

# One Reading Is Not a Trend

An unusually high result is usually followed by a more ordinary one — whatever you did in between. This single statistical fact is why so many things appear to work.

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<https://longevitydecoded.net/one-reading-is-not-a-trend-article.html>

## WHAT YOU'LL UNDERSTAND BY THE END

Why every measurement varies, what regression to the mean is, and why it makes ineffective interventions look effective.

Measure anything about yourself twice and you get two different answers. Blood pressure, resting heart rate, almost any blood test. Nothing changed about you between the readings, and yet the numbers differ.

Two separate sources of variation are at work, and neither is error in the ordinary sense.

## WHERE VARIATION COMES FROM

### Two kinds of wobble

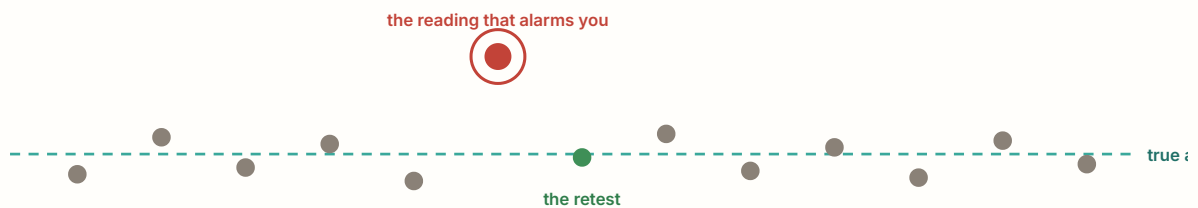
**Biological variation** is you, genuinely changing. Levels fluctuate through the day, with meals, sleep, stress, hydration, recent activity, illness and — for many measures — the time of year. Some analytes are remarkably stable within a person; others swing widely.

**Analytical variation** is the measurement itself. Run the identical sample twice and a good laboratory returns slightly different numbers. Small, but not zero.

Together these mean every result is really a value *plus noise*. Which sets up the most useful idea in this lesson.

#### THE EFFECT THAT FOOLS EVERYONE

### Regression to the mean



Nothing was treated. Nothing changed. The second number was always going to be lower.

*Illustrative — regression to the mean.*

One person, repeatedly measured. The alarming point is the noise, not the signal.

If a reading is unusually extreme, part of that is likely to be noise that happened to fall the same way. Noise does not persist. So **the next measurement will probably be closer to your average** — with no treatment, no change, nothing at all.

#### WHY THIS MATTERS SO MUCH

People do not usually start an intervention at a random moment. They start when a number looks *bad* — which is precisely when it is most likely to have been an extreme reading. Then they retest, it has improved, and the intervention gets the credit.

This is not a small effect. It is one of the main reasons ineffective treatments accumulate enthusiastic personal testimonials, and it is a large part of why the control group in a trial so often improves too. **Any before-and-after with no comparison group is vulnerable to it.**

#### PRACTICALLY

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## What to do about it

- **Repeat before reacting.** A single unusual result on a stable measure usually warrants a repeat rather than an intervention.
- **Standardize the conditions.** Same time of day, same fasting state, same posture, same lab. A great deal of apparent change is really a change in circumstances.
- **Watch the trend, not the point.** Three or four readings over months carry far more information than one, and the direction matters more than any single value.
- **Be skeptical of your own before-and-after.** Especially when you started because the first number looked alarming. That is exactly the setup regression to the mean exploits.

This is also the honest limit on personal experimentation, and it is worth saying plainly. You can learn real things about yourself from tracking — but a single person, without a control group, changing one thing while life continues around them, cannot cleanly separate an effect from noise. That is not a reason to stop measuring. It is a reason to hold conclusions more loosely than the numbers make you feel entitled to.

### WHAT THE EVIDENCE ACTUALLY SAYS

#### HUMAN EVIDENCE

Biological and analytical variation are both well characterized, and vary substantially between analytes. Standard laboratory science.

#### HUMAN EVIDENCE

Regression to the mean is a mathematical property of repeated measurement with noise, not a hypothesis. It is a recognized source of apparent treatment effect in uncontrolled studies.

#### HUMAN EVIDENCE

Blood pressure diagnosis requires repeated measurement, partly for this reason. Reflected in all major guidelines.

#### MECHANISM

Standardizing measurement conditions reduces variability and improves the interpretability of a trend.

#### NOT SUPPORTED

That an improvement between two readings, with no control comparison, demonstrates that an intervention worked.

## Where this connects

DIAGNOSTICS, BIOMARKERS & TRACKING

**The Study That Confirms Itself**

DIAGNOSTICS, BIOMARKERS & TRACKING

**What a Biomarker Is — and What It Isn't**

### THE WHOLE LESSON IN ONE LINE

Every measurement is a value plus noise, so an extreme reading tends to be followed by a more ordinary one regardless of what you did — which is why trends beat points and why uncontrolled before-and-afters are so persuasive and so unreliable.

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Educational content only — not medical advice, diagnosis, or treatment. This lesson explains how measurements behave, for a non-specialist audience. It does not interpret anyone's results and cannot tell you whether a value of yours is a problem. Test results must be read by a clinician alongside your symptoms, history and examination — a number without that context is not a diagnosis. Never start, stop or change a medication on the basis of an article. Discuss any changes to your health, medications, or supplements with a licensed professional who knows your situation.

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