

FITNESS & NUTRITION
COACHING BREAKTHROUGHS

**CALORIES,
HORMONES,
AND WEIGHT
CONTROL**

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THE TRUTH ABOUT CALORIES, HORMONES, AND WEIGHT CONTROL

Learn the science of energy balance—and what to do when diet and exercise “aren’t working.”

By John Berardi, Ph.D.

“You’re either with me, or you’re against me.”

Everyone’s heard this one. But did you know the health and fitness industry has its own version of the saying? It goes: “You’re either with me, or you’re stupid.”

I kid, of course!

But this kind of binary mindset *does* fuel plenty of heated debates. Especially when it comes to one topic in particular: “calories in vs. calories out,” or CICO.

CICO is an easy way of saying:

- When you take in more energy than you burn, you gain weight.
- When you take in less energy than you burn, you lose weight.

This is a fundamental concept in body weight regulation, and about as close to scientific fact as we can get.

Then why is CICO the source of so much disagreement?

It’s all about the extremes.

At one end of the debate there’s a group who believes CICO is straightforward. If you aren’t losing weight, the reason is simple: You’re either eating too many calories, or not moving enough, or both. Just eat less and move more.

At the other end is a group who believes CICO is broken (or even a complete myth). These critics say it doesn't account for hormone imbalances, insulin resistance, polycystic ovary syndrome (PCOS), and other health problems that affect metabolism. They often claim certain diets and foods provide a “metabolic advantage,” helping you lose weight without worrying about CICO.

Neither viewpoint is completely wrong.

But neither is completely right, either.

Whether you're a health and fitness coach tasked with helping clients manage their weight—or you're trying to learn how to do that for yourself—adopting an extreme position on this topic is problematic; it prevents you from seeing the bigger picture.

This lesson will add some nuance to the debate and help you figure out how to troubleshoot your toughest cases.

Rethinking common misconceptions.

Much of the CICO debate—as with many other debates—stems from misconceptions, oversimplifications, and a failure (by both sides) to find a shared understanding of concepts. So let's start by getting everyone on the same page for a change.

CICO goes beyond food and exercise.

There's an important distinction to be made between CICO and “eat less, move more.” But people, especially some CICO advocates, tend to conflate the two.

“Eat less, move more” only takes into account the calories you eat and the calories you burn through exercise and other daily movement. But CICO is really an informal way of expressing the Energy Balance Equation, which is *far* more involved.

The Energy Balance Equation—and therefore CICO—includes all the complex inner workings of the body, as well as the external factors that ultimately impact “calories in” and “calories out.”

Imperative to this, and often overlooked, is your brain. It’s constantly monitoring and controlling CICO. Think of it as mission control, sending and receiving messages that involve your gut, hormones, organs, muscles, bones, fat cells, external stimuli (and more), to help balance “energy in” and “energy out.”

It’s one hell of a complicated—and beautiful—system.

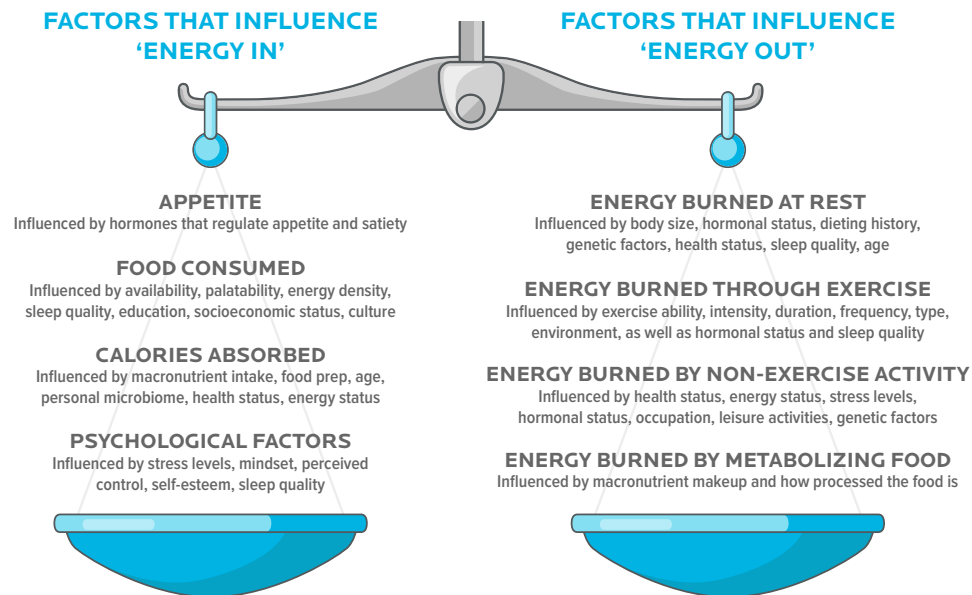
Yet the Energy Balance Equation itself looks really simple. Here it is:

- $[\text{Energy in}] - [\text{Energy out}] = \text{Changes in body stores}^*$

* Body stores refers to all the tissues available for breakdown, such as fat, muscle, organ, and bone. I purposely haven’t used “change in body weight” here because I want to exclude water weight, which can change body weight independent of energy balance. In other words, water is a confusing, confounding variable that tricks people into thinking energy balance is broken when it’s not.

With this equation, “energy in” and “energy out” aren’t just calories from food and exercise. As you can see in the illustration below, all kinds of factors influence these two variables.

ENERGY BALANCE



This isn't a comprehensive list of factors, but rather a snapshot of the most common ones. It's important to know that elements on both sides of the scale are influenced by: each other, hormones (e.g. leptin, thyroid), sleep, stress, medical conditions, pharmaceuticals, and more. This means none of these things invalidate CICO. Rather, they influence how many calories we absorb and how many we burn. And this is what leads to weight gain or loss.

For more info: precisionnutrition.com/calories-in-calories-out
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Adapted from Alan Aragon's CICO scale, alananaragon.com



When you view CICO through this lens—by zooming out for a wider perspective—you can see boiling it down to “eat less, move more” is a significant oversimplification.

Calorie calculators and CICO aren't the same.

Many people use calorie calculators to estimate their energy needs, and to approximate how many calories they've eaten. But sometimes these tools don't seem to work. As a result, these individuals start to question whether CICO is broken. (Or whether they're broken).



The key words here are “estimate” and “approximate.”

That’s because calorie calculators aren’t necessarily accurate.

For starters, they provide an output based on averages, and can be off by as much as 20-30 percent in normal, young, healthy people.

They may vary even more in older, clinical, or obese populations.

And that’s just on the “energy out” side.

The number of calories you eat—also known as your “energy in”—is also just an estimate.

For example, the FDA allows inaccuracies of up to 20 percent on label calorie counts, and research shows restaurant nutrition information can be off by 100-300 calories per food item.

What’s more, even if you were able to accurately weigh and measure every morsel you eat, you still wouldn’t have an exact “calories in” number. That’s because there are other confounding factors, such as:

- We don’t absorb all of the calories we consume. And absorption rates vary across food types. (Example: We absorb more calories than estimated from fiber-rich foods, and less calories than estimated from nuts and seeds.)
- We all absorb calories uniquely based on each person’s individual gut bacteria.
- Cooking, blending, or chopping food generally makes more

calories available for absorption than what may appear on a nutrition label.

Of course, this doesn't mean CICO doesn't work. It only means the tools we have to estimate “calories in” and “calories out” are limited.

To be crystal clear: Calorie calculators can still be very helpful for some people. But it's important to be aware of their limitations. If you're going to use one, do so as a rough starting point, not a definitive “answer.”

CICO doesn't *require* calorie counting.

At Precision Nutrition, sometimes we use calorie counting to help clients improve their food intake. Other times we use hand portions. And other times we use more intuitive approaches.

For example, let's say a client wants to lose weight, but they're not seeing the results they want. If they're counting calories or using hand portions, we might use those numbers as a reference to further reduce the amount of food they're eating. But we also might encourage them to use other techniques instead. Like eating slowly, or until they're 80 percent full.

In every case—whether we're talking numbers or not—we're manipulating “energy in.” Sometimes directly; sometimes indirectly.

So make no mistake: Even when we're not explicitly “counting calories,” CICO still applies.

CICO might sound simple, but it's not.

There's no getting around it: If you (or a client) aren't losing weight, you either need to decrease "energy in" or increase "energy out." But as you've already seen, that may involve far more than just pushing away your plate or spending more time at the gym.

For instance, it may require you (or your clients) to:

- Get more **high-quality sleep** to better regulate hunger hormones, improve recovery, and increase metabolic output
- Try stress resilience techniques like **meditation, deep breathing, and spending time in nature**
- Increase your daily non-exercise movement by **parking the car a few blocks away** from your destination, **taking the stairs**, and/or **standing while you work**
- Trade some high-intensity exercise for **lower-intensity activities**, in order to aid recovery and reduce systemic stress
- Improve the **quality of what you're eating**, as opposed to reducing the quantity. This can allow you to eat more food with fewer total calories
- Tinker with the macronutrient makeup of what you eat. For example: eating **more protein and fiber**, or **increasing carbs and lowering fats**, or **vice versa**
- Experiment with the **frequency and timing of your meals** and snacks, based on personal preferences and appetite cues

- Consider **temporarily tracking your food intake**—via hand portions or weighing/measuring—to ensure you’re eating what you think you’re eating (as closely as reasonably possible)
- Evaluate and correct **nutritional deficiencies**, for more energy during workouts (and in everyday life)
- **Consult with your physician** or specialists if consistent lifestyle changes aren’t moving the needle

Sometimes the solutions are obvious; sometimes they aren’t. But with CICO, the answers are there, if you keep your mind open and examine every factor.

Imagine yourself a “calorie conductor” who oversees and fine-tunes many actions to create metabolic harmony. You’re looking for anything that could be out of sync.

This takes lots of practice.

So, to help, here are 5 common energy balance dilemmas. In each case, it might be tempting to assume CICO doesn’t apply. But look a little deeper, and you’ll see the principles of CICO are always present.

5 common energy balance dilemmas.

Dilemma #1: “I’ve been eating the same way forever, but suddenly I started gaining weight.”

Can you guess what happened?

More than likely, “energy in” or “energy out” *did* change, but in a way that felt out of control or unnoticeable.

The culprit could be:

- Slight increases in food intake, due to changes in mood, hunger, or stress
- An increase in the amount of energy absorbed—caused by new medication, an unknown medical condition, or a history of chronic dieting. (Later in this lesson, we’ll provide an extensive list of medications that could influence “energy in” or “energy out”)
- Physiological changes that resulted in fewer calories burned during exercise and at rest
- The onset of chronic pain, provoking a dramatic decrease in non-exercise activity thermogenesis (NEAT)
- Significant changes to sleep quality and/or quantity, impacting metabolic output and/or food consumed

In all of these cases, CICO is still valid. Energy balance just shifted in subtle ways, due to lifestyle and health status changes, making it hard to recognize.

Dilemma #2: “My hormones are wreaking havoc on my metabolism, and I can’t stop gaining weight. Help!”

Hormones seem like a logical scapegoat for weight changes.

And while they’re probably not to blame as often as people think,

hormones are intricately entwined with energy balance.

But even so, they don't operate independently of energy balance.

In other words, people don't gain weight because "hormones."

They gain weight because their hormones are impacting their energy balance. This often happens during menopause or when thyroid hormone levels decline.

Take, for example, triiodothyronine (T3) and thyroxine (T4), two thyroid hormones that are incredibly important for metabolic function. If levels of these hormones diminish, weight gain may occur. **But this doesn't negate CICO: Your hormones are simply influencing "energy out."**

This may seem a bit like splitting hairs, but it's an important connection to make, whether we're talking about menopause or thyroid problems or insulin resistance or other hormonal issues.

By understanding CICO is the true determinant of weight loss, you'll have many more tools for achieving the outcome you want.

Suppose you're working from the false premise hormones are the *only* thing that matters. This can lead to increasingly unhelpful decisions, like spending a large sum of money on unnecessary supplements, or adhering to an overly restrictive diet that backfires in the long run.

Instead, you know results are dependent on the fact that "energy in" or "energy out" has changed. Now, this change *can* be due to

hormones, and if so, you'll have to make adjustments to your eating, exercise, and/or lifestyle habits to account for it. (This could include taking medication prescribed by your doctor, if appropriate.)

Research suggests people with mild (10-15 percent of the population) to moderate hypothyroidism (2-3 percent) may experience a metabolic slow down of 140 to 360 calories a day.

That can be enough to lead to weight gain, or make it harder to lose weight. (One caveat: Mild hypothyroidism can be so mild many people don't experience a significant shift in metabolic activity, making it a non-issue.)

What's more, women suffering from polycystic ovary syndrome, or PCOS (about 5-10 percent), and those going through menopause, may also experience hormonal changes that disrupt energy balance.

So, it's important to understand your (or your client's) health status, as that will provide valuable information about the unique challenges involved and how you should proceed.

Dilemma #3: “I’m only eating 1,000 calories a day and I’m still not losing weight!”

So what gives?

The conclusion most people jump to: Their metabolism is broken. They're broken. And CICO is broken.

But here's the deal: Metabolic damage isn't really a thing. Even though it may seem that way.

Now, their energy balance challenge could be related to a hormonal issue, as discussed above. However, when someone's eating 1,000 calories a day but not losing weight, it's *usually* due to one of the two reasons that follow.

(No matter how simple they sound, this is what we've seen over and over again in our coaching program, with over 100,000 clients.)

Reason #1: People often underestimate their calorie intake.

It's easy to miscalculate how much you're eating, as it's usually unintentional. The most typical ways people do it:

- They underestimate portions. (For example, without precisely measuring “one tablespoon of peanut butter,” it might actually be two, which adds 90 calories each time you do it)
- They don't track bites, licks, and tastes of calorie-dense foods. (For example, your kid's leftover mac and cheese could easily add 100 calories)
- They don't record everything in the moment and forget to log it later on
- They “forget” to count foods they'd wished they hadn't eaten

Don't believe this can be a big issue?

A landmark study, and repeated followup studies, found people often underestimate how much they eat over the course of a day, sometimes by more than 1,000 calories.

I'm not bringing this research up to suggest it's impossible to be realistic about portion sizes. But if you (or your clients) aren't seeing results on a low-calorie diet, it's worth considering that underestimation may be the problem.

Reason #2: People overeat on the weekends.

Work weeks can be stressful and when Friday night rolls around, people put their guard down and let loose. (*You probably can't relate, but just try, okay?*)

Here's how it goes: Let's say a person is eating 1,500 calories a day on weekdays, which would give them an approximate 500-calorie deficit.

But on the weekends, they deviate from their plan just a little.

- Drinks with friends and a few slices of late night pizza on Friday
- An extra big lunch after their workout on Saturday
- Brunch on Sunday ("Hey, it's breakfast *and* lunch, so I'm going to eat double!")

The final tally: An *extra* 4,000 calories consumed between Friday night and Sunday afternoon. They've effectively canceled out their deficit, bumping their average daily calories to 2,071.

The upshot: If you (or your client) have slashed your calories dramatically, but you aren't seeing the expected results, look for the small slips. It's like being a metabolic detective who's following—perhaps literally—the bread crumbs.

(By the way, we'll address how to help clients stop weekend overeating in Lesson 2.)

Dilemma #4: “I’m eating as much as I want and still losing weight, so this diet is better than all the others!”

This might be the top reason some people reject CICO.

Say someone switches from a diet of mostly processed foods to one made up of mostly whole, plant-based foods. They might find they can eat as much food as they want, yet the pounds still melt away.

People often believe this is due to the “power of plants.”

Yes, plants are great, but this doesn't disprove energy balance.

Because plant foods have a very-low energy density, you can eat a lot of them and still be in a calorie deficit. Especially if your previous intake was filled with lots of processed, hyperpalatable “indulgent foods.”

It *feels* like you're eating much more food than ever before—and, in fact, you really might be.

On top of that, you might also feel more satiated because of the volume, fiber, and water content of the plants.

All of which is great. Truly. But it doesn't negate CICO.

Or take the ketogenic diet, for example. Here, someone might have a similar experience of “eating as much as they want” and still losing weight, but instead of plant foods, they're eating meat, cheese, and eggs. Those aren't low-calorie foods, and they don't have much fiber, either.

As a result, plenty of low-carb advocates claim keto offers a “metabolic advantage” over other diets.

Here's what's most likely happening:

- Greater intake of protein increases satiety and reduces appetite
- Limited food choices have cut out hundreds of highly-processed calories they might have eaten otherwise (Pasta! Chips! Cookies!)
- Reduced food options can also lead to “sensory-specific satiety.” Meaning, when you eat the same foods all the time, they may become less appealing to you, so you're not driven to eat as much
- Liquid calories—soda, juice, even milk—are generally off limits, so a greater proportion of calories are consumed from solid foods, which are more filling
- Higher blood levels of ketones—which rise when carbs are restricted—seem to suppress appetite

For these reasons, people often tend to eat fewer calories *and* feel less hungry.

Although it might seem magical, the keto diet results in weight loss by regulating “energy in” through a variety of ways.

You might ask: If plant-based and keto diets work so well, why should anyone care if it’s because of CICO, or for some other reason?

Because depending on the person—food preferences, lifestyle, activity level, and so on—many diets, including plant-based and keto, aren’t sustainable long-term. This is particularly true of the more restrictive approaches.

And if you (or your client) believe there’s only one “best diet,” you may become frustrated if you aren’t able to stick to it. You may view yourself as a failure and decide you lack the discipline to lose weight. You may even think you should stop trying.

None of which are true.

Your results aren’t diet dependent. They’re behavior dependent.

Maintaining a healthy body (including a healthy body weight) is about developing consistent, sustainable daily habits that help you positively impact “energy in” and “energy out.”

This might be accomplished while enjoying the foods you love, by:

- Eating until you’re 80 percent full
- Eating slowly and mindfully
- Eating more minimally processed foods

- Getting more high quality sleep
- Taking steps to reduce stress and build resilience

It's about viewing CICO from 30,000 feet and figuring out what approach feels sane—and achievable—for *you* (or your client).

Sure, that might include a plant-based or a keto diet, but it absolutely might not, too. And you know what?

You can get great results either way.

Dilemma #5: “I want to gain weight, but no matter how much I eat, I can't seem to.”

The CICO conversation doesn't always revolve around weight loss.

Some people struggle to gain weight.

Especially younger athletes and people who are very, very active at work. (Think: jobs that involve manual labor.)

It also happens with those who are trying to regain lost weight after an illness.

When someone intentionally eats more food but can't pack on the pounds, it may seem like CICO is invalidated. (Surprise.)

They often feel like they're stuffing themselves—“I'm eating everything in sight!”—and it's just not working. But here's what our coaches have found:

People tend to remember extremes.

Someone might have had six meals in one day, eating as much as they felt like they could stand.

But the following day, they only ate two meals because they were still so full. Maybe they were really busy, too, so they didn't even think much about it.

The first day—the one where they stuffed themselves—would likely stand out a lot more than the day they ate in accordance with their hunger levels. That's just human nature.

It's easy to see how CICO is involved here. It's lack of consistency on the “energy in” part of the equation.

One solution: Instead of stuffing yourself with 3,000 calories one day, and then eating 1,500 the next, aim for a calorie intake just above the middle you can stick with, and increase it in small amounts over time, if needed.

People often increase activity when they increase calories.

When some people suddenly have more available energy—from eating more food—they're more likely to do things that increase their energy out. Like taking the stairs, pacing while on the phone, and fidgeting in their seats.

They might even push themselves harder during a workout than they would normally.

This can be both subconscious and subtle.

And though it might sound weird, our coaches have identified this as a legitimate problem for “hardgainers.”

Your charge: Take notice of *all* your activity. If you can't curtail some of it, you may have to compensate by eating even more food. Nutrient- and calorie-dense foods like nut butters, whole grains, and oils can help, especially if you're challenged by your lack of appetite.

3 strategies to game the system.

Once you accept that CICO is both complex and inescapable, you may find yourself up against one very common challenge.

Namely: “I can't eat any less than I am now!”

This is one of the top reasons people abandon their weight loss efforts or go searching in vain for a miracle diet.

But here are three simple strategies you (or your clients) can use to create a caloric deficit, even if it seems impossible. It's all about figuring out which one works best for you.

Maximize protein and fiber.

Consuming higher amounts of protein increases satiety, helping you feel more satisfied *between* meals. And consuming higher amounts of fiber increases satiation, helping you feel more satisfied *during* meals.

These are both proven in research and practice to help you feel more satisfied overall while eating fewer calories, leading to easier fat loss.

This advice can sound trite, I know. In fact, someday when there are nutrition coach robots, “eat more protein and fiber” will probably be the first thing they’re programmed to say.

But the truth is, most people trying to lose weight still aren’t focused on getting plenty of these two nutrients.

And you know what? It’s not their fault.

When it comes to diets, almost everyone has been told to *subtract*. Take away the “bad” stuff, and *only* eat the “good” stuff.

But there’s another approach: Just start by adding.

If you make a concerted effort to increase protein (especially lean protein) and fiber intake (especially from vegetables), you’ll feel more satisfied.

You’ll also be less tempted by all the foods you think you should be avoiding. This helps to automatically “crowd out” ultra-processed foods.

Which leads to another big benefit: By eating more whole foods and fewer of the processed kind, you’re actually retraining your brain to desire those indulgent, ultra-processed foods less.

That’s when a cool thing happens: You start eating fewer calories without actively trying to—rather than purposely restricting because you have to.

That makes weight loss easier.

Starting is simple: For protein, add one palm of relatively lean protein—chicken, fish, tempeh—to one meal. This is beyond what you would have had otherwise. Or have a Super Shake as a meal or snack.

For fiber, add one serving of high-fiber food—in particular vegetables, fruit, lentils and beans—to your regular intake. This might mean having an apple for a snack, including a fistful of roasted carrots at dinner, or tossing in a handful of spinach in your Super Shake.

Try this for two weeks, and then add another palm of lean protein, and one more serving of high-fiber foods.

Besides all the upside we've discussed so far, there's also this: Coming to the table with a mindset of abundance—rather than scarcity—can help you avoid those anxious, frustrated feelings that often come with being deprived of the foods you love.

So instead of saying, “Ugh, I really don't think I can give up my nightly wine and chocolate habit,” you might say, “Hey, look at all this delicious, healthy food I can feed my body!”

(And by the way, you don't actually have to give up your wine and chocolate habit, at least not to *initiate* progress.)

Shift your perspective.

Imagine you're on vacation. You slept in and missed breakfast.

Of course, you don't really mind because you're relaxed and having a great time. And there's no reason to panic: Lunch will happen.

But since you've removed a meal, you end up eating a few hundred calories less than normal for the day, effectively creating a deficit.

Given you're in an environment where you feel calm and happy, you hardly even notice.

Now suppose you wake up on a regular day, and you're actively trying to lose weight. (To get ready for vacation!)

You might think: "I only get to have my 400-calorie breakfast, and it's not enough food. This is the worst. I'm going to be so hungry all day!"

So you head to work feeling stressed and frustrated, counting down the minutes to your next snack or meal. Maybe you even start to feel deprived and miserable.

Here's the thing: You were in a calorie deficit both days, but your subjective experience of each was completely different.

What if you could adjust your thinking to be more like the first scenario rather than the second?

Of course, I'm not suggesting you skip breakfast everyday (unless that's just your preference). But if you can manage to see eating less as something you *happen* to be doing— rather than something you *must* do—it may end up feeling a lot less terrible.

Add activity rather than subtracting calories.

Are you a person who doesn't want to eat less, but would happily move more? If so, you might be able to take advantage of something I've called G-Flux.

G-Flux, also known as “energy flux,” is the total amount of energy that flows in and out of a system.

As an example, say you want to create a 500-calorie deficit. That could look like this:

- Energy in: 2,000 calories
- Energy out: 2,500 calories
- Deficit: 500 calories

But it could also look like this:

- Energy in: 3,000 calories
- Energy out: 3,500 calories
- Deficit: 500 calories

In both scenarios, you've achieved a 500-calorie deficit, but the second allows you to eat a *lot* more food.

That's one benefit of a greater G-Flux.

But there's also another: Research suggests if you're eating food

from high-quality sources and doing a variety of workouts—strength training, conditioning, and recovery work—eating more calories can help you carry more lean mass and less fat.

That’s because the increased exercise doesn’t just serve to boost your “energy out.” It also changes nutrient partitioning, sending more calories toward muscle growth and fewer to your fat cells.

Plus, since you’re eating more food, you have more opportunity to get the quantities of vitamins, minerals, and phytonutrients you need in order to feel your best.

Win. Win. Win.

To be clear, this is a somewhat advanced method. And because metabolism and energy balance are dynamic in nature, the effectiveness of this method may vary from person to person.

Plus, not everyone has the ability or the desire to spend more time exercising. And that’s okay.

But by being flexible with your thinking—and willing to experiment with different ways of influencing CICO—you can find your own personal strategy for tipping energy balance in your (or your clients’) favor.



PRESCRIPTIONS, FITNESS, AND BODY FAT

**Your guide to medications that can
affect client results**

By Krista Scott-Dixon, Ph.D.

Whenever we take on new Precision Nutrition Coaching clients, we ask them about the medications they take, either regularly or occasionally. (And we always encourage our **Precision Nutrition Certified** fitness professionals to do the same).

This isn't just a getting-to-know you game (although we do try to tailor each client's program for their unique needs).

We ask this question because some medications may, in fact, prevent you from losing fat, gaining muscle, and/or improving your athletic performance.

In this part of today's lesson, we'll give you a brief overview of the most common medications our clients are taking when they come to Precision Nutrition. We'll also share some of the potential side effects these medications can produce.

This may not be the most interesting reading, but use it to be aware of potential issues when you start working with a new client, and as a reference to cross-check for clues when clients are struggling.

The pharmaceutical society

We've seen incredible advances in medicine and pharmacology in the last century.

The upside: In industrialized countries, we're living longer and generally better.

We're no longer killed or debilitated by common, curable diseases or nutritional deficiencies.

And we can alleviate many everyday complaints, such as aches and

pains, upset stomach, or allergies.

The downside: We often end up taking a lot of medications to do this.

Most of us take at least one or two medications occasionally. But more and more of us are taking more and more medications chronically.

Our clients and their prescription habits

Many of our clients take some form of medication regularly when they start coaching with us. Because women take more hormones (especially for birth control) as well as experience autoimmune diseases, migraines, anxiety, and depression more than men, **female clients are more likely than men to take medication.**

Over half of our female clients are on something, and often a whole lot of somethings. We've seen female clients taking *ten or more* medications simultaneously.

(Don't feel too smug, gentlemen. **More than one-third of you take medications too.** We know you're popping plenty of pills for your cholesterol, high blood pressure, and upset stomachs.)

Why does medication use matter?

When you think about losing fat and gaining muscle, you might not think about the role that your medications play in getting results.

But in fact, your medication might be affecting—even actively *hampering*—your progress.

Here, we'll look at some of the more common medications, and what effects they can have on your nutrition, fitness, and overall wellness.

At the end of this lesson, we'll give you some suggestions about what to do next.

Important notes

First, three important cautions.

1. We do NOT recommend that you simply quit taking any suspect medications. Don't ever advise your client to do so. *Always* discuss any changes in medication with your doctor and/or pharmacist, and require your clients get their physician's approval.

2. We're NOT saying "medications always bad, pharma-free living always good." We know that for many folks, medications can mean the difference between a good—or functional—day and a horrible day.

If you're on medications, you probably have some well-founded concerns about your health. We're simply offering some information that you may not have considered in making your decisions about whether to take a particular drug.

3. We do NOT cover all the potential side effects of a given prescription or OTC medication. These side effects are just those relevant to people who are looking to lose fat, gain muscle, and/or improve their athletic performance.

What did we look at?

Medication types

Again, we compiled this list from new client intake data in our coaching programs. So this is information from thousands of people.

While our clients are taking a wide roster of medications, here are some of the most common medication types they took regularly or occasionally.

Top medication types by gender

Men

Women

Anti-hypertensive

Anti-depressant/anti-anxiety

Statin

Thyroid

Anti-depressant/anti-anxiety

Birth control

Insulin/glucose management

Allergy/asthma - antihistamine

Stomach - PPI

Anti-hypertensive

Aspirin

NSAID

Beta blocker

Allergy/asthma - corticosteroid

Allergy/asthma - antihistamine

Stomach - PPI

Thyroid

Allergy/asthma - beta agonist

Allergy/asthma - beta agonist

Hormones (progesterone)

Hormones (testosterone)

Hormones (estrogen)

Hyperlipidemia

Insulin/glucose management

NSAID

Statin

Allergy/asthma - corticosteroid

Diuretic

Gout (uricosuric)

Corticosteroid

Diuretic

Migraine

ADHD drugs

Aspirin

Antiviral

Opioid painkiller

Blood thinner

Sleep aid

Beta blocker

Medication notes

ADHD: These are typically stimulants.

Allergy/asthma: We divided these up into three separate categories because they work differently: antihistamines (which block histamine release), beta-agonists (which act on adrenergic receptors of the beta type, in this case typically “ramping up” heart rate and sympathetic nervous system function), and corticosteroids (which “dampen down” inflammation).

Hyperlipidemia: These types of drugs are often prescribed along with statin drugs to lower cholesterol/lipids.

Insulin/glucose management: These are drugs like Metformin that are typically prescribed for Type 2 diabetics or prediabetics with poor insulin or glucose control.

Stomach - PPI: Proton pump inhibitors (aka “acid blockers”) prescribed typically for gastro-esophageal reflux disease (GERD).

Painkillers: We’ve divided these into a few categories:

- **Aspirin:** Technically a painkiller but often used for its blood-thinning / heart attack reducing effect.
- **NSAID:** Non-steroidal anti-inflammatory, such as ibuprofen or naproxen drugs.
- **Opioid painkillers:** The heavy-duty stuff such as morphine derivatives.
- **Uricosuric:** This is prescribed for gout and works by increasing the excretion of uric acid in the urine.

Side effects

To figure out what would be important to our clients looking to lose fat, gain muscle, and improve their fitness or athletic performance, we divided side effects into a few categories.

Gastrointestinal: This includes things like liver function, nausea/vomiting, diarrhea/constipation, and changes in appetite or hunger.

Nervous system: This includes things like pain, dizziness, and neurologic muscle weakness.

Metabolic: This includes things like glucose and lipid (fat) processing, metabolic syndrome/Type 2 diabetes, and weight gain.

Circulatory/cardiovascular: This includes things like cardiovascular complications (e.g. heart rhythm disturbances), electrolyte regulation (e.g. sodium/potassium levels), fluid (e.g. water retention), hypertension, or blood clots.

Mental-emotional: This includes things like mood, focus, sleep, and perceived energy levels. Memory and cognition are also included, since these affect your ability to recall information (such as nutritional advice), follow instructions, focus on a plan, or make smart decisions.

Hormonal: This includes things like adrenal, thyroid, and sex hormones, which in turn affect metabolism and body composition.

Musculoskeletal: This includes things like muscle pain and weakness, cramping, or bone and soft tissue damage.

Nutrient interactions: This includes things like medication blocking vitamin or mineral absorption, or nutrient deficiencies presenting as other health problems (e.g. anemia or insomnia).

Other: This included miscellaneous side effects like increased or decreased sweating or poor body temperature regulation; FDA warnings about lactation; and ominous-sounding stuff like “purple toe syndrome” (yep, that’s a thing—who knew?).

Once we mapped out all of the relevant side effects, **we were astonished to find out how much even relatively “safe” medications can impact a person’s body composition, metabolic health, and athletic performance.**

We started to realize: **This is some serious stuff. Our clients and coaches need to know this.**

Your medication—even if it’s over-the-counter—can significantly affect your fitness, nutritional response, metabolic environment, recovery, and overall health.

A sampler of possible side effects

Here are the side effects of some of the most common medications that we’ve listed above.

We can’t give you a complete list of each and every side effect you might experience. Nor will you inevitably experience these.

Some of these side effects are due to the actions of the drugs themselves. Other side effects occur with the nutrient changes or depletions (such as alterations in the way our bodies process minerals or electrolytes).

But here are key considerations, based on this list of common medications.

- **Allergy: Antihistamines**
- **Allergy: Beta agonists**
- **Allergy: Corticosteroids**
- **Anti-depressant/antianxiety drugs**
- **Anti-hypertensives**
- **Beta blocker**
- **Birth control drugs**
- **Insulin/Glucose management drugs**
- **Non-steroidal anti-inflammatories (NSAIDs)**
- **Statins**
- **Stomach: proton pump inhibitors (PPIs)**
- **Thyroid drugs**

Allergy: Antihistamines

Along with NSAIDs, allergy medications were some of the most common OTC drugs consumed daily or regularly.

Key side effects:

- **Gastrointestinal:** Nausea/vomiting

- **Nutrient interactions:** May deplete melatonin, leading to insomnia and metabolic dysregulation

Allergy: Beta agonists

Folks with allergies and asthma are likely most familiar with these as inhaler-style medications that “open up” constricted airways.

Key side effects:

- **Gastrointestinal:** May suppress appetite
- **Nervous system:** Tremor, muscular weakness, spasms
- **Metabolic:** Elevated homocysteine (as a result of low B6)
- **Circulatory/cardiovascular:** Elevated heart rate and cardiovascular disease risk; postural hypotension
- **Mental-emotional:** Anxiety, depression, insomnia
- **Nutrient interactions:** May deplete vitamin B6 and potassium
- **Other:** A meta-analysis of 19 studies reviewing the safety of this type of asthma medication showed that patients on the drugs are more than twice as likely to be hospitalized compared to those taking placebos. Advair, for example, carries a black box warning alerting patients to serious risks—the drug itself may *worsen* asthma symptoms. Study researchers estimated that Advair may be responsible for as many as 80 percent of the 5,000 asthma-related deaths each year in the United States. In response to these findings, the FDA issued a warning about long-acting beta agonist drugs.

Allergy: Corticosteroids

Note that these side effects are also common to corticosteroids generally, and will vary depending on dose and type.

Key side effects:

- **Gastrointestinal:** Corticosteroids are well-known to increase appetite and/or cause weight gain; changes in smell or taste
- **Metabolic:** Increased blood glucose and lipids; weight gain (especially visceral and on upper back/neck); increased cardiovascular disease risk
- **Circulatory/cardiovascular:** Edema (fluid retention); high blood pressure; anemia; cardiac irregularities
- **Mental-emotional:** Mood swings; irritability; anxiety; depression; insomnia
- **Hormonal:** Amenorrhea; hypogonadism (which impacts muscle health); adrenal insufficiency; poor stress tolerance; hypothyroidism
- **Musculoskeletal:** Loss of bone density; muscle/joint pain and cramping (esp. after steroid withdrawal); delayed healing
- **Nutrient interactions:** May deplete Vitamin B6, Vitamin B12, folic acid, Vitamin C, Vitamin D, calcium, potassium, magnesium, zinc, selenium, chromium
- **Other:** Mouth/respiratory infections

Anti-depressant/anti-anxiety drugs

Many people—especially women—are on more than one of these medication types, several of which are correlated with weight gain.

Key side effects:

- **Gastrointestinal:** Diarrhea or constipation; taste changes; GI upset; nausea/vomiting; possible liver damage (rare); appetite disruption
- **Nervous system:** Dizziness, tremor
- **Metabolic:** Weight gain
- **Circulatory/cardiovascular:** Hyponatremia (low sodium)
- **Mental-emotional:** Anxiety and worsening depression; fatigue; sleep disruption; insomnia
- **Hormonal:** Irregular menstruation in women; hormonal abnormalities
- **Musculoskeletal:** Muscle or joint pain
- **Nutrient interactions:** May deplete melatonin, leading to insomnia and metabolic dysregulation

Anti-hypertensives

Anti-hypertensive drugs typically work on the renin-angiotensin-aldosterone (RAA) system and dilate blood vessels, providing a bigger “pipe” for blood to flow through. Since the RAA system is also involved

in things like fluid/electrolyte balance and cardiac regulation, anti-hypertensives can have significant side effects.

Key side effects:

- **Gastrointestinal:** Upset stomach; diarrhea; disturbances in taste (rare); constipation (rare); acute pancreatitis; nausea/vomiting; hepatitis; jaundice
- **Nervous system:** Dizziness
- **Metabolic:** Hyperglycemia (rare); hypoglycemia
- **Circulatory/cardiovascular:** Cardiovascular events (including heart attacks); congestive heart failure; palpitations; edema; disrupted potassium; inappropriate secretion of anti-diuretic hormone (ADH); low blood pressure
- **Mental-emotional:** Depression; insomnia; fatigue
- **Hormonal:** Gynecomastia (in men)
- **Musculoskeletal:** Muscle pain; back pain; cramping; rhabdomyolysis (rare)
- **Other:** Some anti-hypertensive drugs can alter the metabolism of enkephalins and modulate cholinergic activity. Thus on some rare occasions, anti-hypertensives have been linked to psychiatric complications such as mania, cognitive disturbances, and even hallucinations.

Beta blockers

Beta blockers have the opposite effect as beta agonists—they inhibit particular stress chemicals such as epinephrine (adrenaline) from binding to cells' beta receptors. They're used to treat many cardiac conditions and hypertension. The most significant effect of beta blockers for an active population is decreased exercise tolerance/ endurance and hypoglycemia.

Key side effects:

- **Gastrointestinal:** Diarrhea; dry mouth; nausea/vomiting
- **Nervous system:** Dizziness
- **Metabolic:** Altered lipid and blood glucose metabolism; hypoglycemia. Beta blockers used with diuretics may increase the risk of diabetes.
- **Circulatory/cardiovascular:** Cardiovascular events; edema; hyponatremia; hyperkalemia (low potassium); low blood pressure
- **Mental-emotional:** Sleep disturbances; nightmares; insomnia.
- **Nutrient interactions:** May deplete CoQ10 and melatonin, leading to reduced energy and heart function; insomnia

Birth control drugs

The effects of birth control hormones will differ by formulation/brand, synthetic vs. bio-identical hormones, dosage, and delivery method (e.g. oral, injections, implants, transdermal, etc.)

These side effects cover the most common birth control medications.

In our practice, we have found that **most women taking synthetic hormones (i.e. most commercial birth control formulations) have trouble losing fat.**

Key side effects:

- **Gastrointestinal:** Abdominal pain; nausea/vomiting; jaundice; gallbladder problems. Rarer liver side effects have included focal nodular hyperplasia, intrahepatic cholestasis, liver cell adenomas, hepatic granulomas, hepatic hemangiomas and well differentiated hepatocellular carcinomas.
- **Metabolic:** Weight gain. Disrupted lipid metabolism: Progestins can decrease HDL (and HDL2) cholesterol levels and increase LDL cholesterol levels. Because estrogen opposes progestins' actions, changes to lipid profiles depend on the relative amount, type, and potency of the estrogen and progestin in a given product.
- **Circulatory/cardiovascular:** Cardiovascular events and cardiac abnormalities; edema; anemia; elevated homocysteine; blood pressure deregulation

- **Mental-emotional:** Depression; irritability; memory loss and “brain fog”; fatigue/lethargy
- **Musculoskeletal:** Bone demineralization; muscle cramps
- **Nutrient interactions:** May deplete Vitamins B1, B2, B3, B6, B12 and folic acid, Vitamin C, as well as magnesium, selenium and zinc.
- **Other:** Decreased immune function

Insulin/glucose management drugs

Coaching clients who are still solidifying good nutrition habits and regular activity, or carrying a lot of body fat, often have disrupted glucose and insulin control (as do women with PCOS), so they take drugs such as Metformin that help to regulate this. Unfortunately, this drug group may exacerbate some of the underlying problems, such as weight gain.

Key side effects:

- **Gastrointestinal:** Upset stomach; diarrhea; constipation; bloating and gas; taste changes; nausea/vomiting (related to hypoglycemia); elevated liver enzymes; jaundice; increased hunger levels
- **Nervous system:** Dizziness
- **Metabolic:** Weight gain; hypoglycemia; dyslipidemia; diabetic acidosis
- **Circulatory/cardiovascular:** Edema; hyponatremia; low blood pressure

- **Nutrient interactions:** May deplete CoQ10, vitamin B12, and folic acid, leading cardiovascular problems, weak immune system, low energy; anemia, tiredness, weakness, increased cardiovascular disease risk; birth defects, cervical dysplasia, anemia, heart disease, cancer risk

Non-steroidal anti-inflammatories (NSAIDs)

Many people take these for everyday aches and pains as well as more chronic problems like arthritis or long-term injury recovery. Unfortunately, they have significant GI and cardiovascular side effects, and may even worsen existing musculoskeletal problems or impede healing.

Key side effects:

- **Gastrointestinal:** Constipation; general abdominal discomfort; nausea and vomiting; dyspepsia; diarrhea; stomatitis; peptic ulcerations; gastrointestinal hemorrhage or perforation; ulcerative esophagitis; eosinophilic colitis; salivary gland inflammation; pancreatitis; gastroesophageal reflux; flatulence; diverticulitis; dry mouth; dysphagia (trouble swallowing); eructation (burping); gastritis; hemorrhoids; hiatal hernia; blood in stools; tenesmus (feeling of constantly needing to pass stools, despite an empty colon); tooth disorder; intestinal obstruction; cholelithiasis (stones in the gallbladder); elevated liver enzymes; jaundice; hepatitis.
- **Nervous system:** Dizziness; impaired concentration
- **Metabolic:** Hypoglycemia; hyperglycemia; hypercholesterolemia

- **Circulatory/cardiovascular:** Edema; palpitations; elevated blood pressure; shortness of breath; cardiovascular thromboembolic adverse events (heart attacks, angina pectoris, and peripheral vascular events); aggravated hypertension, syncope, congestive heart failure, ventricular fibrillation, pulmonary embolism, cerebrovascular accident, peripheral gangrene, angina pectoris, coronary artery disorder, myocardial infarction, palpitations, tachycardia, thrombophlebitis; unstable angina, aortic valve incompetence, sinus bradycardia, and ventricular hypertrophy
- **Mental-emotional:** Depression; insomnia; sleep disturbances
- **Musculoskeletal:** Muscle pain and weakness; myopathy; connective tissue injury (e.g. tendinoses)
- **Nutrient interactions:** May deplete folic acid, which can lead to anemia, depression, elevated homocysteine, increased risk of certain cancers

Statins

These “cholesterol-lowering” drugs inhibit the liver’s synthesis of cholesterol. However, because cholesterol is such an important molecule in the body, interfering with its formation can have wide-ranging effects. Particularly of concern for active people is the soft-tissue and muscular damage that can occur, but the rest of the side effects are no picnic either.

Key side effects:

- **Gastrointestinal:** Diarrhea, dyspepsia; constipation; gastroenteritis; flatulence; periodontal abscess; gastritis;

pancreatitis; nausea/vomiting. Hepatic side effects include altered liver functions; elevations in liver enzymes; elevated bilirubin; hepatitis; jaundice; fatty changes in the liver; cirrhosis; fulminant hepatic necrosis; and liver failure.

- **Nervous system:** Headache; dizziness; insomnia; hypertonia; paresthesia; vertigo; neuralgia; drowsiness; fatigue; weakness; cranial nerve dysfunction; tremor; memory loss; decline in cognitive function; peripheral neuropathy; polyneuropathy; and peripheral nerve palsy.
- **Circulatory/cardiovascular:** Angina; vasodilation; palpitations; edema; high blood pressure
- **Mental-emotional:** Depression; anxiety; impaired cognition; decreased libido; insomnia; suicidal thoughts; delusions; paranoia; agitation; nightmares; confusion
- **Musculoskeletal:** Severe myopathy and rhabdomyolysis (rare); myalgia; muscle weakness; back pain; arthritis; tendon rupture. Increased creatine kinase; myoglobinuria (muscle protein excreted in urine); proteinuria (excretion of protein in urine); renal failure. Taking statins with gemfibrozil (fibric acid derivatives), niacin, cyclosporine, erythromycin (macrolides) or azole antifungals may increase the incidence and severity of musculoskeletal side effects. Statin-induced myopathy is also worse in older people, smaller people, women, and people with renal and/or hepatic dysfunction, perioperative periods, hypothyroidism, diabetes mellitus, and alcoholism.
- **Nutrient interactions:** May deplete CoQ10, leading to reduced energy and heart function

Stomach: Proton pump inhibitors (PPIs)

Along with statins, proton pump inhibitors (often known as “acid reducers”) are one of the most-prescribed drugs in North America for gastro-esophageal reflux disease (GERD). Unfortunately, they can wreak havoc with the rest of the GI tract—and might even worsen the original problem.

Key side effects:

- **Gastrointestinal:** Bowel irregularity; aggravated constipation; dyspepsia; dysphagia (trouble swallowing); dysplasia (abnormal lining of the stomach or epithelial layer/mucosa); epigastric pain; eructation (aka burping); esophageal disorder; diarrhea; gastroenteritis; GI hemorrhage; changes in appetite; ulcerative stomatitis; nausea/vomiting; microscopic colitis; pancreatitis; bilirubinemia (bilirubin in the blood); abnormal liver function, and increase in liver enzymes; hepatitis; jaundice.
- **Nervous system:** Confusion; dizziness; hypoesthesia (reduced sense of touch or sensation); insomnia; migraine aggravation; paresthesia (“pins and needles” sensation); sleep disorder/sleepiness; tremor; vertigo; and seizures
- **Metabolic:** Glycosuria (excretion of glucose in urine); hyperuricemia (elevated uric acid); hyponatremia (low sodium); increased alkaline phosphatase; excessive thirst; vitamin B12 deficiency, and weight increase/decrease. May cause low serum magnesium levels (hypomagnesemia) if taken for prolonged periods of time (in most cases, longer than one year).

- **Circulatory/cardiovascular:** Angioedema; tachycardia; chest pain; irregular heartbeat; chest pain; edema; high blood pressure
- **Hormonal:** Goiter
- **Musculoskeletal:** Muscle spasm (tetany); arthralgia; aggravation of arthritis; arthropathy; cramps; fibromyalgia syndrome; hernia; hypertonia; polymyalgia rheumatica; back pain; myalgia (muscle pain); bone fracture (esp. with long-term use).
- **Nutrient interactions:** May deplete folic acid, Vitamin B12, Vitamin D, calcium, iron, zinc, and protein

Thyroid drugs

Many people in our coaching programs—particularly women—are struggling with the weight gain and sluggishness of low thyroid function and are consequently on medication for it.

Key side effects:

- **Gastrointestinal:** Diarrhea; increased gastric motility
- **Nervous system:** Seizures (rare)
- **Metabolic:** Weight loss; changes in diabetes symptoms
- **Circulatory/cardiovascular:** Cardiovascular events; heart palpitations; high blood pressure; tachycardia; arrhythmia; cardiopulmonary arrest; hypotension; myocardial infarction; phlebitis; and angina; all of which may be exacerbated in patients with underlying cardiovascular disorders. TSH

suppression is associated with an increased incidence of premature ventricular beats, an increased left ventricular mass index, and enhanced left ventricular systolic function.

- **Mental-emotional:** Insomnia
- **Hormonal:** Menstrual changes, adrenal insufficiency
- **Musculoskeletal:** Osteoporosis & loss of bone density
- **Nutrient interactions:** May deplete iron, leading to anemia, weakness, fatigue, hair loss, brittle nails, and a weakened immune system.

What to do next: Some tips from Precision Nutrition

Be a careful consumer and an informed patient. Research all medication choices carefully. Your pharmacist especially can be a great resource.

If you take medication—even occasionally—double-check *all* of its side effects. [MerckManuals.com](https://www.merckmanuals.com) and [RxList.com](https://www.rxlist.com) are helpful resources.

Treat over-the-counter medications as carefully as prescription medications. OTC doesn't necessarily mean side-effect-free.

Double check interactions between medications and *all* supplements. Again, check with your pharmacist and do your own research. As you can see above, many common medications impair proper digestion and GI function as well as nutrient uptake and use.

If, for example, your liver isn't functioning properly, any other supplements you ingest may not be properly or safely metabolized.

Additionally, medications may work synergistically with supplements. For instance, combining an allergy/asthma beta-agonist with a “fat burner” (which has stimulant effects) could be bad news for cardiac safety.

Recognize that medications have powerful effects on body composition, physical performance, and overall wellness. If you're struggling to get results with a solid health and fitness program, underlying health conditions and medication use might be playing a role.

If you work in fitness, consider learning more. Through our Precision Nutrition Certification, we teach motivated fitness professionals the art and science of nutrition coaching. Including how to work with clients with special medical conditions, how to address medication use, and so much more.

Whatever the outcome you're getting from your fitness and nutrition program, keep doing the healthy behaviors that truly matter. The better your general fitness, health, and nutrition, often the fewer medications you'll need to take.

Discover how to help anyone eat better—starting now.

If you want to take your nutrition expertise to the next level, check out the **Precision Nutrition Level 1 Certification**. It's the most respected nutrition coaching education program in the world—and the next group kicks off soon.

Created specifically for working (and aspiring) health and fitness pros, our self-paced nutrition certification teaches you the science of nutrition and the art of world-class coaching.

Developed over 15 years. Proven with over 100,000 clients. Trusted by professionals in every corner of the industry—from personal trainers, strength coaches, and group exercise instructors to medical doctors, registered dietitians, nutritionists, and beyond.

Whether you're already mid-career or just starting out, this self-study nutrition certification will give you the knowledge, systems, and tools to make a real, lasting change with anyone you work with.

Visit this link for more information: <http://get.pn/level-1>.

(Already a student or graduate of the Level 1 Certification? Take the next step and check out our **Level 2 Certification**. It's an exclusive, year-long Master Class for elite professionals who want an immersive, career-changing experience you can't get anywhere else.)