

2. “N-back FAQ,” accessed April 2011, www.gwern.net/N-back%20FAQ.html. Maintains a list of software for different platforms, as well as online websites where you can practice the dual n-back task.
3. “Brain Workshop: A Dual N-Back Game,” Paul Hoskinson and Jonathan Toomim, accessed April 2011, <http://brainworkshop.sourceforge.net/tutorial.html>.

Hack 54: Think, Try, Learn

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Live life as a series of scientific experiments.

This hack outlines an approach to living that’s based on the set of practices that has impelled humanity through tremendous progress for the last 400 years: science. Treating life as an experiment enables you to look at problems as opportunities to explore, and to have a sense of rational, yet ultimately rich, control over what you choose to do. Living experimentally empowers you with control of your thinking and behaviors, and this helps you to cope with life’s inherent unpredictability and limitation of control. Additionally, it can lead to your being more fully engaged and mindful of the frankly amazing world around us.

In Action

There are two facets of putting this approach into action: how to experience your world with a life-as-experiment mindset, and how to use concrete practices to try new things experimentally.

The Experimental Mindset

First, how do you *choose* where to apply experimental methods? Here are five main characteristics that define an experiment. The more of these that apply to the problem, question, or opportunity under consideration, the more likely it is a candidate for the experimental approach.

- **Novel:** *Something that is new to you, unfamiliar and untested*
- **Speculative:** *Something about which you have questions, or that arouses your curiosity*
- **Unpredictable:** *Something you can’t make good predictions about with your current level of knowledge*

- **Improvisational:** *Something that lends itself to changing actions during the process, or to a certain flexibility in how you approach it*
- **Provisional:** *Something that can be changed in response to what you learn, or that will be done repeatedly, possibly differently each time*

Following are a few examples of experiments that people have done to improve themselves and their lives, and some ways you could consider them experimental, based on the preceding characteristics.

Trying a New Hobby

Learning to cook, for example, is most fun when you're experimenting. It is unpredictable (a burnt casserole is an occupational hazard), improvisational (pictures and instructions are one thing, but actually putting together a meal is another), and provisional (you might not stick with it if you didn't enjoy cooking or eating it, or you might cook something else next time).

Taking a New Medication

Finding the best treatment for a medical condition is often complicated and time-consuming. Treating it as a formal experiment can make the process shorter and more effective.

How can taking a prescribed drug be an experiment? If you think about it, recommended dosages are ones that work acceptably well, based on average results for large groups of people; what matters most, however, is determining what amount works best for a specific person — you — and that's something you cannot know without experimenting (under professional supervision, of course). It is certainly unpredictable (who hasn't looked at a prescription's "scare sheet" of side-effects without suspecting they have half of them?), improvisational (while you have a specific dosage plan to follow, you need to pay attention to your reaction, and act accordingly), and provisional (it's an excellent idea to keep in mind that there is usually more than one medication or combination you can try for a medical condition, and this can be a source of hope if one doesn't work out).

WARNING Keep it safe! Like anything you do, it is important to ensure that your experiments are benign and ethical. We can take a cue from the Belmont Report, which outlines three principles (<http://ohsr.od.nih.gov/guidelines/belmont.html#gob>) that address experimental ethics: Experiments should respect the people involved, be beneficial, and be just. For experiments with relationships, you should consider carefully letting others know what you're doing. For medical experiments, check with your medical professional for help setting them up safely, monitoring while you're trying them, and analyzing your results.

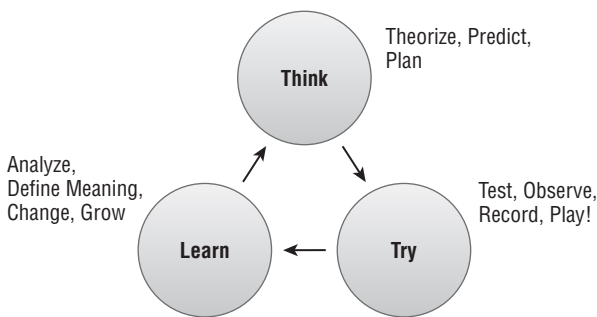
Getting Started

To begin trying this method in your life, start with something small, such as an experiment that you could complete in less than a week. Pick an area of your life that needs changing, a problem you want to work on, or something you've been thinking of trying for a while but haven't had the gumption yet. Figure out just one change you'll make, and one or two things at most that you'll measure during the experiment. Many people start with a health or lifestyle focus, such as eating smaller portions, starting to exercise, or improving sleep.

Another starting point might be a hack from this book. After all, they are all about making changes to improve your life, and experimenting is a principled way to incorporate and evaluate how much they end up helping. Just find one that jumps out at you and then set it up using the Think, Try, Learn process.

Experimental Practices

To actually implement the mindset, you'll apply the basic practices of identifying experiments, designing them, carrying them out, and analyzing and learning from the results. Overall, it helps to think of the process as having three interconnected components: *think* (design and direction), *try* (experimentation and observation), and *learn* (analysis, reflection, and integration), as shown in Figure 54-1.



Cycles: Iterations, Recursions, Interleavings, and Orderings

Figure 54-1: The Think, Try, Learn process

These three elements form the framework for the specific practices and tools that you can use to live an experiment-driven life.

Think

In this stage, you decide what you want to experiment on, how you'll go about it, and possibly capture your expectations with predictions of what might happen.

It's a reasonable starting point for many experiments, although any entry point is valid, such as by accidental discovery during the Try phase.

After you've used an experimental mindset to find appropriate subject matter for an experiment, you need to thoughtfully decide how to approach how you'll test a solution in the Try phase. It's helpful to ask the following four questions, which I've taken from my Edison site, a tool that helps people track, share, and learn from their experiments.¹

- What will you do?
- How will you test your idea and measure success?
- How will you know you are done?
- How will you enjoy the journey?

Regarding the actual structure and sequence of the experiment you come up with (the first three questions), several approaches are possible. The most common is the *Reversal*, or *ABA design*. The steps of the design are as follows:

1. Define the question you're trying to answer.
"Is grinding during the day causing my tooth pain?"
2. Decide on one thing that you're going to change.
Wear a night guard during the day.
3. Decide on at least one corresponding measurement you'll make.
Rate pain on a scale of zero to two.
4. Start taking measurements for a while.
You're in the first "A."
5. Implement the change and keep measuring.
Now you're in "B."
6. Cut out the change and continue measuring until you're done.
This is the final "A."

Try

How exactly do you run an experiment once you've designed it? Think of it as being composed of four interrelated activities:

- Carry out the changes you decided on in the Think phase.
- Make observations about what you're experiencing during the process.
- Record your measured data.
- Regularly analyze where you are in the experiment.

It's helpful to capture your personal observations throughout the experimentation process by recording any stories, ideas, insights, and relevant thoughts that occur.

An essential practice of self-experimenting is to keep an experimenter's log, or journal, where you record the expectations, observations, data, and experiences and results before, during, and after your experiment. The tool you choose must be readily accessible so that you can easily record observations when they're fresh. Keeping a log has multiple benefits:

- It provides the data you need to identify exploitable patterns.
- It's a source of information for possible troubleshooting.
- It provides motivation for your experiment and keeps you engaged.
- It develops your observation skills.
- It helps you be more optimistic and grateful — reflecting on your day reminds you that good things have happened.
- If shared with others, it helps them learn from your work and may motivate them to try it too.

You may want to consider the new technology options available for monitoring your results, which are in vogue due to the rise of mobile technology and embeddable sensors for self-monitoring. The ability to take measurements that are ubiquitous, wireless, and consolidated opens the door to major changes in how we think about taking control of our health, and it can give us useful data for developing insight into how we operate as habitual creatures — what Jim Collins calls “a bug called you.”² Some examples include Fitbit for walking, calories, and sleep (www.fitbit.com/); Nike+ iPod Sport Kit for running (www.apple.com/ipod/nike/); Zeo Personal Sleep Coach (www.myzeo.com/); the Withings scale and blood pressure home devices (www.withings.com/); and GlowCaps for prescription compliance (<http://rxvitality.com/>). Nearly all of them offer web-based tools for data collection, analysis, and sharing. For an excellent introduction to these options, see Gary Wolf's article in the *New York Times*.³

Finally, you evaluate how your experiment is proceeding, and whether you need to make any changes to it. Are you facing obstacles? Are you not getting adequate results? Are you still learning anything? You may decide to continue the experiment, make an adjustment to what you're doing, or call it completed and move on.

As with the overall Think, Try, Learn process, there is no strict ordering of these activities. You are guided instead by your results and intuition, plus any advice you can get from others, professional or otherwise.

Learn

In the Learn stage, you make sense of your experiment's results. You analyze any data you've collected, reflect on what you've learned about the subject, and assimilate the outcome into your life. Reviewing your experimenter's journal is an excellent starting point. Ideally, you've discovered something that improves

whatever area you were targeting, and which you can permanently incorporate into your life via a new perspective or behavior.

If you've collected quantitative data in addition to your observations, this is when you analyze it. Your goal is to see the connections, and to look for cause and effect, between the thing you changed (known as the *independent variable*) and the resulting effect on the other thing you tracked (the *dependent variable*).⁴ If you're doing an ABA type of experiment, the transition points will be of interest: A-to-B and B-to-A. Try using simple visualization tools, such as an X-Y plot, to help you find patterns.

For example, if you were doing an ABA experiment to test whether recent fatigue you are feeling relates to how much sugar you eat, you might record two things each day: total sugar consumed (mg) and overall vitality during the day (using three levels such as low, OK, and high, for example). The A portion would be continuing your current intake of sugar (for a week), and B might be halving it, also for a week. Then you would go back to your original consumption. Afterward, you would plot sugar consumption and vitality against time to determine whether the latter changes along with the former.

Note that it can be difficult to identify definitive cause-and-effect relationships between our actions and results because of the complex interrelationships between things in our lives. You might decide that your mood varies with how much sugar you eat, yet there may be confounding factors⁵ such as major life stressors going on at the time, the timing of your sugar intake over the course of a day, and so on.

When you've collected your information and analyzed it to glean any new insights or correlations from what you've learned, you're ready to move back to the Think stage, to see if applying your new knowledge leads to developing a better solution to try next.

In Real Life

Here are two examples of larger experiments I've done over the last few years.

Experiment: Improving Sleep

Like many people, I sometimes suffer from insomnia; in my case, I typically have trouble falling asleep. Not too long ago it was especially bad and started to affect my ability to work, so I decided to experiment; over the course of a year I ended up trying a bunch of possible solutions, though not at the same time.

Following are the solutions I've tried:

- Counting breaths and doing relaxation visualizations.

Result: No improvement.

- Taking melatonin.
Result: No improvement.
- Adopting the “no computer” rule in the evening.
Result: No improvement, though worth further experimentation.
- Not eating right before bed.
Result: No improvement. Ditto for not exercising right before bed.
- Avoiding bright lights at night, primarily from playing on my phone in bed.
Result: I decided that although the light probably has an impact, the relaxing nature of the play is worth any trade-off.
- Not napping during the day.
Result: Left me more tired than ever. The opposite experiment, napping when I felt tired (30 minutes max) worked very well (I felt better during the day) and didn't seem to harm falling asleep at night.
- Finally, going to bed when I first felt tired.
Result: This one ended up being extremely effective, and I try to do it each night.

Note that I ran each of these as its own experiment, working the Think, Try, Learn cycle before moving on to the next one. For each, I (1) came up with details for what I would do and measure; (2) tried it for some time, recording observations and data; and then (3) assessed the experiment and repeated the cycle, sometimes making small variations on the current experiment, and for others trying something very different.

If you also suffer from insomnia, here is a detailed description of another sleep experiment I ran. Because it is common knowledge that caffeine is a stimulant that can affect falling asleep, I wondered if there were a relationship between sleep and the two cups of chocolate I drank each day, which contain a little caffeine. I came up with an ABA test in which I would consume my current two cups per day for three days (the first A), then do a B phase of stopping completely for three days (be brave, experimenter!), then go back to my normal dose (the final A). I recorded sleep quality each morning using a simple three-value scale of restedness: groggy, slightly drowsy but awake, or alert.

At the end of the ninth day, I did some analysis in the Learn phase, and in my case the results were conclusive: The chocolate did not hurt my sleep. This was frankly a relief, as I love the stuff! Don't ask me what I would have done otherwise.

Experiment: Becoming More Productive

Staying on top of work can be a struggle. Fortunately, you can easily apply the Think, Try, Learn methods explained earlier to get more productive. Combining it with the productivity system Jetpack (Hack 21, “Get Control of Yourself”) makes both techniques stronger. Briefly, that system organizes your work so

that you work from a calendar and three consolidated lists (tasks, waiting, and projects). Those lists can provide a concrete starting point for running a number of helpful experiments. Here are a few examples.

Daily Planning

Creating a daily “to do” list is a classic time-management idea. The idea is to create a temporary list of tasks to do each day that will accomplish a strategic mix of work, and that will give you a sense of satisfaction at the end of your day. A straightforward test is to try daily planning for a week, and then switch back for a few days and evaluate any difference in productivity. You might measure your overall feeling of accomplishment at the end of the day, or your ability to prioritize and focus on critical tasks. Or simply tally how many tasks you completed each day.

“Just 10 Minutes”

This is an experiment in procrastination-busting whereby you limit the duration of all tasks to no longer than 10 minutes. This addresses the common problem of feeling too overwhelmed to even get started.

Interruption Log

Because interruptions are a common productivity drain, try the experiment of simply tracking them. Record who interrupted you, when it happened, how long it lasted, and the reason. Do it for one week, and then study the results to find preventable interruptions. You might encourage the people who interrupt you to use alternative forms of communication such as e-mail, or think about how you can delegate better. If it’s bad enough, you might even try a separate experiment, such as closing your door with a sign on it: “Do not disturb. Will be free at 1:30 p.m.”

In my case, I’ve tried all of these at one time or another, and found the daily planning technique to be extremely helpful. I now use it every day because it gives me a “focus anchor” when phone calls, e-mail, and other distractions pull me off course. It also gives me a concrete sense of accomplishment at the end of the day, which lets me enjoy my down time in the evening. Finally, it’s a great way to become more accurate at estimating how long it takes to finish particular tasks, which makes planning smoother and more effective.

How It Works

As humans, we are wired to be curious, and we have an innate drive to explore the world. Living experimentally is a natural application of these traits. To be reminded of this, just watch children playing for a few minutes, and notice their boundless enthusiasm to question and investigate. Unfortunately, we often lose sight of this as we get older.

Change and Control

There is an evolutionary basis for assuming that change represents a threat — we might lose something dear to us, or we might encounter new situations for which we don't feel prepared. Ancestors who mastered their surroundings were more successful, so we are happier when we have influence. However, nothing is static, and outside factors often limit the practical power we can wield.

Treating goals as experiments gives us a feeling of more control over how we view or approach our options, and turns our fear of change into excitement about the potential of the unknown to surprise and delight us.

Desire

It's natural to want things, but unwavering attachment to a particular outcome can make us unhappy because it means we are open to only one outcome, the particular one we desire. But life rarely cooperates by giving us exactly what we want. Attachment to the end product closes us to the rich opportunities that can actually unfold, ones that are different from our initial desire (Hack 33, "Make Happy Mistakes"). Also, it sets up a lose-lose success metric that disappoints us, regardless of whether things are looking positive (in which case we worry about losing something good), or when they're not going our way, which also disappoints.

To feel more equanimity, we can apply a healthy sense of detachment via objective observation. This way of treating the process and results as data allows us to stay flexible and enjoy what's actually unfolding, rather than clinging to our expectations going in, which may conflict with reality.

Mindfulness

In our busy, complex lives, it's easy to become distracted by rehashing the past or worrying about the future. But each moment we live is where the action is; it's where we experience the world through our senses, are able to exert our influence, create memories and stories, and discover the unpredictable fruits of our efforts. The vigilant observation that's integral to experimenting is a sustainable way of experiencing each irrecoverably precious moment.

Finally, I'd be remiss if I didn't encourage you to think of this hack itself as an experiment. If you try it, ask yourself if it helps *some* aspect of the way you see the world or interact with it. Don't take my word for it; prove it to yourself.

See Also

- Stewart Friedman, *Total Leadership: Be a Better Leader, Have a Richer Life* (Boston: Harvard Business School Press, 2008). This impressive book thoroughly applies the Think, Try, Learn idea to business, and shows leaders how they can use it to be healthier and more well-rounded people.

- A great starting point for getting to know the self-experimentation community is the *Quantified Self* blog (“Self Knowledge Through Numbers”): <http://quantifiedself.com/>. You can also visit my blog, *The Experiment-Driven Life*, where I cover Think, Try, Learn, along with Edison stories and experiment ideas.
- A helpful clearinghouse for sites and tools of all types is *The Complete QS Guide to Self Tracking* (<http://quantifiedself.com/guide/>).

Notes

1. The self-experimentation movement is on fire, and you can choose from many creative tracking tools. They run the gamut from the simple to the sophisticated, though most of them are specific to a domain, such as mood, exercise, sleep, or sex. Edison, the Think, Try, Learn Experimenter’s Journal (<http://edison.thinktrylearn.com/>) is an integrated data- and observation-recording tool, along with a helpful community of motivated self-experimenters. It enables you to create and track your individual experiments, set up group experiments that you can invite fellow experimenters to participate in, and give and receive encouragement and advice using social collaboration features.
2. From Stanford’s Entrepreneurship Corner with Tom Kelley of the IDEO design firm: “Young at Heart: How to Be an Innovator for Life”: <http://ecorner.stanford.edu/authorMaterialInfo.html?mid=2054>.
3. Quantified Self founder and *Wired* writer Gary Wolf’s seminal *New York Times* article: “The Data-Driven Life,” Gary Wolf, www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html?_r=1&pagewanted=all.
4. While I’ve mostly avoided scientific experimental terminology in this hack, some of it is helpful for self-experimentation. This is a complex topic that is essential for sophisticated scientific studies, but you can find some general characteristics of good experiments at <http://answers.yahoo.com/question/index?qid=20090124093953AAP04zf>.
5. Confounding factors are variables that you haven’t accounted for but which affect the results of your experiment. For example, in working on improving sleep, you might not realize the impact of recent stressful events. Read more at www.experiment-resources.com/confounding-variables.html.