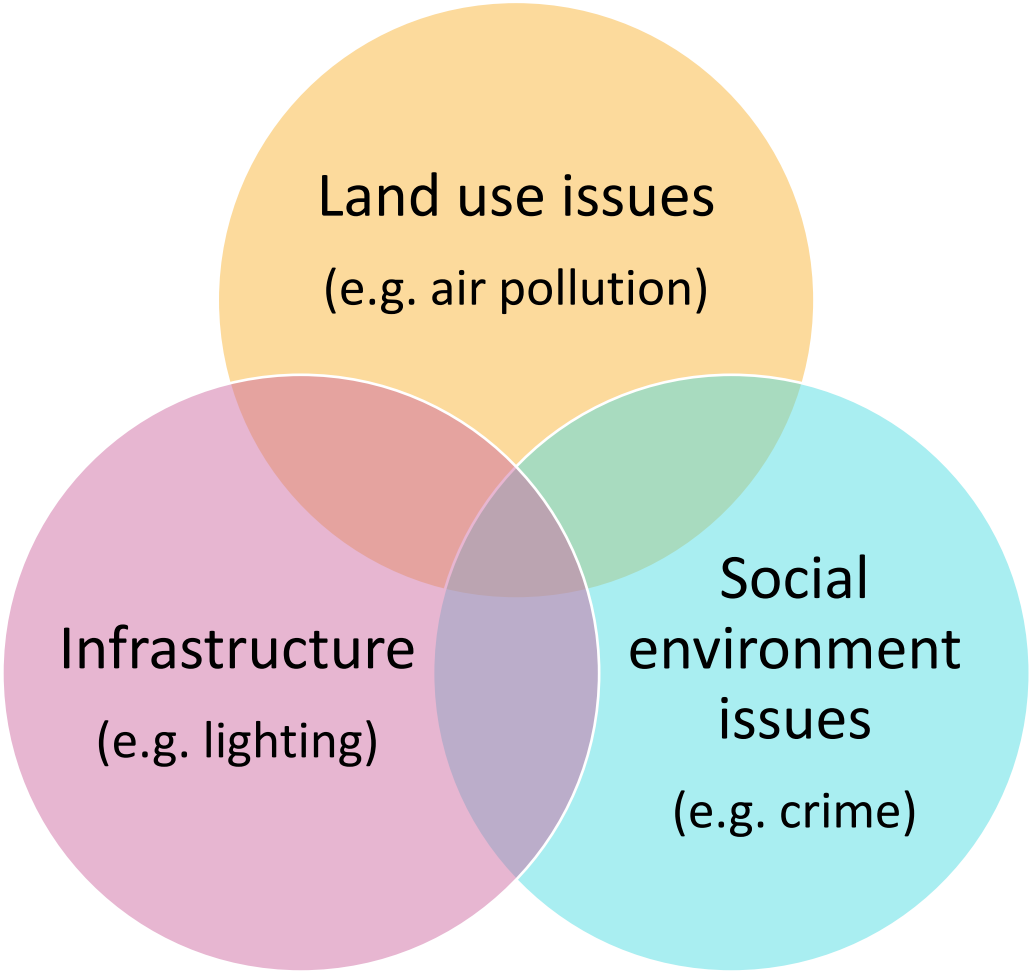
Why all the inactivity?

An Auto-Centric World

Technology, while it fuels economies and aids humankind, also promotes **obesity** by reducing the need for **physical activity**. It has made us **lazy** and has stifled the creativity needed to structure environments that encourage activity.

Brownell, K. D., & Horgen, K. B. (2004). *Food fight: The inside story of the food industry, America's obesity crisis, and what we can do about it*. Chicago: Contemporary books.

Walkability of Living Environment



Lopez, R. P., & Hynes, H. P. (2006). Obesity, physical activity, and the urban environment: public health research needs. *Environmental Health*, *5*(1), 25.

The Energy Expenditure Side: Television viewing

- Studies showed that TV time is **coupled with both obesity and poor food consumption**.
- Children in families where watching TV occurs during meals watch more TV in total, eat **fewer fruits and vegetables**, and consume **more snacks and soft drinks**.

Dennison BA, Erb TA, Jenkins PL. Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatrics, 2002;109:1028–1035; Hu FB, Leitzmann MF,* Stampfer MJ, Colditz GA, Willett WC, Rimm EB. Physical activity and television watching in relation to risk for type 2 diabetes mellitus in men. *Archives of Internal Medicine, 2001;161:1542–1548; Borzekowski DL,* Robinson TN. The 30-second effect: an experiment revealing the impact of television commercials on food preferences of preschoolers. *Journal of the American Dietetic Association, 2001;101:42–46; Andersen RE, Crespo*
Coon KA, Goldberg J, Rogers BL, Tucker KL. Relationships between use of television during meals and children's food consumption patterns. *Pediatrics, 2001;107:E7; Dennison BA, Erb TA, Jenkins PL. Is family* dinnertime undone by TV? *Obesity Research, 2001;9:92S.*

Effects of Television Viewing Reduction on Energy Intake and Expenditure in Overweight and Obese Adults

A Randomized Controlled Trial FREE

Background The average adult watches alr
with increased risks for obesity. This trial exar
energy expenditure (EE), energy balance, body
divided by height in meters squared), and slee

But if you add it up over time, it's equivalent to walking eight miles a week. Over a year, it might help prevent weight gain of 12 pounds.

Methods Randomized controlled trial of 36 adults with a BMI of 25 to 50 who self-r dium of 3 h/d of TV viewing. Participants were enrolled in home-based protocols from January through J 2008. After a 3-week observation phase, participants were stratified by BMI and randomized to an observation-only control group (n = 16) or an intervention group (n = 20) for 3 additional weeks. The intervention consisted of reducing TV viewing by 50% of each participant's objectively measured baseline enforced by an electronic lock-out system.

Results Although not statistically significant, both groups reduced their EI (−125 kcal/d [95% CI, −303 to , −265 to 190]) (P = .52) for intervention and control group participants, respectively, dence interval. The intervention group significantly increased EE (119 kcal/d [95% with controls (−95 kcal/d [95% CI, −254 to 65]) (P = .02). Energy balance was on group between phases (−244 kcal/d [95% CI, −459 to −30]) but positive in 95% CI, −216 to 330]) (P = .07). The intervention group showed a greater reduction in % CI, −0.45 to −0.05] vs −0.06 [95% CI, −0.43 to 0.31] in controls) (P = .33). There was no nge in sleep.

How much is 120 kcal equivalent to?

Conclusion Reducing TV viewing in our sample produced a statistically significant increase in EE but no apparent change in EI after 3 weeks of intervention.

Otten, J. J., Jones, K. E., Littenberg, B., & Harvey-Berino, J. (2009). Effects of television viewing reduction on energy intake and expenditure in overweight and obese adults: a randomized controlled trial. *Archives of Internal Medicine*, *169*(22), 2109-2115.
http://www.nytimes.com/2009/12/22/health/22regi.html?_r=0

Does Exercise Time Interfere with Academics?

Perceptual and Motor Skills, 2000, 91, 531-534.

ACADEMIC PERFORMANCE AND PARTICIPATION IN PHYSICAL ACTIVITY BY SECONDARY SCHOOL ADOLESCENTS[1]

AMANDA J. DALEY AND JASON RYAN

Centre for Sport and Exercise Science
Sheffield Hallam University

Sport, Health and Physical Education
St. Mary's College

Summary.—This study investigated the relationship between adolescents' academic performance and participation in physical activity. 232 boys and girls from Years 8–11 (ages 13–16 years) were randomly selected, and their academic performance was assessed on previous examination scores in English, Mathematics, and Science. Participants were also asked to list all the sports-based physical activities in which they normally participated during a typical week and to indicate how many times per week they took part in each activity and the duration of each. Overall, no significant correlations were found, although weak negative correlations were recorded between the amount of time (in minutes) in sport and exercise and English scores for children ages 13, 14, and 16 years. A similar association was also noted for Science scores of children 16 years old.

Daley, A. J., & Ryan, J. (2000). Academic performance and participation in physical activity by secondary school adolescents. *Perceptual and motor skills*, *91*(2), 531-534.

Does Exercise Time Interfere with Academics?

Effects of Health-Related Physical Education on Academic Achievement: Project SPARK

James F. Sallis, Thomas L. McKenzie, Bohdan Kolody, Michael Lewis, Simon Marshall, and Paul Rosengard

The effects of a 2-year health-related school physical education program on standardized academic achievement scores was assessed in 759 children who completed Metropolitan Achievement Tests before and after the program. Schools were randomly assigned to condition: (a) Specialists taught the Sports, Play, and Active Recreation for Kids curriculum; (b) classroom teachers were trained to implement the curriculum; and (c) controls continued their usual programs. The Trained Teacher condition was superior to Control on Language, Reading, and Basic Battery. The Specialist condition was superior to Control on Reading, but inferior on Language. Despite devoting twice as many minutes per week to physical education as Controls, the health-related physical education program did not interfere with academic achievement. Health-related physical education may have favorable effects on students' academic achievement.

Sallis, J. F., McKenzie, T. L., Kolody, B., Lewis, M., Marshall, S., & Rosengard, P. (1999). Effects of health-related physical education on academic achievement: Project SPARK. *Research quarterly for exercise and sport*, *70*(2), 127-134.

Does Exercise Time Interfere with Academics?

- Spur cell growth
- Decrease stress & anxiety
- Increase decision speed
- Elevate mood
- Improve brain function
- Increase self-esteem
- Promote learning

Hillman CH, Weiss EP, Hagberg JM, Hatfield BD. The relationship of age and cardiovascular fitness to cognitive and motor processes. *Psychophysiology, 2002;39:303–312.*

Sallis J, McKenzie T, Kolody B, Lewis M, Marshall S, Rosengard P. Effects of health-related physical education on academic achievement: Project SPARK. *Research Quarterly for Exercise and Sport, 1999;70:127–134;* Daley A, Ryan J. Academic performance and participation in physical activity by secondary school adolescents. *Perceptual and Motor Skills, 2000;91:531–534.*

Physical Inactivity: The Cause or Consequence of Obesity?

Overweight people are **less active** than their thinner peers (Baker & Brownell, 2000; King et al., 2001) and the prevalence of obesity has **risen** while physical activity has **declined**.

But gaining weight makes exercise less likely, so it is possible that **obesity causes inactivity** and not the reverse.

Do you think that physical inactivity is the **cause or consequence** of obesity, **why**?

Baker CW, Brownell KD. Physical activity and maintenance of weight loss: Physiological and psychological mechanisms. In C Bouchard (Ed) *Physical Activity and Obesity. Champaign, IL: Human Kinetics Press, 2000,* pp. 311–328; King GA, Fitzhugh EC, Bassett DR Jr, McLaughlin JE, Strath SJ, Swartz AM, Thompson DL. Relationship of leisure-time physical activity and occupational activity to the prevalence of obesity. *International Journal of Obesity, 2001;25:606–612.*

Class Poll

Q1. Physical Inactivity: The Cause or Consequence of Obesity?

Q2. Why? (Start your response with "cause/consequence, because…")

Go to **www.govote.at**

and use the code

32 88 24

Physical Inactivity:
The Cause or Consequence of Obesity?

"This study does not support that physical inactivity promotes development of obesity, but suggests that obesity may **lead to physical inactivity**."[1]

Which side does each statement support?

"Individuals who increased their physical activity level and decreased their food intake over time were **protected from weight gain** compared to those who did not… women who consistently engaged in higher levels of moderate physical activity **gained weight at a slower rate** compared to women who were less active."[2]

1. Petersen, L., & Serensen, T. L. (2003). Is physical inactivity the cause or the consequence of obesity?. *Progress in Obesity Research: 9*, *9*, 383-386.
2. Sherwood NE, Jeffery RW, French SA, Hannan PJ, Murray DM. Predictors of weight gain in the Pound of Prevention study. *International Journal of Obesity and Related Metabolic Disorders, 2000;24:395–403.*

Let's Stop Lying to the Public About Physical Activity and Obesity

- What is the key message from Dr. Malhotra? Do you agree with him?

Dr. Aseem Malhotra, cardiologist at Frimley Health NHS Foundation Trust and consultant clinical associate to the Academy of Medical Royal Colleges

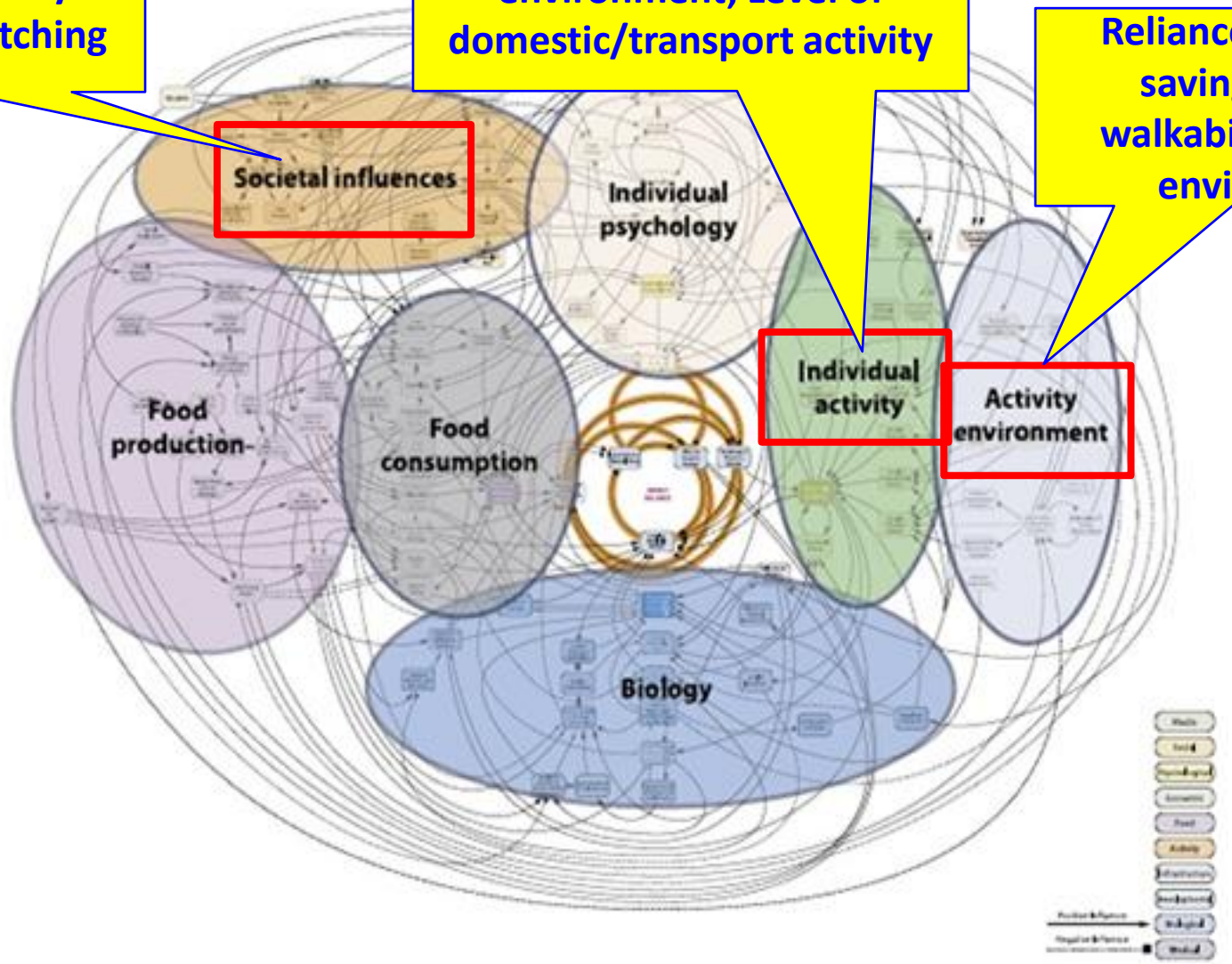
Let's Stop Lying to the Public About Physical Activity and Obesity
https://www.youtube.com/watch?v=Q3kGT2iHWeA

Obesity System Map

Social acceptability of fatness; TV watching

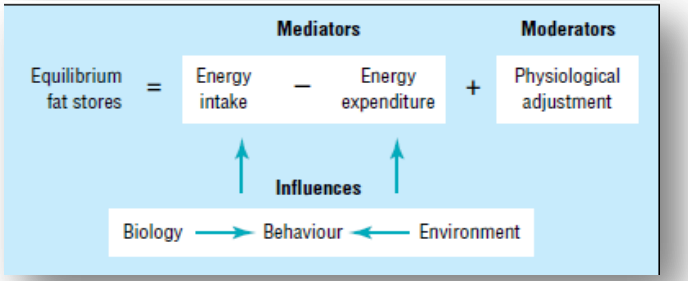
Perceived danger in environment; Level of domestic/transport activity

Reliance on labour-saving devices; walkability of living environment



https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296290/obesity-map-full-hi-res.pdf

Summary



- **"Obesogenic Environment"**
- **An ecological paradigm for understanding obesity**
- **Social Construction of Fat at Personal Level**
  - Punjabi people; Pima Indians
  - "Nutritional wisdom"

  -> The Environment Must Change!!!
  - **The Energy Expenditure Side: Physical Inactivity**
    - Technology
    - Walkability of Living Environment
    - Television viewing
    - Does Exercise Time Interfere with Academics?
    - Physical Inactivity: The Cause or Consequence of Obesity?