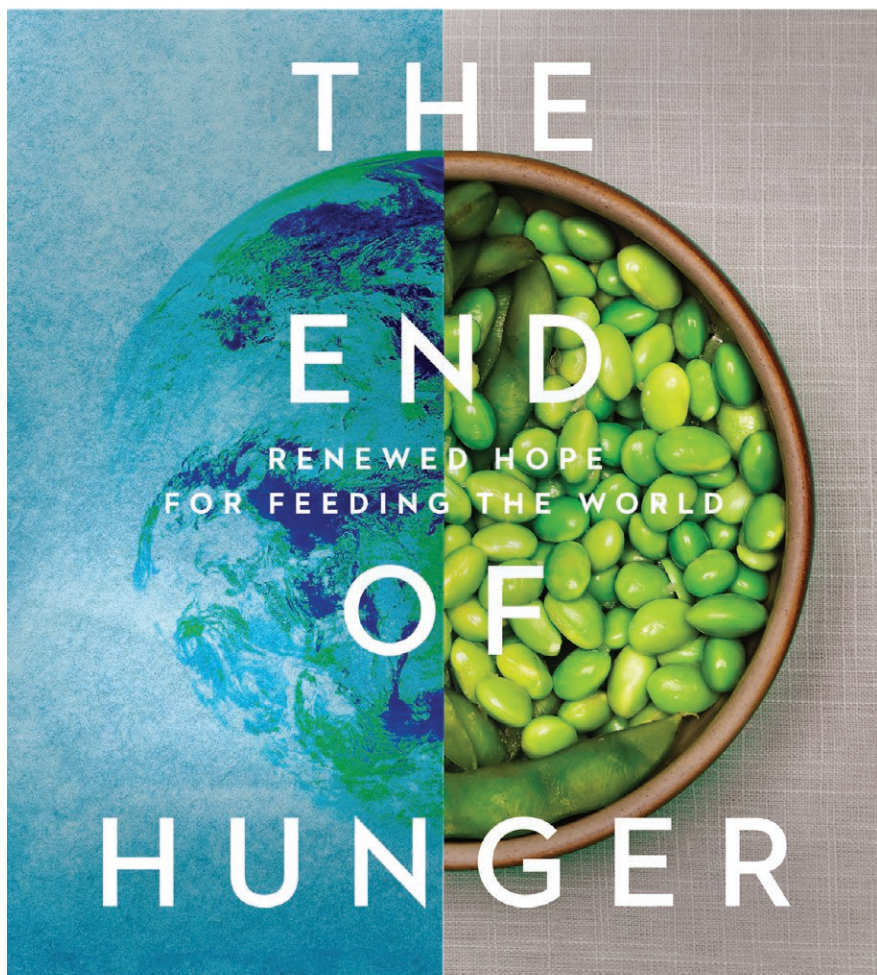


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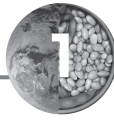


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InterVarsity Press  
ivpress.com

Taken from *The End of Hunger: Renewed Hope for Feeding the World*  
edited by Jenny Eaton Dyer and Cathleen Falsani.  
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Published by InterVarsity Press, Downers Grove, IL. [www.ivpress.com](http://www.ivpress.com).



# HUNGER AND YOUR BRAIN

*Feed the Hungry. You'll Feel Better Too.*

MIKE McHARGUE

**W**hen I die, the coroner will probably write “pizza” on the death certificate as my cause of death. My devotion to food and eating doesn’t end with those miraculous, savory pies we call pizza. I start to fantasize about lunch about an hour after breakfast. Dinner springs to mind by about two in the afternoon. My life is completely centered around mealtimes, and there’s no recurring train of thought in my life more common than, “What am I eating next?”

If I miss a meal by more than a few hours, my usually sanguine disposition evaporates. In doing so, an acrid bed of irritability and confusion is exposed. To paraphrase Bruce Banner, “You wouldn’t like me when I’m hungry.”

So, it probably comes as no surprise that I’ve never managed to make it more than a few hours into a spiritual fast without giving up. Years ago, as I trained for a marathon, I carried food with me, so I could snack as the hours rolled by, and my feet went numb. Still, for someone who *feels* hungry all the time, I have no idea what it’s really like to be *actually* hungry. None at all.

Hunger is a complex biological process, and I’ve only experienced its beginning stages. Those start in the stomach. A couple of hours after your last meal, your stomach begins to contract in order to sweep

any remaining food into your intestines. Sometimes, this causes a rumble or two, which are called borborygmus. Once the stomach is emptied, your insulin and blood sugar levels start to drop, and the body responds by producing a hormone called ghrelin.

Ghrelin stimulates the hypothalamus in your brain. The hypothalamus is buried deep within your brain and regulates some of our most basic bodily functions, such as sleep, thirst, and sex drive. In response to the ghrelin message, the hypothalamus produces a neurotransmitter—neuropeptide Y—that you experience as appetite.

So, you eat.

I choose pizza most of the time, but you may have a healthier relationship to food than I do. The body has a couple of systems to help you feel full, involving the hormone leptin and the vagus nerve, but don't worry about that. Just know that as long as you eat every six to eight hours, your hunger cycle is quite shallow.

That's because you don't deplete your glycogen stores. You're restocking those shelves before they run dry, and you're able to keep producing glucose on demand—which is great. Your brain basically runs on glucose. Twenty-five percent of the glucose your body uses goes to your brain.

But what happens when you don't eat for longer than six to eight hours? Well, you run out of glycogen and get “hangry,” or hungry-and-angry. I know all about *hangriness*, and I'm insufferable when I reach this state.

By the time you reach this point, your body enters a metabolic state called ketosis where it starts burning fat stores instead of glucose.

When your body burns fat, it produces fatty acids, which are much larger molecules than the glucose your brain usually consumes. They're so large, in fact, that they can't cross the blood-brain barrier at all. Your brain recognizes there's no glucose available and starts to consume ketone chains instead, which are derived from the fatty acids that come from burning fat cells.

If you've heard of the keto diet, that's a fad designed to make your body think it's starving. You don't have to be starving to be in a state of ketosis: low-carb diets and intense or endurance exercise can get you there. And, ketosis does burn fat—but at a cost. Only about 75 percent of the energy your brain needs can be supplied by ketosis.

Depending on how long you sleep, and how many hours before bed time you ate, it's entirely possible to go into ketosis while you sleep. This state of ketosis can play a role in feeling foggy or less sharp than normal. Your cognitive functions are impaired while you're in a state of ketosis.

What happens when you go even longer without eating? After seventy-two hours or so, your body changes strategies. Your brain needs glucose, and your body breaks down protein into amino acids, which can then be transformed into glucose.

But if you aren't eating, where can your body get this essential protein?

From your muscle tissue and internal organs—including your heart. That's where. Then your bones start to lose density as well. If you don't eat for a week or two, you become so depleted of vitamins and minerals that your immune system starts to shut down.

When you're starving, there's a good chance that an opportunistic infection will kill you before starvation does. If an infection doesn't get you, perhaps cardiac arrest or organ failure will.

This is why I say I don't know what hunger is like. I've only ever experienced the normal appetite of someone who is well-fed. I've never had to break down muscle tissue to keep my brain going, or had my immune system start to shut down because of malnutrition.

But, one in nine people living on this planet right now is intimately familiar with hunger—*actual* hunger. They go to bed hungry most of the time.

This kind of chronic hunger is physically debilitating. Imagine you have just enough food to keep yourself in a nearly constant state of

ketosis, with a brain so starved for glucose that it asks the body to perform cellular autocannibalism.

Think about the kinds of enduring hardships that are required for a person not to eat. Who would choose such a thing? It takes a natural disaster or utter economic stagnation for most of us in the developed world to miss very many meals in a row.

And yet, more than 700 million people worldwide are hungry, starving, or malnourished.

Science can describe hunger and starvation with startling clarity. But, it also can measure the amount of food required to feed the world—and, of course, we already grow enough food to feed every person living on Earth. What we're lacking is not the capacity to produce food, but the will to make sure the food we grow makes it into hungry bellies everywhere.



As a Christian, I am grieved by hunger. The Bible is absolutely packed with admonishments for those with plenty to share what they have with those who don't have enough. The poor. The hungry. The homeless. The prophet Isaiah put it like this:

If you spend yourselves in behalf of the hungry  
and satisfy the needs of the oppressed,  
then your light will rise in the darkness,  
and your night will become like the noonday.” (Isaiah 58:10)

In the New Testament letter that bears his name, James says our faith is dead if we refuse to meet the physical needs of others. This is from the second chapter of the Epistle of James: “Suppose a brother or a sister is without clothes and daily food. If one of you says to them, ‘Go in peace; keep warm and well fed,’ but does nothing about their

physical needs, what good is it? In the same way, faith by itself, if it is not accompanied by action, is dead” (James 2:15-17).

Proverbs says it particularly poignantly: “The generous will themselves be blessed for they share their food with the poor” (Proverbs 22:9). If you’re thrown off by the “bountiful eye,” then think of the Gospel of Matthew, which says, “The eye is the lamp of the body” (Matthew 6:22). Often when Scripture speaks of our eyes, it’s talking about the condition of our character, or even our souls.

We don’t need biology to understand how horrific starvation is—the authors of our Holy Scriptures knew, and told us that God is pleased when we share what we have to feed others.

We have plenty of food to feed everyone. So, in a world where American Christians have incredible, even historic, wealth—how can so many people go hungry?

I can think of more than 700 million reasons.

Our brains work best when we are trying to understand or comprehend communities of around 150 people. Any time you get people together in a group that is small enough for each person to know everyone else, we humans can be remarkably altruistic. The kinds of polarizing social labels we use to divide ourselves in social conflict don’t hold up in smaller groups.

We may bristle when people describe themselves as “liberal” if we see ourselves as “conservative,” and we may even demean and degrade each other on Facebook or Twitter. But in person, when we can see the facial expressions and body language emerge from the object of our scorn, it tends to melt away rage and replace it with something else: empathy.

The more someone is hurt, the more we can see their pain, the more empathy we feel. If we insult someone and they look sad, or cry, we can’t maintain our anger. We feel their pain. If someone is injured, we respond even more readily. And who, when faced with a person obviously starving to death, could turn them away?

Very few of us, indeed.

But when I tell you that more than 700 million people in the world are hungry, that's a scale your empathy isn't equipped to handle. Even if that bit of information prompts you to think deeply about the problem, your empathy will swell to the point where you become overwhelmed and, therefore, unable to act. Paralyzed. Imagining hundreds of millions of starving children doesn't usually motivate us. Instead, we shut down as our brains try to defend themselves through emotional defense mechanisms.

Now, if you're a person who never thinks about the hungry, it's time to do so. Make an effort to open your mind, and your heart. But, if you're a person who feels overwhelmed or even grieved by the magnitude of hunger in our world, I have great news. There's a scientifically proven solution to make you feel better: *take action*.

When you take some meaningful action to help others, including giving to charity and contacting elected officials on behalf of people in need, your brain releases several substances that neuroscientists call the "happiness trifecta": oxytocin, serotonin, and dopamine.

In today's world, that trifecta can be hard to come by. We're surrounded by a twenty-four-hour news cycle, geopolitical strife, and ever-deepening polarization. But, when we help, really and truly help, we push back the fog of anxiety, sadness, and anger, and we experience true joy.

Shifting our lives in this way has profound health benefits. When we help others, we don't just make their lives better—we feel better too. You may find that it's easier to maintain a healthy weight and that you are at a lower risk for heart attack or stroke when you take action to help others.

We are designed to help others. And we are built to give to others. Our culture may tell us that happiness comes from buying things, or taking exotic vacations, or looking beautiful and sexy. But that's a lie.



Modern science and our faith are in total agreement that true joy belongs to those who help those in need.

You can feel better. Right now.

Just turn to the Next Steps section of this book. There you'll find a list of actions—practical steps you can take to help alleviate hunger.

Pick one and do it.

And do it now. (You can thank me later.)

**BUY THE BOOK!**

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