FAT HEAD KIDS presentation by Tom Naughton

"Fat Head Kids, Stuff about diet and health,

I wish I knew when I was your age."

So the talk I'm giving today is what for now we think will be chapter three

and again this is a book for kids, DVD for kids,

so when I start talking to you as if you're a bunch of kids,

that is not a comment on your intelligence or maturity level...

Not even Jimmy's...

This is how we plan to explain this stuff to kids,

so let's not start at the beginning, let's start with chapter three,

"Stuff I wish I knew when I was your age.

Getting fat isn't about character, it's about chemistry."

Now since this part of the book is about why kids get fat,

I'm probably supposed to show you a bunch of charts and figures

to convince you that there are more fat kids now than there used to be.

I'm not going to do that and here's why.

I went to school in the 1960s and 1970s and yes things were different then.

We had maybe one or two fat kids in each class.

And after I became one of them

I never once got together with the other fat kid in class and said

"Isn't it great? They were the only ones.

"For the sake of the nation, I'm so happy all of our classmates
are skinny enough to make fun of us."
No, we never said that, because it's no fun being a fat kid. Period.
If you've been getting fat, I know you want to change that
and I'll bet at least a few people have already told you
why you're fat and what to do about it
like the classmates who explained it to me.

Now let's suppose these guys grow up and become doctors,
or nutritionists, or personal trainers!

And they learn it's not polite to make fun of fat people.
They'll still give the same advice
only now that advice will sound almost like science.
It's all about the calories in and calories out.
There are 3500 calories in a pound of fat,
so if you decrease your intake by 500 calories per day,
you'll automatically lose one pound of fat per week.

Well it's strange if you think about it, because 50 years ago
very few Americans were overweight and nobody was counting calories.
In fact they couldn't because those nutrition labels you see on foods now
did not exist until the 1990s.
Nowadays though we have a lot more fat people
and it seems like everyone's talking about calories.

As an "Cut the calories, cut the calories, cut the calories!"

So what's a calorie?

Well to understand calories, let's forget about food for a second

and talk about something you probably don't eat.

Wood.

If I gave you a nice piece of wood, you could chop it up

and make something useful, like a chair.

Or you could store it for later.

Or you could toss it in the fireplace and burn it for heat.

How much heat?

There are different units for measuring heat,

but the common ones are BTUs, Joules and Calories.

So technically, a calorie is a unit of heat.

But heat is also a form of energy and in our world energy makes things happen.

200 years ago people were burning wood to boil water to make steam

and the steam could turn an engine big enough to move an entire train.

So we could say the energy to move a train came from the calories in wood.

It's the same with food.

To determine the calories in food,

scientists put it in a special piece of lab equipment,

burn it and measure the heat.

And no, they are not trying to figure out

how many pizzas you should burn to keep your house warm.

They want to know how much energy the food would provide

if you burned it off for fuel.

But you don't, because some of what you eat

is converted into building materials for the rest of your body

and some of what to eat is converted to fat and stored in your fat cells.

That way your body can burn fat, when you're not eating.

If your body couldn't store calories as fat,

you would have to spend almost all your waking hours eating.

Now because your body can store calories as fat,

a lot of the so-called experts think your body works just like a bank account.

I called that The Piggy Bank Theory and it looks like this.

Every time you eat, you deposit calories into your body

like putting money in the bank.

Some of the calories go into your body's building and repair fund,

some go to pay the daily energy bill.

But if there are any calories leftover, they are automatically converted to fat

and stored in your fat cells, which are like the piggy bank.

Now with a real piggy bank it's easy to control the balance,

because it's all based on the simple math of dollars in, minus dollars out.

If I deposit $50 a week in the piggy bank and withdraw $40,

I know my piggy bank's growing by $10 per week.

If I deposit $50 and I withdraw $60,

I know the piggy bank is shrinking by exactly $10 per week.

Well according to The Piggy Bank Theory, losing weight is just as easy,

because it's based on the same simple math.

All you have to remember is that there are 3500 cal in a pound of fat

and then to lose weight you just make smaller deposits by eating less.

Or you make bigger withdrawals by exercising to raise the daily energy bill.

People who believe in the piggy bank--

And oh, if you do either one of those things,

your body will automatically withdraw calories from your fat cells

to pay the daily energy bill.

People who believe in The Piggy Bank Theory do things like drive to a gym,

take an elevator to the workout room

and then spent an hour on a treadmill walking nowhere.

They want to raise the daily energy bill.

Or they write health and fitness articles offering simple advice like this:

"If you cut just one pat of butter per day from your daily diet

"you'll lose 10 pounds per year.

And if you also walk for 20 minutes a day, you'll lose 20 pounds per year."

Well, that sounds easy, doesn't it?

So according to these people, if you're fat,

it's because you're not willing to eat just a little less.

Which means you're a pig.

Or you're not willing to move around just a little more,

which means you're a lazy pig.

But does that actually makes sense?

Most fat people hate being fat. I know I did.

Do we really believe they would rather look like this,

than give up one pat of butter per day?

And if getting fat comes down to character, then how do we explain the fact

that there are far more overweight and obese babies than there used to be?

Did babies in previous generations have more discipline?

Did they go to baby aerobics classes?

Did they drink less milk so they wouldn't get fat?

And if our bodies work on the same simple math as a bank account,

how do we explain the fact that some people, like my wife,

weigh exactly the same year in and year out,

even though they eat whenever they're hungry and never think about calories?

That's like making a bunch of deposits, a bunch of withdrawals in your bank,

never bothering to add them up,

but every time you check your balance, it's exactly $2,000.

Well, obviously there's something wrong with The Piggy Bank Theory

and doctors and researchers who dig into the science had known that for decades.

In a study from the 1960s

doctors wrote about a group of obese patients who were put in a hospital

and only fed 600 cal per day.

That's about one fourth as many calories as most adults eat,

including a lot of skinny people.

But these obese patients didn't lose weight.

Are we going to blame that on their character?

Should they apply more discipline and eat only 300 cal per day?

In a study at the Mayo Clinic

researchers took a group of naturally thin people, people who don't gain weight,

and they had them eat an extra 1,000 cal a day for 56 days.

Now according to The Piggy Bank Theory,

those 56000 extra calories should have been converted to fat.

16 pounds worth.

But these naturally thin people didn't gain 16 pounds.

In fact most of them barely gained any weight at all.

In another experiment researchers took a group of adult mice,

who weren't gaining or losing any weight.

They figured out how many calories they were consuming

and then they cut their calories by 5%.

So that's the mouse version of cutting one pat of butter per day from your daily diet.

And they also use special equipment to make sure they were just as active as before.

So let's apply The Piggy Bank Theory and predict what happened to the mice.

They were eating less, so they're making smaller deposits.

They were just as active, so the daily energy bill should be the same.

Therefore they had to withdraw calories from their fat cells to pay the energy bill,

which means their fat cells had to shrink. Right?

But that isn't what happened.

When these mice were given less food, their fat cells got bigger, not smaller.

So here's why The Piggy Bank Theory doesn't work in real life.

Calories in minus calories out only describes how we gain weight.

It doesn't explain why we gain weight.

It's true that there are 3500 cal in a pound of fat.

It's true that if you're gaining weight,

you are consuming more calories than you are burning.

So how we gain weight can be described by simple math that looks like this.

But why we gain weight is a matter of chemistry,

which looks like this.

Now don't panic because you don't have to understand all that chemistry.

In fact very few people understand all of it,

and the ones who do, usually look something like this.

Here is what you do need to understand.

Even if you're sitting still right now, your body is incredibly busy.

Your lungs are breathing air, your heart is pumping blood,

your digestive system is breaking down that lunch you just ate,

your muscles, organs and bones

are generating literally millions of new cells to replace old cells

and your entire body is producing heat to keep you warm.

And that is a small fraction of what's happening inside you right now.

Everything that happens in your body is driven by chemical reactions

and those chemical reactions use energy.

Even the chemical reactions that convert food into energy burn some energy.

If you take all those chemical reactions together that we see in this scary chart,

they make up what scientists call "your metabolism".

Now you may have heard that some people have a fast metabolism

and some people have a slow metabolism.

So what does that mean?

Well, let's suppose your body is like a house.

And your dad comes to you one day and says, "You know what?

We're saving too much money. I don't like saving this much money.

Find some way to jack up the electric bill."

So you run around, you open the windows to let in cold air,

then plug in electric heaters to keep the house warm,

you turn on all the TVs, lights, computers and appliances,

get out some power tools, tear down some old rickety stairs,

rebuild them then, what the heck, tear down and rebuild them again.

Your house isn't moving, but the daily energy bill has gone way up.

So now your house has a fast metabolism.

Now let's suppose your dad comes to you and says, "What's with all these open windows?

"I'm not trying to heat the whole neighborhood, you know.

"We need to save money so we can build on to the house and make it bigger.

Stop wasting electricity."

So you run around, you close all the windows, turn off the TV's, computers and appliances,

you stop trying to rebuild those stairs, you turn the thermostat down to 63

and make everyone wear big ugly sweaters to keep warm.

Your house still isn't moving, but the daily energy bill has gone way down.

Now your house has a slow metabolism.

But your metabolism does a lot more than just burn energy.

It determines when you're hungry and when you feel full.

It determines when you feel lazy and when you're so energetic you can't sit still.

When you eat a meal, your metabolism decides how much to spend for fuel,

how much to store as fat

and how much to put into your body's building and repair fund.

In other words if your body is like a bank,

your metabolism is a super complicated software application

that controls all the operations in the bank.

Now, if you're like most kids, you already have some favorite software applications

only you probably call them Apps.

My daughters love their apps and I have to admit some of them are pretty cool.

But even the coolest app can only do what it's been programmed to do,

not what you wanted to do.

If you're playing Angry Birds, for example, you can't just decide

that one little bird's going to knock down the big old castle,

because that's not how it's programmed.

When you click on a mouse, type on a keyboard or tap and drag on a screen

you send an application a message.

And the application always responds

by following the instructions that are written into its code.

That's all it can do.

Now software developers like me and my buddy Howard,

we create apps for computers and tablets by writing code in a computer language,
such as Java, or Python or C+.
But in living organisms the apps are created by nature
and the code is written in chemistry.
Your body is like a huge collection of apps that all work together.
And they're fantastic, they make life possible.
But when they receive a message,
all they can do is follow the instructions that are written into their code.
So to understand why we get fat,
let's suppose your metabolism is a complicated app called Bank Manager.
Just like every other app,
Bank Manager doesn't know or care how you want it to work.
It just responds to messages and then executes the code.

The rest of your body sends commands to Bank Manager
through chemical messengers called hormones.
Bank manager follows those commands by adjusting the difference
between the calories you consume and the calories you burn,
whether the message is "Grow taller" or "Build bigger muscles",
or "Get fatter".

For example if you're not an adult yet, you're getting taller.
To get taller, your body has to deposit extra calories
into the building and repair fund
and to do that you have to consume more calories than you burn.

Now if we were to explain growing taller using The Piggy Bank Theory,

we would say it like this,

"It's all about the calories in and the calories out."

There are 2000 calories and one inch of muscle and bones,

so if you consume an extra 100 calories for 20 days,

you'll grow exactly one inch taller.

Well, wouldn't that be great?

If you were on the short side, you could just eat, and eat, and eat

until you were nine feet tall and then go play in the NBA.

And talk down to Swedish people.

It's a crew's rule I have to make fun of Andreas at least once, by the way.

But of course that's not how getting taller works.

You get taller because your body releases a chemical called human growth hormone

and that triggers the "Get taller" program.

Human growth hormone makes your bones grow longer,

it makes your muscles and organs grow bigger.

That's why you get taller.

And then to make sure you consume more calories than you burn,

Bank Manager makes you really, really hungry so you eat more.

That's how you grow taller.

That's also why teenagers have such amazing appetites.

But they don't grow taller because they're eating more.

They eat more because they're growing taller.

Now let's suppose your dad is six foot five and he's always complaining
about having to squeeze himself into the stupid little seats on airplanes.
Well, if we apply The Piggy Bank Theory, you could avoid growing as tall as your dad
by eating just a little less than he did when he was growing up.
Do you think that would work?
No, because that's not how Bank Manager is programmed.
If you eat a little less than your dad,
Bank Manager is programmed to find another way
to put those extra calories into the building and repair fund.
How?
By slowing down your metabolism just a little bit
to reduce the daily energy bill.

See, according to The Piggy Bank Theory,
your daily energy bill stays pretty much the same
unless you make it bigger by exercising.
But in fact Bank Manager can crank up and slow down your metabolism quite a bit
and it will, depending on the messages it receives.
That's why some people can consume 56,000 extra calories
and barely gain weight.
That's why people like my wife weigh exactly the same
year in and year out without ever thinking about calories.
Their Bank Manager up-raises and lowers the daily energy bill

to spend the calories they consume.

And that is charac-- excuse me, chemistry, not character.

My wife has a wonderful character, but it's not what it keeps her thin.

Getting fat is also about chemistry, not character.

It begins when those chemical messengers called hormones

command the Bank Manager to fire up the "Get fatter" program.

The "Get Fatter" program is a lot like the "Get taller" program,

only instead of extra calories going into the building and repair fund,

they go into your fat cells.

That's why you get fatter.

And then Bank Manager runs code

to make sure you consume more calories than you burn.

That's how you get fatter.

Here is how powerful the commands from hormones can be.

In one experiment researchers performed the surgery on rats.

They caused their bodies to become flooded with "Get fat" hormones.

The rats began eating like crazy and they got fat.

Now at this point people who believe in The Piggy Bank Theory would say,

"Uh-huh, they ate too much, it's too many calories.

That's why they got fat."

But wait a second!

Later researchers performed the same surgery on a different group of rats

and this time they didn't let them eat more.

Guess what?

Those rats got just as fat just as quickly.

Because when they weren't allowed to eat more,

Bank Manager followed the "Get fat" command

by drastically lowering the daily energy bill instead.

I saw a documentary called the Science of Obesity

and part of it featured a woman who'd been lean her entire life

and then all of a sudden she got fat, she got very fat.

She cut her calories down to 1500 per day and continued getting fatter.

Now was she consuming more calories than she burned?

Yeah, absolutely.

That is always how we gain weight.

But was consuming more calories than she burned, why she was getting fatter?

No.

Eventually a doctor figured out why she was getting fatter.

She had a small tumor on her brain

that was causing her body to become flooded with "Get fat" hormones.

That hormonal command was so powerful,

Bank Manager kept lowering her metabolism

to make sure she was consuming more calories than she burned

even when she only ate 1500 calories per day.

Now if you're getting fatter I'm not suggesting you have a brain tumor.
That's a very rare condition, but something in your body
is telling your Bank Manager app to run the "Get fatter" program.
Consuming more calories than you burn is not the cause of the problem.
It's the result of the "Get fatter" command.

Now at this point you might be thinking something like,
"Okay, I understand. Bank Manager can slow down my metabolism.
But if I keep on eating less, keep cutting calories,
I have to lose weight at some point."
Bank Manager can't reduce the energy bill to zero.
And that's true.
If you are willing to starve yourself,
at some point Bank Manager has to withdraw calories from the fat cells
to pay the daily energy bill.
But starving yourself to become thin is a terrible idea
and it almost never works in the long run.
If you watch shows like The Biggest Loser,
you've seen people lose a lot of weight by starving themselves.
Here is what you didn't see.
Most of the contestants were miserable the whole time
and most of them gained back the weight as soon as the show was over.
So why does that happen?
If we want to lose weight by starving ourselves,
why won't Bank Manager just go along with the plan?

The answer is that your body is trying to protect itself.

A while back I read a wonderful book called "The Happiness Hypothesis"

written by a psychologist named Jonathan Haidt.

As Dr. Haidt explains

your body and your unconscious mind are kind of like an elephant.

Your conscious mind, the part of you that thinks and makes plans

is like a rider on top of the elephant.

The rider likes to think he's in control and often it seems that he is,

because he is telling the elephant where to go. Right?

Well, what you think would happen

if the rider tried to walk the elephant into a forest fire?

I'm pretty sure you can guess.

The elephant would turn, run the other way

and the rider would realize he was not in control after all.

And that's because our conscious minds are like software

that's only two or three generations old.

But your body's apps are version 100,000 or higher.

They have been perfected since the dawn of time

and they all serve one purpose - to keep your body alive.

And if there is one instruction

coded into every app for every living creature on earth it's this...

Don't starve!

You may think it's a fine idea to go hungry for weeks on end

to look better in a swimsuit, but your body disagrees

and when you fight your body, your body wins,

because your conscious mind can set goals, it can make plans,

but it cannot change the instructions that are written into the elephant's code.

Or as Dr. Haidt put it...

When the elephant really wants to do something, I'm no match for him.

The rider cannot order the elephant around against its will.

Now again according to The Piggy Bank Theory, all you have to do is eat a lot less

and your body is going to automatically withdraw calories from your fat cells

to pay the daily energy bill.

The problem is that is not how the elephant is programmed.

If your body believes it's in danger of running out of fuel,

it will send chemical messages to the Bank Manager

that say "Starvation emergency! Fire up the survival program!"

And survival means keeping the Piggy Bank as full as possible.

So depending on how your body is programmed,

your Bank Manager app will slow down your metabolism

and reduce your body heat to lower the daily energy bill,

release chemicals that make you feel lethargic or depressed

so you don't waste fuel by running around and burning calories.

It'll break down your muscles and burn muscle tissue for fuel instead of fat

and it can reprogram your body chemistry

to make getting fat easier than before

to survive the next starvation emergency.

Remember those mice who had their calories cut by 5%

and ended up with bigger fat cells?

Their bodies interpreted less food as a starvation emergency.

Their Bank Manager app responded by drastically lowering the daily energy bill

to store more fat.

In fact bank manager was so determined to store fat,

they burned muscle tissue for fuel instead of fat.

They ended up with bigger fat cells and smaller muscles,

all because they interpreted less food as a starvation emergency.

And that is why advice based on The Piggy Bank Theory

can completely backfire.

You try starving yourself, but bank manager slows down your metabolism,

so you stop losing weight.

Bank Manager releases those chemicals that make you feel tired and depressed,

so you want to get out and move around more.

Meanwhile you're getting hungrier and hungrier,

until the elephant finally panics, runs the other way,

and that's when you say, "I can't stand this anymore. I give up."

So you go back to eating just as much as you did before.

But remember, Bank Manager just slowed down your metabolism

to reduce the daily energy bill.

So you not only gain back what you lost.

There's a good chance you end up fatter than you were before.

And who do you blame?

Probably yourself.

Maybe with a little help from these guys.

If there's one thing I hope you understand after reading this book, it's this:

If you tried to lose weight by following advice based on The Piggy Bank Theory

and couldn't do it... you didn't fail.

The diet failed, the advice failed, The Piggy Bank Theory failed.

And it failed because it's based on simple math

that works just fine with The Piggy Bank, but not with human biology,

because that is not how your body is programmed.

Which is why one researcher wrote this:

"The commonly held belief that obese individuals can ameliorate their condition

"by simply deciding to eat less and exercise more

is at odds with compelling scientific evidence."

Now here's the good news - you can shrink the Piggy Bank.

I've done it despite being a fat guy for much of my life

and so of millions of other people.

But to lose fat and keep it off, you have to work with the code

that is written into your body's chemistry, not against it.

You have to burn more calories than you consume

without triggering your body starvation emergency program.

And that means instead of going hungry all the time,

you have to change the messages your body sends to the Bank Manager app.

You have to stop triggering the "Get fatter" program.

You have to stop sending messages that fire up the "Get hungry" program

when you shouldn't really be hungry.

You change the messages your body sends to Bank Manager

by changing the kinds of food you eat, not how much.

So let's talk about food

and why different foods send different messages.

That's it!