Terry Wick, Hartford Union High School (Hartford, WI)
Recipient of a 2020 APA TOPSS Charles T. Blair-Broeker Excellence in Teaching Award

TOPSS: Standard Areas: Motivation and Biopsychological Domains

Content Standards

After concluding this unit, students will understand:

1. Perspectives on motivation
2. Domains of motivated behavior in humans and non-human animals
3. Structure and function of the endocrine system
4. The interaction between biological factors and experience

Individual Variation Domain

Standard Area: Motivation

Content Standard 1: Perspectives on motivation.

1.1 Explain biologically based theories of motivation.
1.2 Explain cognitively based theories of motivation.
1.3 Explain humanistic theories of motivation.
1.4 Explain the role of culture in human motivation.

Content Standard 2: Domains of motivated behavior in humans and non-human animals

2.1 Discuss eating behavior.

Biopsychological Domain

Standards Area: Biological Bases of Behavior

Content Standard 2: Structure and function of the endocrine system

2.1 Describe how the endocrine glands are linked to the nervous system.
2.2 Describe the effects of hormones on behavior and mental processes.

Content Standard 3: The interaction between biological factors and experience

3.2 Describe the interactive effects of heredity and environment.
3.3 Explain how evolved tendencies influence behavior.

Next Generation Science Standards

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

The lesson plans that I am submitting can fit a variety of classes with adaptations or subtractions to what I have written. I am writing them at the AP level, so the Intro level would have to alter the plans.

1) Regular level (Intro) could do a lot of the basics of this.
2) AP Psych would be able to do most of this.

3) The combined AP Bio/AP Psych would be able to do all of this. I will denote the BioPsych lessons with this marking **. This is a unique class that is team taught with an AP Biology teacher and an AP Psychology teacher.

**Our class is made up of both juniors and seniors. We teach in a 90 minute block and we are constantly back and forth as we go through the course material. Both teachers are very comfortable with the interjections from the other and/or the kids of the class. We try to collaborate everyday in the class and the students are very comfortable with the back and forth nature of the discussion. We have found this to be a unique set-up, one that I am not sure is used anywhere else at the high school level.

Google Presentation for this lesson.

Day 1

I start the class with them having to take the two surveys linked below. When they are done with those surveys we discuss the ideas of hunger and what makes people hungry or not hungry. They are assigned pages from the text and have read the material coming into class, so their prior knowledge is key to the lesson.

The objective of today's lesson is to introduce the biological aspects of hunger. This ties in with the Motivation Unit.

1) Maslow Survey - Take on Day 1

   Body Type Survey - Take on Day 1 using this chart

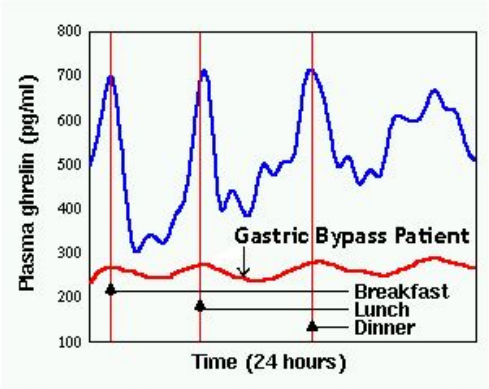
2) Show Motivational Speeches video.
   Show Aaron Ralston video -
   Write in Personal Reflection Journal What do these clips have in common?

3) Discuss the idea of Drive-Reduction and the concept of Homeostasis.
   How would a biologist explain homeostasis?
   What are the connections to psychology?

4) Physiology of Hunger. Lecture and discussion.

   a) Hunger causing properties and brain part - Orexin, Ghrelin, Insulin, Lateral Hypothalamus
   b) Hunger suppressing properties and brain part - Leptin, PYY, Ventromedial Hypothalamus
   c) Plate size, plate color, table size, etc.
   d) 2000 calories vs 200 calories - ASAP Science This is 200 Calories
   e) Personal connection journal on This is 200 Calories.

** The goal of the AP BioPsych Bundle is to incorporate and connect as many possible connections as possible. We talk about and use a Claim Evidence Reasoning (CER) framework throughout the year and then the graph of the Gastric Bypass Patient is discussed. This graph leads to a lot of discussion from both the Biological and the Psychological viewpoints of hunger and eating experiences.



5) Minnesota Starvation Experiment - Ancel Keys

   a) Read article
   b) Apply to Maslow's Hierarchy
   c) Apply to real-life scenarios
   d) Watch Clip #2 as a tie in to current analysis of the experiment and diets.
   e) Discuss dieting - investigate how/if diets work - What is the biology of dieting? It is about the balance of caloric intake versus the caloric expenditure of energy.

6) ** Basil Metabolic Rate

   a) Look at metabolism - AP Bio would take over for this segment *see slides*
   b) Look at thermodynamics and total energy and how this applies to psychology as well.

7) Homework

The Biology of Food - This all ties back to the physiology of food. As homework the students are to watch and take notes on the 3 videos for class tomorrow. Each of the videos are 5 minutes long. For each of these videos create a T-chart with biology on one side and psychology on the other side to see the connections. This will help for the discussion tomorrow in class.

   a) How the food you eat affects your brain.
   b) How the food you eat affects your gut.
   c) How do carbs affect your health.

Day 2

The objective of today's lesson is to look at the humanistic side of body size and shape. We also look at the biological side of metabolism and how the body processes foods.

1) Show Dove Beauty Sketches

   a) Personal Reflection Journal

2) Go over the results of the Body Image Survey from Day 1. Compare our class results to that of the reported results in the study.

3) Transition into Eating Disorders and Discuss (How do these also apply to the Need to Belong?)

a) Dove evolution
b) Fotoshop by Adobe'

4) ** Investigate the Food/Sugar industry - more connections with AP Bio

a) Is Sugar Toxic - 60 Minutes video (use what is needed)
b) After viewing divide class into 3 groups to investigate the three topics below.

i) The history of Sugar
ii) The marketing of Sugar
iii) The biology of Sugar

c) Have 1 Google Presentation created, so each section can add their info to the classes presentation. As they find their info, the students will add it to the presentation. Students will then share the info in an informal presentation for all to tie it together and make the BioPsych connections.

5) ** As another CER activity, we are looking for students to use their analytical skills to infer the relationship between the quantity of enzyme and time of eating the meal. Our goal was to then use scientific reasoning to explain how the hunger hormones also fit into the use of insulin and glucagon. We added the graph on insulin and glucagon and then they wrote it up as a Claim Evidence Reasoning activity.

6) The Biology of Food - This all ties back to the physiology of food. As homework the students were to watch and take notes on the 3 videos for class today.

d) How the food you eat affects your brain.
e) How the food you eat affects your gut.
f) How do carbs affect your health?

In class discussion, the goal is to pair/share the info that they took notes on, if there is time. Then as a large group discuss with all the key items from each video. What are the tie-ins to Biology, Psychology, and how does this new knowledge affect them? Are there changes that they want to or need to make on a personal level to be healthier?

Informal assessments will be made on the personal connections journals and the presentations of the groups. A formal assessment of this material will be included on the unit test.

1.

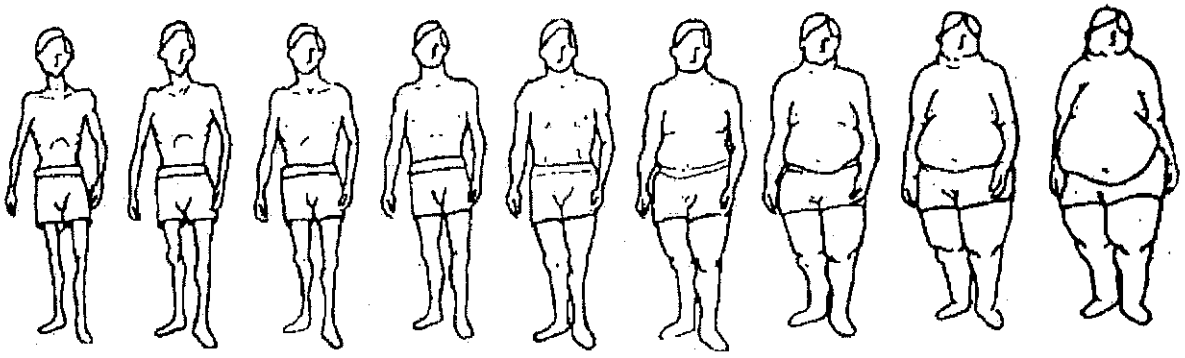


Figure 4.1 Figural rating scale for men.
Source: Adapted from Stunckard *et al.*, 1983 with permission.

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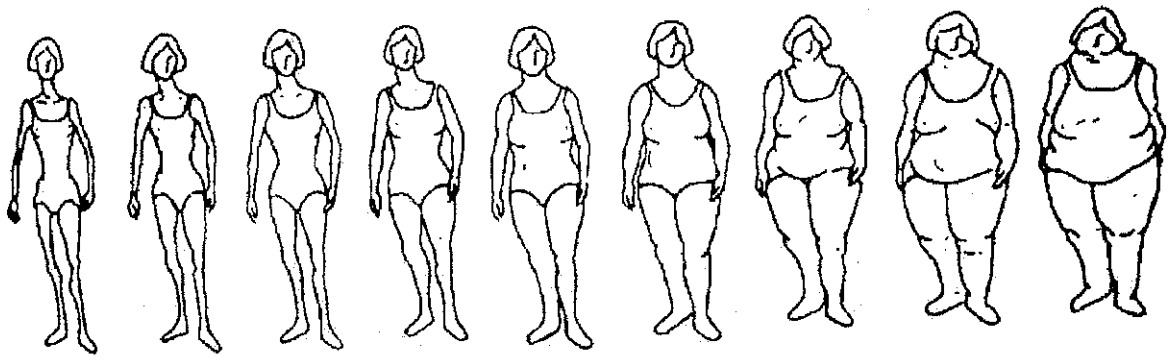


Figure 3.1 Figural rating scale for women.
Source: Adapted from Stunckard *et al.*, 1983 with permission.

1 on left 9 on the right

After viewing the Motivational Speeches video and the Aaron Ralston video, reflect on these questions:

1. What do you think you would have done?
2. What does HOPE have to do with Maslow and these 2 videos?
3. Ralston uses the term 'metaphysical' toward the end of the video - what does it mean and how does it apply to Maslow?

Magazine

The Minnesota starvation experiment

By Janet Ball
BBC World Service

20 January 2014



TIME LIFE

During World War Two, conscientious objectors in the US and the UK were asked to volunteer for medical research. In one project in the US, young men were starved for six months to help experts decide how to treat victims of mass starvation in Europe.

In 1944, 26-year-old Marshall Sutton was a young idealist who wanted to change the world for the better. As a conscientious objector and Quaker, he refused to fight in the war but he still craved the chance to help his country.

"I wanted to identify with the suffering in the world at that time," he says. "I wanted to do something for society. I wanted to put myself in a little danger."

That danger came, unexpectedly, in the shape of a small brochure with a picture of children on the front.

"Will you starve that they be better fed?" it asked. It was a call for volunteers to act as human guinea pigs in a medical experiment at the University of Minnesota.

TIME LIFE

All over Europe people were starving - in the Netherlands, in Greece, in eastern Europe and the Soviet Union - and the US military wanted to learn how best to re-feed them. But first they had to find healthy people willing to be starved.

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Perhaps surprisingly, hundreds of conscientious objectors - or COs - applied, all eager to help. Sutton was grateful to be one of 36 young men chosen.

"I felt very useful, fulfilled," he says. "There were hundreds of people like me who didn't have that type of opportunity, and I felt very fortunate that I could be there."

The experiment started in November 1944 and for the first three months they were fed to their optimum weight and monitored. Then their rations were cut dramatically. Food quickly became an obsession.

"I ate what I had in about three minutes and got out of there - I didn't want to stay," says Sutton, remembering mealtimes in the canteen.

"There were some in the experiment who lingered over that food for 20 minutes. I couldn't take that. Some fellows were reading cook books all the time."

The men ate meals twice a day. One might be cabbage, turnips and half a glass of milk. On another day, it might be rye bread and some beans.

Like many hungry people in Europe, the men never had meat, and calories were set at 1,800 or less. But Sutton remembers one occasion when, carrying his meagre rations in a paper bag, he took his girlfriend out to dinner at the most expensive restaurant in Minneapolis.

"I wanted to take her to a restaurant just to enjoy seeing her eat... but when the waiter came up with the food she just couldn't do it. I was a bit disturbed by it, I'd spent all that money on a big meal and she just couldn't eat it."

The regime was tough - during the six months they were being starved, the men were expected to walk or run 22 miles (36 kilometres) every week, expending over 1,000 calories more than they consumed each day.

Their walks took them past bakeries and other temptations - and it was all too much for some participants. Three pulled out of the experiment.

Those that remained lost about 25% of their weight and many experienced anaemia and swollen ankles, as well as apathy and exhaustion. Their ribs stuck out through their skin - their legs were as thin as their arms used to be. And there were psychological effects as well.

"After you've not had food for a while your state of being is just numb," says Sutton. "I didn't have any pain. I was just very weak. One's sexual desires disappeared."

The men grew anxious and depressed.

"When something good happened, we would explode with joy and when we were pessimistic we were very depressed," Sutton recalls.

"I had a very close friend there and often I'd speak sharply to him and I'd find myself going to him almost every night and apologising."

The men coped in different ways. One man managed to study for a law degree. Sutton read philosophy and theology, and drew comfort from Quaker friends and the church.

Others struggled, occasionally eating illicit food before becoming despondent with guilt. One man even cut off a finger while chopping wood and couldn't explain how or why.

The experiment is still cited as a source of reference by academics studying nutrition and eating disorders, and it raised many questions about how far psychological problems can be treated if the subject is still starving.

AP

But in some ways the project came too late. Even as the experiment continued, one Nazi concentration camp was liberated, then another - and the full horror of starvation became apparent.

UNIVERSITY OF MINNESOTA

BBC correspondent Edward Ward entered the Buchenwald concentration camp in April 1945, seven days after it was liberated.

"A hollow-eyed emaciated German Jew hobbled across to me," he reported. The man opened the door of a large cupboard. Inside there were about 20 corpses piled high.

"'Last night's crop,' said the man, almost casually. 'It'll be the same tomorrow, and the next day, and the next day.' The wretched inmates have been freed from their Nazi tormenters, but they've not yet been freed from slow starvation."

But while the results may have come too late for many of World War Two's victims, they still could help others.

In 1946, the researchers released a guide book for aid workers - Men and Hunger.

Its advice included:

- Show no partiality, and refrain from arguments; the starving are ready to argue on little provocation, but they usually regret it immediately
- Informing the group what is being done, and why, is just as important as getting things done - billboards are the easiest way
- Starvation increases the need for privacy and quiet - noise of all kinds seems to be very bothersome and especially so during mealtimes
- Energy is a commodity to be hoarded - living and eating quarters should be arranged conveniently
- A thoughtful worker will make use of the fact that the starving are emotionally affected by the weather -some special and cheerful activities might be saved for bad days

In the last months, the Minnesota men were fed back to health. Different groups got different foods and calorie allowances. But it was months, even years - long after the men had returned home - before they had all fully recovered.

On the day Marshall Sutton left Minnesota, he took a bus to Chicago.

"Every time the bus stopped I had a couple of [milk-]shakes and the world was a wonderful place," he says.

"I had a wonderful sense of having all the food I wanted, but I didn't have the strength - I was so happy and I was eating, but I wasn't normal."

Sutton, like most of the volunteers, went on to lead a healthy and successful life. He worked in Gaza with starving refugees in 1949 then took part in Quaker projects in the US. Now 95, he lives in a Quaker Community in Baltimore.

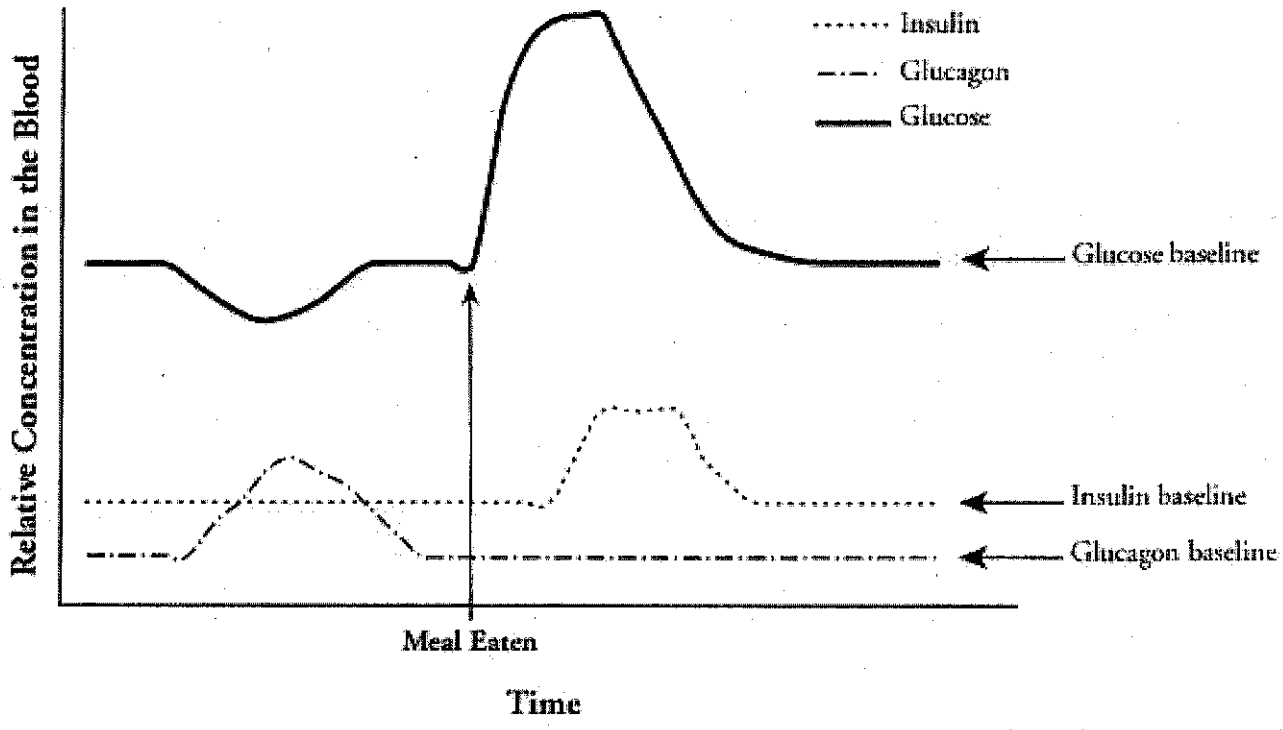
Seventy years on, he is still glad he took part in the experiment. His friends were risking their lives in the South Pacific, he says, and it was an honour to make a sacrifice himself.

Janet Ball's *Witness is broadcast on the BBC World Service on January 20 from 08:50 GMT. Listen via* **BBC iPlayer Radio** *or* **browse the Witness podcast archive**.

After viewing the Dove Beauty Sketches, reflect on the following questions:

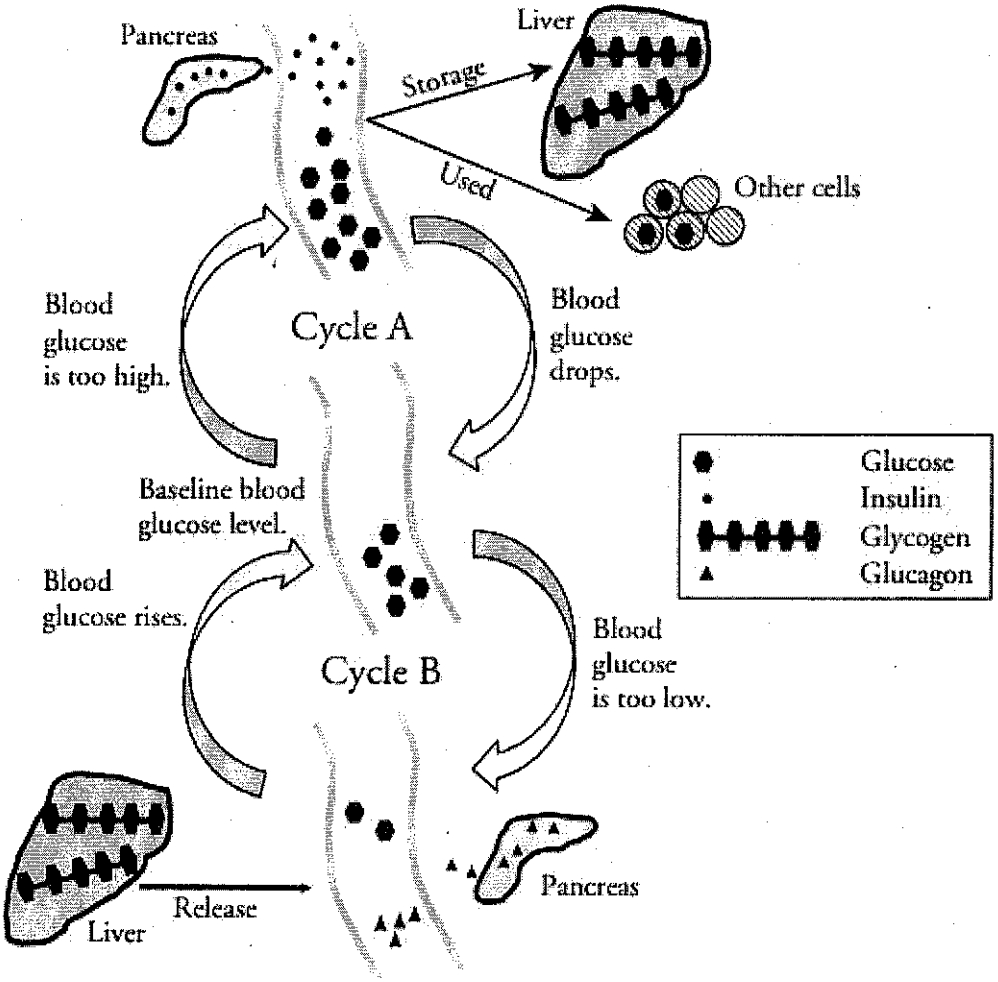
1. What is your initial reaction to the video?
2. How does/can the video apply to your life? What can you do with the new information? Maslow's Hierarchy should be used here too.
3. Are there any ways to 'improve' the study?

Blood Sugar CER



Claim:

Evidence:	**Evidence:**	**Evidence:**
Reasoning:	**Reasoning:**	**Reasoning:**



Explain how this is an example of feedback control.