# Early Retirement Extreme

A philosophical and practical guide to financial independence.

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# About the book

I think of this book first and foremost as a philosophy book about strategy. Like most philosophical books, it's voluminous compared to its content because much of it is dedicated to (re)defining underlying concepts and fundamentals, trying to find the words to describe something that isn't automatically implied by the usual understanding[1] of the words used. The lack of concrete specifics is intentional because they won't pertain to very many people. The approach is deliberately open-ended to make the concepts applicable to as many different situations as possible. This may also mean that the concepts, which aim to create consilient and resilient structures, are applicable to other kinds of organizing like policy-making or business management.

This book isn't a "how-to" manual to a specific lifestyle, but a "how-to" manual for "how-to" manuals. The intention is for each person to create his own strategy. In this sense, this book isn't a travel journal, nor is it a set of map directions; it's a book that teaches you to become a navigator. I used the principles in this book to reduce my expenses to a quarter of the average person and become financially independent in five years. While my story may be entertaining or inspiring, it may not be directly useful towards reaching a similar goal. Similarly, while initially motivating due to their actionable form, a set of map directions would fail the first time one reaches a crossroads not on the map. This would end the journey if the "pilot" has no navigational skills. I have therefore written the book as a textbook. Learning how to become financially independent requires study. This requires effort and is not easy--if it was truly easy, everybody would be doing it--but it's no more difficult than getting a college education or becoming a skilled tradesman in your respective field. What I'll describe here is another kind of life, the life of an independently wealthy and widely skilled person--a modern Renaissance man.

#### A note about the difficulty level

This isn't a book for beginners. It's not a book one can pick up, read, and proceed to become financially independent just as reading a textbook about physics won't turn a person into a physicist. This only happens when the concepts are constantly applied and one starts "thinking like a physicist." Things are similar for a person pursuing financial independence.

This is a book which I think can be read at several different levels. The reason for different levels is that people change as they learn. Depending on where you are, the book will relate to you in different ways. This is good, because those who evolve will become different people, eventually. What used to seem like a sacrifice will seem natural, and what used to seem natural will come to be seen as a sacrifice. What used to be a collection of techniques will become a general principle. What used to feel challenging will now feel easy.

#### A note about getting started

You don't need to learn everything before getting started. After all, you can drive a car without knowing how the engine works. In fact, you can drive several different kinds of cars. This is because most cars handle the same. However, to stay with the analogy, the same car can be driven with very different gas mileages. It may be listed as 33mpg, but good technique can double that number and poor technique can cut it in half. A trivial technique is to reduce speed by 5mph, which will simply bring most drivers back to the speed limit. Similarly, if living is thought of as driving a particular kind of "vehicle," there are techniques in this book which can be applied without understanding exactly why they work. Understanding why they work will subsequently allow one to tweak and improve them.

#### A note about references

This is not an academic work. I have resisted the temptation to follow the medievally inspired academic tradition of citing old books to make statements based on authority.[2] I find that showing the derivation from basic principles is more useful for application. Instead of references, I have provided a bibliography of books in the appendix of this book, each of which will add to the subject.

#### A note about geography

While this book is somewhat US-centric in its examples, the methods should work in any developed country with a market economy. Retirement plans have different names from country to country, but every country offers very similar plans to its citizens. In some countries health care is paid through taxes, and in other countries it's paid out of pocket. In any case the prices for goods and services are similar in developed countries so the strategies in this book will

work, even if technical details differ.

#### A note about originality

Feynman once remarked that the best way to find new insights into a problem was to step out of the box, ignore previous publications, and come to your own conclusions. With such an approach, it often happens that a concept which is initially considered to be novel turns out to have been discovered already. In fact, many of the ideas in this book go back decades and even centuries.

To give an example, when I was a teenager, I wasted a lot of my time playing computer games. One genre I particularly enjoyed was real-time strategy: games like *Dune*, *Warcraft I* and *II*, and *Command and Conquer*. In these games you build up forces comprised of individual units (tanks, warriors, etc.). When these units fight, each fights at full strength until it's destroyed or killed. Since the rate of attrition depends on the number of weapons firing or striking, the optimal strategy in a battle is therefore for all your units to attack a single individual enemy at a time to reduce the number of enemies firing or striking as fast as possible. A great many players have independently "discovered" this strategy, called Lanchester's Square Law, without being aware that it had actually already been discovered by Frederick W. Lanchester during World War I. So it is with many observations about life in general. This incidentally is why reading the classics is very worthwhile--concepts get discovered, forgotten, and then rediscovered, either independently or by reading old books. Like Lanchester's Law, I discovered many of the concepts in this book only to find out later that someone else had already discovered and named the concept before me. Further reading revealed that yet others had written about the concept before them, and so on.[3] Analogously, I'm sure that Lanchester wasn't the first person to think about how to most effectively direct the fire of siege trebuchets.

#### A note about completeness

There's always the temptation to make a book complete. However, a line must be drawn lest the book grow to the size of a minor encyclopedia. After all, the quantity of knowledge that must be mastered is not trivial, and thus I can't describe everything. However, I hope I've used enough relevant keywords to allow a quick search on the Internet for more information. In all cases I've striven to use standard words rather than jargon.

# A different frame of mind

When I grew up, I dutifully went to school and did my homework. For the most part, schooling was about sitting still for 45 minutes while doing simple tasks that the teacher handed out. I was very good at sitting still and thus I was a good student. I learned how to add, multiply, divide, and subtract. I learned how to punctuate a sentence and how to spell. I learned something about chemistry. Then I learned something about physics and geology. At some point, the teacher introduced tests and grades. Test-taking became the primary objective; learning secondary. We had the option to quickly forget what we had spent the past year learning after the test was done. In other words, we were being taught to be "flexible." Later, there were job fairs and educational fairs telling us how to write résumés and how to interview so we could get jobs.

Yet, I never learned *why* the world worked the way it did, and in retrospect, I think nobody ever even asked the question. Everybody always only focused on the "what" and "where;" no questions asked. But as I started my career as a research assistant in physics, I started getting interested in all the "whys" of life. As I studied and thought about various fundamental questions such as, "Why do we use money instead of promises or favors?"; "Why do we live in houses and not boats or cars?"; "Why are there usually 2-4 people in a home and not 10-20?"; "Why do we move away from home?"; "Why do we work until we're 65?"--all while getting assaulted with well-intended "encouragements" that I should make sure to open a retirement account before I was 30 and put 15% of net income into it; that I should buy a house; that married homeowners were more prosperous and therefore I better get married too; that I should buy a new car; that people would like me more if I wore a particular kind of brand clothing, and that I would enjoy a beverage more if it came from a certain kind of bottle. I was beginning to feel that something was wrong. "Why is the emperor not wearing any clothes?" I started getting an uneasy feeling that something about the world was not quite right. Nobody explained the "why." Sure, they could explain how I should first purchase a "starter home," so I could "upgrade" later. But nobody could or would explain why I should buy a house in the first place. Nobody could or would explain why I should have a career, only that career development was important.

There are a few allegories that explain this progression in thinking. The oldest is Plato's Cave.[4] In Plato's Cave prisoners have been arranged in a row in

a dark cave since childhood. They're chained so that they can't move their bodies, and their heads are restrained too so they can only face forward, towards a wall. They can hear and speak but they can't see each other, nor can they see themselves. Behind them is a fire. The fire's light shows the shadows of the prisoners on the wall. Between the prisoners and the fire there are people and animals acting out a realistic play casting shadows on the wall as well. The prisoners see only the shadows, but they hear all the sounds. Naturally they think the world is composed of shadows on the wall and that they themselves are shadows on the wall. The shadows talk to each other and interact, and it all makes sense to the prisoners, who think that all the shadows on the wall are like themselves. The prisoners even know each other through the shadows they see and the voices they hear, and they gain status by their ability to recognize other shadows and predict what they'll do. Now, imagine that one of the prisoners is released. His shackles fall to the ground and he can turn his head. He sees the other prisoners sitting in a row chained to the ground and he's horrified. He also sees the actors and animals between the prisoners and the fire. He sees the cave opening and ventures out. He is blinded by the light, but finally sees the big picture: All his life he has been sitting in a cave, chained to the ground, believing that the wall was it. Now he has realized that the action on the wall is guided mainly by a few actors, with the prisoners providing commentary. Now he sees the opportunities in the real world. He feels duty-bound to go back and inform the prisoners of the situation and try to release them. First he tries to explain the existence of the puppet-masters to the prisoners, but the masters are unlikely to corroborate his story since they derive much personal benefit from the current way of the world. Then he tries to explain how the system is arranged with the prisoners and the cave. Tragically, he finds the prisoners more resistant than he expected. Most don't believe him--and why should they? Having adjusted to the light outside, he can't see the shadows as clearly as they can. "What a dimwit." Taking off the chains requires too much effort, so most of them remain seated. These are people who are very good and successful at identifying, naming, and dealing with shadows, and so they may not want to leave.

There are also those who do feel the need to leave. Leaving is not easy; it requires much learning and a reorientation of one's values from equating success with identifying shadows to equating success with moving around in the real world.

In real life, the prisoners of Plato's Cave are those who are prisoners or slaves to their wages and their culture. A wage slave is a wage earner who is entirely dependent on their wages. While the wage slave is free to leave the current job, he isn't free to leave the job market altogether and he can likely not

imagine the possibility of doing so. He is still entirely focused on the wall.

The wall shows other people not as who they are, but as what they own. There goes a man in his new sports car--what is not seen is that the car is bought on credit and that the man is stressed because he is having trouble making the payments.

Wage slaves have jobs where they can go and spend their most productive hours writing high-powered memos so they can be more productive, while other people spend their time ignoring memos so they can be more productive too. This is how it goes. In fact, one of the great inventions of the 20th century, the personal computer, has made it possible to write even more memos and notices. This is great because it allows people to do their job while looking busier than ever. Looking busy is important because in this culture business is a virtue, just as being in debt is a virtue, and the most virtuous are those with the highest credit scores. They're better at being in debt compared to other people. This endless working and paying is called "making a living," yet people are so busy "making a living" that they have no time for living. A wage slave is a person who is not only economically bound by mortgages, loans, and other obligations, but also mentally bound by an inability to perceive that there are other options available, like the prisoners in Plato's Cave. Their chains are not physical like those of 150 years ago (though they still are in some parts of the world); the chains are mental, which in some sense makes them worse, because it turns the prisoners into their own prison wardens. Like the slaves in Plato's Cave, the only commonly accepted way for one of them to leave is to win the "prison game," which means accumulating at least a million to retire.[5]

The disenchanted grumble about "the system" or "the man." The analogy of "the system" is the people walking around behind the chained slaves, keeping them going. However, it's mainly the slaves themselves who keep themselves going. We don't realize that we maintain this system by lack of imagination and questioning. Like birds, which never seem to have a flight plan, yet always seem to fly together in a swarming flock, we don't question. We obediently pick whatever options are handed to us, often choosing based on what our neighbors have chosen. We make the best of the shadows on the wall, but we do not question the wall. The best prison is the one with invisible bars.

Perhaps one reason for this complacency is the large quantity of material goods available to the chain gang. Material goods are often used as compensation. Frequently, when someone is depressed, the advice is "Go out and spend some money. Buy yourself something nice. Treat yourself. Try a little retail therapy." People don't seem to realize that this attempt to feel good is exactly what propagates the problem. Compared to people just 50 years ago,

modern wage slaves live a life of material abundance. They're consumers. They have big-screen TVs, movies on demand, microwave ovens, food processors, and 24-piece flatware. They own multiple pairs of shoes and enough clothes for more than a week without doing laundry. They have carpeted floors, matching furniture, and vacuum cleaners. They have expensive toys. They have car payments, college degrees, five-bedroom/three-bathroom mortgages, laptop computers, cell phone contracts, power tools with 108-piece bit sets, premium cable, air conditioning systems, blenders, food processors, pool tables, DVD players, and granite countertops. They redecorate, attend sporting events, go on vacations, and occasionally play with their toys.

Society has made it very easy to spend money. Shopping centers line every street. Many creative means of spending money have been devised. Instead of spending 30 seconds opening a can of tomatoes with a traditional can opener, it's now possible to spend 30 minutes working to pay for an electric can opener that can open the can in the same amount of time. Similarly, many of the ways we used to do things have been redesigned to ensure that instead of doing it ourselves, we can buy some gadget or some service to have it done for us. This is convenient, because we're usually too busy working to pay for it to do it ourselves. This is the gist of the service economy; presumably, if we didn't create enough problems to spend time solving them, the economy would collapse.

To speed up consumption, it's possible to obtain loans and spend money that's yet to be earned. All it requires is a promise of increased amounts of work in the future, and a commitment of up to 30 years to pay the money back--plus twice the amount in interest. Lots of personal finance gurus are willing to charge you money (some will do it for free) to advise you as to exactly how to distribute your money into retirement plans, college savings plans, mortgages, credit cards, etc. to maximize your lifetime consumption. Success and power are equated with spending money.

It usually starts with toys for the children and quickly evolves to cell phones and fashionable clothes. Many realize that demonstrating their personal values through the color and build of their cell phone is perhaps inadequate and then move on to bigger and more expensive propositions like large cars, redecorating, or kitchen renovating. Not that there's anything wrong with such creative outlets, but the scale of these "projects" is often mind-boggling, with tens of thousands being spent on marginal increases in functionality. The old but typically fully functioning items are discarded, especially if they have those ugly 1970s earth tone colors, or that bland 1980s beige, or whatever we had in the 1990s, *etc.* Try for a moment to envision the large pile of abandoned yet functional telephones, TVs, furniture, toys, old clothes and shoes, LPs, CDs, and packaging material

that you have discarded so far in your life. Such stuff doesn't magically disappear. It goes somewhere, typically a landfill. Now multiply that by several hundred million people--not cool! In the same vein, tally up the sum total of your earned income so far, subtract your savings, and compare the difference to your pile of stuff. Was it really a good deal?

Is spending the most productive years of your life chained to the job market to collect a lot of rarely used stuff that gathers dust in the closet or takes up space in junkyards a wise choice? Were you really born just to die, leaving a large pile of discarded consumer goods? Probably not. I realize that not wanting a house full of things makes me look weird and recently even "unpatriotic." After all, more is better, and who doesn't want to be better? But perhaps conformity is not the only way to live. In fact, by taking the other end of the bargain, saving as much as other people are spending on wants, it's possible to retire and live on invested savings after just *five years of full-time work*. Rather than increasing the amount of work to acquire more stuff, reducing this superficial need reduces the amount of necessary work. It's possible to reduce the amount of work all the way down to zero: financial independence. Indeed, playing the shadow game for five years provides a permanent way out of the cave. Alternatively, it's also possible to return to the cave for a few months every year to earn money for the next adventure out of the cave. This is living *on* the economy, so to speak, rather than living *in* the economy.

The resulting freedom can be spent on personal projects such as reading books, visiting places, entertaining, exploring, cooking, learning, and experiencing. It can also be used to start businesses, engage in a second career, care for family members, etc. without worrying about having to support oneself. This book explains how, but it really becomes quite simple once you realize that the option is there. I have done it, and others have, too. In my mind, financial independence provides a greater sense of balance to one's life compared to doing just one thing. In addition, it doesn't postpone this balance until traditional retirement age, when people who have been stuck in the same place all their life decide that they need to travel, only to find that they're sick of traveling after a while because they never figured out exactly what makes them happy.

The most frequent objection to casting off the chains is that living on something corresponding to every third paycheck, or even every fourth paycheck ($6,000-$10,000 a year), as opposed to living paycheck to paycheck, must be a boring life. Not knowing any better, I must admit that I started my own adventure with such assumptions, but back then the knowledge and the wisdom relevant to such an undertaking wasn't as easy to come by as it is today. I had to discover everything from scratch. I grew up as a consumer and spent my money

on increasingly larger toys. I knew a ton about various CPUs, and how to match memory and graphics cards to build the ultimate gaming platform. I also had pretty good hand-eye coordination from many hours spent playing computer games. Like most consumers, I was wholly ignorant of ways to attain a high-quality life without spending money. This is why retirement savings goals are frequently in the millions. Those--and they're a majority--who have to pay for every convenience really need that much to replicate a median income lifestyle. As a lifelong consumer used to spending large amounts of money to obtain food, stuff, and entertainment, it's hard to imagine how it's possible to spend practically nothing on furniture, a few dollars on clothing, very little on food, almost nothing on transport, and generally less on rent/mortgage.

However, it's possible to live on a third or even a quarter of the median income, putting one solidly below the government defined poverty line, without living in austerity or eating grits. There is no reason to pay "retail." You can enjoy the fun of beating the system that exists to take your money and live a middle-class lifestyle on a quarter of the usual numbers. But why aim low? Why not live an upper-class lifestyle and think of yourself as a poor aristocrat? It requires a somewhat different approach, though, and it requires some skill. It also requires a reprogramming of "the way we've always done it," or, rather, the way we usually do it. In fact, a frequent question I get when I talk about frugality is what kind of things, like CFLs or pressure cookers people should *buy* to become more frugal. Wrong question, dude!

Leaving the cave takes some effort. It would be easy if the framework or mental modes of thinking outside the cave were similar to the shadows. In that case, I'd write a list of 25 ways to save money, 25 ways to earn money, and 25 ways to save time, and you'd just add them to your checklist and squeeze them in during your lunch hour. It's acceptable to use these lists as inspirations, but don't follow them like recipes. You'd be missing the point. To paraphrase Einstein, you can't solve your problems with the same mindset that created them. To live as a free person, following lists of easy, repetitive things, possibly in return for some reward, is exactly what should be avoided. Instead, it's necessary to understand how the world works and how people have been specialized to the point of general incompetence, like ants, which only know how to do one job, but do it very well; this is not human nature. To live well, one must go beyond lists and start thinking creatively about solving problems. One must accept a lot more personal responsibility than merely showing up on time, following orders, checking off boxes, and trying to fit in. One must learn the general systemic rules that allow one to improvise and really live life the way it was intended--in your own way, rather than following checklists devised by some random guy,

like me. One must start thinking creatively about how to solve problems. Most of life's challenges can be thought of as problems with solutions. Some problems are self-created; one must learn to avoid these. A common solution to problems is to go and buy some product. Too weak to open a lid? Go buy a tool rather than exercise to become stronger. Want to barbecue, but don't have a grill? Go buy one instead of making a fire pit.

Perhaps the best advice to overcoming this consumerist tendency to "buy, buy, buy!" is to study alternative sources of information. Ignore most of the personal finance books out there. They only explain how to play the game by the rules. Instead, use the rules to play a different game. Remember that the shadows on the wall are just a part of life. There's no reason to only follow the rules of the shadows. I have been inspired by many different sources: books on backpacking, observations of animals and ecosystems, boating, cycling, people living in cars--even the homeless. I have read books on systems theory, biology, physics, finance, as well as more practical manuals on plumbing, house wiring, construction, etc., and then I have adapted these ideas to my own life.

To successfully break free of one's chains, one must build an overarching philosophy of what it means to live, which is different from the consumer philosophy of "follow advice/orders; work; get paycheck; spend paycheck; get stuff; repeat." Those who merely try to implement small changes like "25 Frugal Tips To Save Money" to have more money to spend have actions that are entirely misaligned with their goals, and they will fail for exactly the same reasons that most diets fail. What's more, they will have experienced much mental anguish before finally capitulating and declaring, "Enough of this frugality," or, "I want to splurge; I deserve it," or, "I give up; I'll just hire a professional." No, one's entire philosophy must change. Later on I offer a philosophy modeled on the Renaissance ideal of the 17th century and the craftsmen of the 18th century who wrote the Constitution of the United States at the peak of the Age of Enlightenment. This is a framework of complexity where a person is skilled in more than just one area. It is, in a way, a contrarian approach to the contemporary idea of "one man-one specialization." It's an interlocking way of arranging one's life. In risk management parlance, one wants to transfer from a tightly coupled linear system of financed consumerism to a loosely coupled, complex system of the financially independent Renaissance man.

Naturally, I do not expect everybody to like this philosophy. We typically tend to like philosophies that are already somewhat aligned with our personal values and talents. For example, books like this one, which first tell you that everything about our current society is wrong, and then try to offer an

alternative, are mostly a reflection of the author's values rather than an absolute view. We're all different and it's up to each of us to develop, grow, and walk our unique path. This is what it means to be human. One thing is certain, though: conspicuous consumption is not a natural state for all of us.

This change isn't easy. Not everybody can do it. In a sense, it's like running a marathon or getting into shape. Running a marathon is technically easy, but few have the persistence to actually go through with it, and even fewer are already in such a physical condition so as to do it without preparation. Mental blocks are similar. It's much easier to say that something can't work than it is to find a way to make it work. There are always excuses. "I don't want it enough;" "It'd be nice, but I can't do it," they say. Of course they can do it. There are no laws of physics that forbid it. There are, thankfully, no laws of society that forbid it, either. They just prefer their convenient, predictable, and comfortable misery. So don't expect people to immediately understand when you start casting your chains off. There will also be resistance from "well-adjusted" people who like to see everybody fit a particular mold and who don't tolerate anyone with different values. They'll tell you that you are unrealistic and irresponsible, and maybe speak of duty: "If you don't work, you're lazy. If you don't spend, you're unpatriotic." Yet these same people may feel stuck in a life of quiet desperation--stuck because they've convinced themselves that everything is good as long as others are living the same way. In the best case, people will be slightly amused at what a crackpot you are: "Yes, that is interesting and may be fine for *you*, but *I* could never..." Even once you're living the good life, they will still not understand, because according to the shadows, what you're doing doesn't make sense: "But you don't have a lawn!"

However, you might be surprised to see that eventually the people around you, your previously doubting friends and family, will start to adopt some of your behavioral patterns. While they will not take the lead, they will follow your example. What Gandhi said; "Be the change you want to see," may sound trite, but that doesn't make it untrue. It works far better than trying to institute policies! You don't need to wait for change while gathering forces; just change. If enough people do it, it will start a slow revolution from the bottom up. When people have more time as a result of working less, because they need less money to satisfy their wants, more things will get done, because it's the right thing to do--the world will be slightly better for it. For those who choose to do it, attaining financial independence in a handful of years will provide them the time and freedom, the lack of which has previously prevented them from getting things done and caused relations with friends to stagnate or degenerate into acquaintances or "networking opportunities."

Financial independence and extreme early retirement are still for the explorers and the pioneers of a new lifestyle. They will be followed by others. Now there are few to follow, but I predict that within a decade or so there will be many others--more on this later.

# Is this for me?

The methods presented in this book don't rely on a combination of risky techniques coupled with once-in-a-lifetime opportunities such as bull market investment returns or leveraged or correctly timed real estate speculation, all of which are hard to replicate. While such methods are interesting to read about, they fall into the high-risk/high-return, personal anecdote category, where only a few people win. Also, typically, when books describing such opportunities finally come out, it's too late to implement their methods, as the market has already peaked.

In this book (and in my life) I have chosen to rely on methods that work regardless of external circumstances, as long as your country has a market economy and does not force anyone to work. However, as mentioned above, just because the methods are universally applicable, it doesn't mean that everybody will adopt them and follow through. This book is, after all, about leaving Plato's Cave and prescribes a lifestyle makeover rather than simple, quick fixes to patch the problems of other lifestyles. To use a sports analogy, this book will teach you how to think and work out like an athlete so that you can become an athlete, rather than present a few easy workouts to lose a few pounds and "get into shape" before the beach season begins.

It might be helpful for readers to get an idea of whether they're ready to leave the cave. What follows are a few questions which might indicate whether someone is a good fit for the proposed changes.

**Are you completely happy with your life?**

This question is important for anyone contemplating change. Anyone who thinks their life perfect is unlikely to want to change anything. However, perhaps you're not completely satisfied with your life, or maybe the way the world works doesn't quite make sense to you. For instance, why do we still work eight hours a day, 50 weeks a year, when we're twice as productive as we were 50 years ago? Why do we have children, then send them away for most of the day shortly after they're born? Is there more to life than more work and more stuff? Can happiness be bought?

**Do you want to live on a solid foundation?**

Many people get married, start a family, or buy a home without a solid financial foundation based on savings. Instead they borrow heavily hoping to make up the difference later. This can easily turn into a lifetime of

struggling to make ends meet because such a large fraction of the income goes towards paying interest on past consumption when it instead could be used to live better. For example, people could work less and spend more time with each other. A good financial foundation allows parents to raise their own children instead of outsourcing the job to daycare centers and babysitters. A good financial foundation allows people to spend more time working on things they want to work on instead of working on things they have to work on to pay the bills. In general, financial independence creates much more flexibility and allows a greater choice of how one lives.

**Do you want to start a business?**

Being financially independent you can take risks with your time to focus on projects which don't require an immediate payout to justify your effort. If successful, working for yourself can be more remunerative than working for others, because you receive the full benefit of your efforts. The biggest cost of a startup is often the salary you need to pay yourself to live. Not having to pay this out of company funds allows you to invest the money back into the company. In addition, you can focus all your effort on the company instead of working other jobs to support yourself.

**Do you dream of doing instead of having things?**

Is your job getting in the way of doing what you want to do? Nobody lives forever and sooner or later people realize that their lifespan is finite and that someday they're going to die. This revelation occurs retrospectively when people hit their forties and ponder what they've done with their life so far. It's called a mid-life crisis. The question you need to answer is what you want to do with your life given that you don't have the time to do everything? Do you want to spend most of your life paying off the interest of a 30-year mortgage and working so you can fill increasingly bigger houses with increasingly more stuff while being stuck in your daily commute in increasingly nicer cars? Or are you prepared to give up the stuff so that you can do whatever you want, whenever, and wherever, within reason? What will your legacy be--what you owned or who you were?

**Do you believe life is an adventure?**

The average man leads a predictable, some would say boring, life. He is expected to get a college degree and a career, buy the things that are advertised on TV, get married and have children, and then get a mortgage and a retirement plan. Our culture of conformity doesn't allow much choice. Do you find it difficult to accept this constraint of choice? Do you find it difficult to pursue your passions when you have to hold onto a full-time job to pay all the bills? Does your job zap your creative energies? Many people,

particularly young people, are starting to realize that the pursuit of happiness isn't found through the pursuit of accumulating things. They don't drop out, they opt out and forge their own path, starting up Internet companies, traveling the world, and retiring early from the rat race so they can spend their lives living rather than just buying stuff. Which do you prefer?

**Do you want to make a difference?**

The "system," which many of us like to blame our problems on and yet count on for our solutions, is not really governed by a mysterious group referred to as "them." The world that we live in is the aggregate sum of the individual behavior of all of us. "They" are not responsible for our world. We are! You are! Unless you are a dictator, a rock star, or another person with enough influence to facilitate a top-down approach with decrees or manifestos, the most effective change starts with individuals using a bottom-up approach. You have to become the change you want to see. You have to set an example for other people to follow. If you're not part of the solution, you're part of the problem. Unfortunately, many people in our culture are part of the problem. We're concerned about our dependence on oil imports and the resulting wars, yet we drive 30 miles to work every day to pay the bills. We're very much locked into an economic and behavioral model that conflicts with our values. What other choice do we have? Well, read on!

Society offers you a deal: Get a student loan; get a college degree; get a mortgage and become a homeowner; build your life with a deck of credit cards. Just sign on the dotted line and before you know it, you're on the hook for a house, a car, the basic "human needs" of cable TV, fancy restaurant visits, cell phone and gym subscriptions, and a house full of toys. After a few years, it'll be hard to imagine life without all that stuff. You will, therefore, spend all your life working in a possibly unfulfilling job to pay the bills for all the things you signed up for. If your job brings you down, you buy something on credit as a reward, dragging you further into the spiral of addiction. You'll be living in a virtual debtor's prison, except you'll only see the bars if you miss a payment. If you have debt, you're not a free person. You're explicitly owned by your debt and implicitly owned by the creditor. You put 15% of your income into a retirement account for 40 years, plan to retire at 65, then try to spend the remainder of your life making up for lost time and health. Are you willing to take that deal? If not, there's another way: Don't accept the chains; leave the cave.

Changing your frame of mind is key to escaping, but change is a challenge. This challenge can become a struggle if your frame of mind is incompatible with your adopted lifestyle. In other words, you need to believe in your lifestyle as an end rather than as a means to an end. To wit, runners and other athletes sometimes get the reverse *cum hoc ergo propter hoc* comment that they're already fit, so they don't need to exercise. Yet their diligent exercising is exactly what causes their fitness. How is doing good, creating wealth, establishing connections--in short, accomplishing anything--any different?

Accomplishing something is more effective with a theory that is compatible with your reality. Such a theory must, like all theories, be built on principles that have been developed from understanding the patterns in observed facts. Here I seek to produce a map rather than a set of directions. Directions are succinct and useful until you get lost or need to change your plans. Maps allow for optimization and the freedom to choose your destination, but they require navigational skills.

To navigate a map, you must first understand your present environment objectively; that is, your reality must match *the* reality. It would not be an exaggeration to say that anyone who has been brought up in our modern way of life knows very little about their environment, except a few particular details they need to operate some machine in a job, push papers around a bureaucracy, or manage those who do so. A broad view of the world is therefore described in The lock-in. You must then understand how your environment, your present position, and your destination relate to the map. You must understand how your environment affects your choices as well as your motivation for choosing. This is described in Economic degrees of freedom. To get somewhere you must have a deliberate purpose in mind and a vision of the destination that drives your actions. This vision is described in The renaissance ideal. To make deliberate choices, you must know how to creatively deal with your environment. Strategic choices relate present actions to future actions. A set of general strategies or guiding principles for maximizing utility and efficiency according to your values is given in Strategy, tactics, and guiding principles. Individual examples of tactics are given in A renaissance lifestyle. Since everybody's situation and goals are unique, these are intended more as examples that illustrate the principles of the previous chapters than as actionable to-do lists. Foundations of economics and finance discusses financial independence and extreme early retirement. There is tremendous confusion as to what extreme early retirement means, most likely because only a minority of extreme early retires choose to replicate the lifestyle--usually an endless vacation--of those who defer their retirement to old age.

This book gives you the tools and shows you how to use them. However, it can't give you experience in using them, nor can it give you the courage to do it; that is up to you.

# Barriers to change

To change, many barriers must be overcome. Having previously overcome barriers, overcoming new barriers becomes much easier. You may want to cross-train for a new lifestyle by first completing a marathon, a PhD, or something equally arduous, like building a house of cards. The decision to overcome barriers can also follow from shocking events. For instance, many decide to become healthy after they, or someone close to them, experiences their first heart attack or something equally serious. Similar epiphanies occur after temporary job losses during an economic crisis.

Barriers include not knowing about an activity or its benefits, the belief that the activity is difficult to engage in, social disapproval, or the belief that there are more benefits in continuing the present behavior. People will naturally choose activities that they believe to have high benefits and low barriers to entry--the quick and easy way to riches. Benefits and barriers vary significantly between people. To some, walking half a mile is fun, or at least as natural as putting on a pair of pants, whereas to others it represents a significant labor to be avoided. Some have the same aversion to merely getting up from the couch. Most importantly, the proposed behavior may compete with one or more other behaviors, where doing the proposed activity excludes another activity, or is simply believed to exclude another activity.

It'll often be the case that activities associated with the highest benefit, such as moving into a smaller home or giving up personal car ownership, also have the highest perceived barriers. In addition, choosing these activities means rejecting other activities, such as driving out to get a bottle of shampoo because you forgot to buy it earlier this morning and simply "need" it for tomorrow morning. Living in a small home means rejecting the pleasure of filling up rooms with stuff from the mall. Not surprisingly, the most common reaction I get is, "This sounds a bit extreme," or, "This may be fine for you, but I prefer something that is more akin to what I'm currently doing."

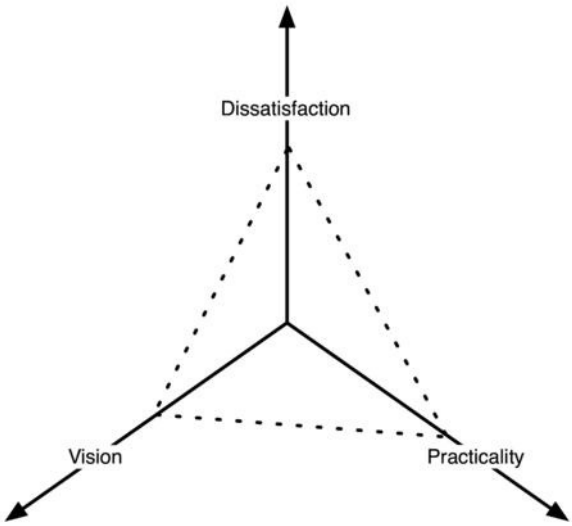
Hence, to convince you of something, I either have to convince you of

- the benefits of the proposed behavior (see Foundations of economics and finance).
- the surmountability of the barriers to the proposed behavior (see A renaissance lifestyle).
- the marginal benefits of the competing behavior (see The lock-in).

- the foolhardiness of the barriers to the competing behavior (see The lock-in).

Many people associate their ideas and thoughts with who they are as a person. This is a significant barrier, since admitting that an alternative is better is perceived as a personal failure. Barriers are therefore raised to protect the ego and avoid a change of perceptions. This is done by adopting one of the counterstrategies to the list above. The most common counter-arguments are that the barriers to the proposed behavior are too high: "I can't give up my car." The second most common counter arguments are that the benefits of the proposed behavior are too low: "I don't know what I'd do if I didn't have to go to work all day every day." The third most common is that the barriers to the competing behavior are low enough: "I'm already doing it this way--I got too much invested already." The fourth most common is that the benefits of the competing behavior are sufficiently high: "Although I'm miserable, at least I'm comfortable." This varies depending on who you are.

Barriers represent a cost which must be paid. The willingness to pay depends on a combination of dissatisfaction with the present situation, vision of the future situation, and the practicality of changing from the present situation to the future situation. This will to change can be represented by the volume of the pyramid in the figure.




The volume of the pyramid represents the will to change from an unsatisfying situation to something else and depends on vision, how practical the change is, and the level of dissatisfaction with the situation.

Intuitively speaking, if either dissatisfaction, vision, or practical first steps are lacking, it's unlikely that action will be taken. Specifically: If dissatisfaction is low, obviously no change is going to happen. Why change strategy if you're

satisfied with the way things are?

If vision is low, this can lead to a situation of comfortable misery where the vision isn't strong enough or too scary to allow change. A high level of dissatisfaction can be accompanied by low vision in cases of depression, loss of faith or vision, or by external circumstances. For example, the mistake many make when becoming frugal is that they don't replace their previous vision of accumulating more stuff with an equally strong vision of doing something else. Giving up the current vision thus results in feelings of deprivation, and is, in a sense, a loss of faith and even identity. If, however, you follow a different faith than "the Church of Shopping," then not partaking in the shopping ritual won't be a deprivation.

Dissatisfaction with the current situation may be high and the vision of an alternative may be high as well, but without a plan, this can only lead to frustration. There must be a strategy or at least a plan, and it must be practical. To get things done, it's much better to have a plan than to have passion, at least insofar as you act on it.

Finally, there is the issue of perceived cost. If the cost is too high, change is not going to happen.

Changemongers thus have the following four variables to play with:

1. Increase your dissatisfaction with present situation.
2. Strengthen your vision of future situation.
3. Build a plan to get from the present to the future.
4. Lower the perceived cost of the plan.

Motivation depends on the individual too. For instance, I'm motivated by avoiding negative outcomes such as feeling bad. Others are motivated by striving for positive outcomes such as feeling good. I prefer to change instantly and radically. Others prefer to change slowly. I have written many of the suggestions in the following chapters in the spirit of changing away from something negative immediately. If you feel differently about change, modify my approach to suit your personality accordingly.

# The lock-in

We have come to a point where spending money is one of the few recognizable signs of success. For instance, spending half an hour in a traffic jam getting from A to B in an expensive car is considered more successful than spending half an hour in a traffic jam getting from A to B in a cheap car. I'm not sure why that is. Even more puzzling, both of these is considered more successful than spending 25 minutes getting from A to B on a train or spending 20 minutes on a bicycle getting from A to B while passing cars in a traffic jam.

Similarly, it's considered more successful to sit on a couch in your home, if there is an additional unused couch in an additional unused room, compared to a house with no unused couches or no unused rooms. In the real estate market, a house with a greater potential for unused rooms generally commands a higher price than a house with fewer but constantly used rooms. Perhaps there is personal fulfillment to be had in cleaning and maintaining a larger home? Or perhaps the fulfillment comes from paying someone else to do it?

Many men spend as much time on manicured lawns as some women do on manicured nails. I'm not sure I completely understand the point of pouring drinking water on a lush green lawn--not to mention the sidewalks--among the rolling brown hills where we live, when lawns are inedible and all the birds in the neighborhood seem to flock to our freely growing flowers, which don't need any watering. However, the homeowners association refers to naturally occurring vegetation as weeds; they think they know better than the birds.

Recently, much attention has been paid to great kitchens and great kitchen appliances, while less attention is paid to great cooking and great cooks, except those on TV. Why boil eggs in a pot when there are 350 varieties of electric egg boilers available? A common misconception is that money is better--or is that "more successfully?"--spent on granite countertops and restaurant-strength food processors and burners than on cooking classes and practice. Who has the time anyway?

This behavior is pervasive. People with more money than time buy $3,000 road racing bicycles with ultralight carbon frames to shave two pounds off the bike, regardless of the fact that they themselves are probably at least 10 pounds overweight, and only take a slow ride once a week because they lack the leg power to go faster and the time to go more often. Compare this to the amateur enthusiast with more time than money, who rides every day and thus has the

power to ride his much less expensive bike much faster. Who enjoys riding more?

For recreation, many believe that saving for a year to drop a large sum on a hectic one-week vacation in an exotic locale is more recreational than staying closer to home and taking a month off to relax. A hectic tourist experience is considered very successful.

A prerequisite for this kind of consumer success is spending money. This money must either be inherited or earned. If that isn't possible, it will be borrowed. Most are not lucky enough to win the birth lottery and inherit their money, and so they have to earn their money. Since acquiring the things that demonstrate success only requires the short time needed to purchase some item, and practically no time actually using or enjoying said item--that is, unless a five-bedroom/three-bathroom home can be enjoyed remotely from one's cubicle while at work--people can dedicate most of their time to earning money rather than using and enjoying the things the money buys.

This results in having little time to develop skills other than spending money, which can be witnessed by the confused helplessness modern people demonstrate towards solving problems without spending money or arguing on the phone with a service representative. Consumers are used to buying or arguing their way out of problems. For $150 you can buy a propane grill at the supermarket or you can spend $300 to have a plumber fix a drain, but a person doing these things has learned nothing. Make a habit out of this and you'll become helpless and deadly afraid of losing your income, as the work-spend method only works as long as there is sufficient income.

Hence, so much effort is expended on earning money or finding ways to earn money that people mostly don't fail to work 40, 80, or even more than 100 hours each week, leaving little time to question their lives or otherwise get in trouble. Of course, being overworked comes with its own problems, such as stress, insomnia, and high blood pressure, but typically these problems can be solved by spending money to eliminate, or at least cover up, the symptoms--money that, ironically, has to be earned by additional work. In many ways, modern society seems to be using a slightly more complicated version of a Keynesian economic stimulus scheme where the economy is stimulated by having some people dig a hole, then having others fill it back in the next day. We create problems, spend the next day solving them, and then claim we have made progress. We're even following Keynes' suggestion quite literally when we dig resources out of the ground, fashion them into consumer objects, temporarily store them in our homes, rarely use them, and eventually replace them with a new and bigger model, while sending the old and likely still functional object to a landfill--back

in the ground.[6] Sure, this increases economic growth, which is a measure of how busy people are turning their money over, but is being busy a good measure of wealth?

For years, I've been wondering whether there is a small group of cynical people who are pulling our strings and intentionally creating problems so that others may solve them, or whether we're all pulling each other's strings because we're too busy paying attention to day-to-day problems like paying bills, going to work, and keeping up with all the shows on TV.

Seen from the outside, the above-mentioned behavior makes no sense. However, when seen from the inside, everything makes perfect sense, because personal values and personal behavior eventually become aligned with the interest of the status quo. Having a job so that the bills get paid and one can go back home every night and pass out in front of the TV is what the good life is all about, right? Most people would agree, because most people can't imagine any alternatives. They are, in other words, prisoners chained to the floor in Plato's Cave.

To break away mentally, one needs to be conscious of the fact that one is chained to the floor in Plato's Cave. The best way to understand this is to see the cave--that is, your current perspective--from a different perspective--namely, looking into the cave from the outside. Here is what I see.

# Education and training

Children naturally try to emulate their parents, at least in the early years, and for the most part a child's values are a direct reflection of his parents', either conformingly aligned or diametrically opposed. Traditionally, parents have played a large role in their children's upbringing. Through watching and emulating, children learn life skills such as respect for others, the virtue of doing chores or performing a day's work for a day's pay, balancing a checkbook or keeping track of money, how to judge value, how to get good deals, eat inexpensively, cook a meal and do dishes, bake bread, clean, declutter, ride a bicycle, tend a garden, hang up a shelf, or fix a plugged drain. However, as people have increased their expenses, households now require two incomes, and thus, as it so often goes in our time, parents have outsourced their children's upbringing and, possibly taking a lesson from their own situation as wage slaves, they now act as managers of their children's lives and careers rather than as role models, signing them up for extracurricular activities that are so very important for their résumé to get into their dream college. What happened to spending all day kicking a rock around or catching frogs in the creek? For that matter, what happened to the frogs?[7]

Fortunately, most of the skills necessary for success as a consumer and wage slave are taught in the institutions of the public school system. It's not the subjects that are taught so much as it's the way they're taught. During children's typical 12-year stint in the public school system, the most "successful" (read well-adjusted) learn not to question authority, not to ask questions which don't pertain to the task at hand, to follow procedure, that trying is better than doing, to be a team player, and not to stand out. Most importantly, children are trained to sit still for increasingly longer time spans while doing mentally menial busywork. During recess children learn the importance of being well-liked and fitting in--that is, being unique and special within a certain restricted range. These are the essentials for later success on the job. If it wasn't for this behavioral training, the limited subject matter that is actually taught could be accomplished much more quickly. However, imagine what would happen if 12-year-olds with the same intellectual power as high school students, but without the acquired discipline and dulled creativity to sit still and follow boring work procedures for extended periods, suddenly flooded the job market. Would they even want a job?

The mass education in high schools reflects the mass production of the real

world. The teaching style has one teacher (supervisor) lecturing (leading) 20-25 students (workers) sitting in rows, much like a manager and his employees. Practically all problems that are presented are closed-form problems where there's only one answer that, by construction, can be found using the methods in the textbook. The subjects taught are selected to be testable, preferably using standardized exams with predefined answers. This means that most subjects are mechanical rather than organic in nature, in the sense that they have a well-defined problem with an easy, step-by-step method of arriving at a solution, rather than an open-ended problem with nonlinear and complex solutions. There is therefore an advantage to focusing on memorizing the textbook rather than attaining a broader understanding. This is excellent training for intelligently following procedure, but also a powerful counter-training against using intelligence creatively.

The testing structure is fairly simple. Some chapter in the book will have a paragraph which reads, "There are three known instances of..." while the test will have a question, "Name the three instances of..." This is not much different from a job, where there are three kinds of burgers for sale and the cash register has three pictures of burgers (press the correct one), or three kinds of situations with three different forms to fill out one for each. This kind of education doesn't instill much permanent information, and it doesn't require much deep understanding of the fundamentals. It doesn't instill knowledge and it certainly doesn't instill wisdom--in that sense, I guess it's much like the news media. What it mostly does is to test the students' intelligence and short-term memorization skills, and their willingness to use these talents to maximize their test scores and grades. It's fortunate that most office jobs don't require much prior knowledge from the job applicant. The procedures for most jobs can be learned by a sufficiently intelligent person with a sufficiently good memory and the conditioning to concentrate on the same task for long hours. Many employers, however, don't hire people without the required proof of achievement and conformity--that is, a degree.

Meanwhile, many subjects that could be taught in school are not. It's probably safe to say that adolescent children growing up in a "primitive" tribe understand the world around them by the time they reach adulthood. They know which plants are safe and which are poisonous. They can hunt and cook and they know the real nutritional value of various foods. They can clothe themselves. They know how to fix and even build a house. They know about sex and having children.

On the other hand, people in our "advanced" civilization know practically nothing about our world. Despite being wholly dependent on technology for all

our needs, few understand how technology provides us with light, heat, food, communication, transportation, *etc.* All we know is how to turn on the ignition and press a button so technology magically performs its intended function. Despite their "education," students are still left to magical thinking and are thus unable to understand the direct causes in the world around them. Specific functions are thus associated with specific (brand name) products rather than the operating ingredients and construction of the product. It would never occur to them that the majority of their collection of 20 different and highly advertised cleaning products could all be replaced with the vinegar and baking soda which people used to use. It would never occur to them to chop garlic with a knife instead of using one of the many different designs of garlic press.

This product-oriented thinking extends to health. The connection between lifestyle and health has been lost. The focus has moved from a healthy lifestyle to affordable health insurance, making health a product rather than a state of being. Cardiovascular problems resulting from stress and lack of exercise can be solved by purchasing triple-bypass operations and popping specialized aspirins. People have heart attacks because they don't see the connection to their stressful, unhealthy lifestyles, and people die from heart attacks despite being surrounded by bystanders because practically none of them knows CPR or basic first aid. Critical thinking has been replaced by opinions derived from pundits and political and religious leaders since people prefer having other people think for them. World affairs are replaced with celebrity reporting, and satirical news is often more analytical than real news.

In conclusion, after "growing up," the only thing children know is that problems are solved by buying products; that in order to buy something, one needs a job; and in order to get a job, one needs a college degree, which happens to be considered a brand name product as well.

## College degrees

A high school diploma used to be sufficient to obtain jobs in most vocations except a few professions which required advanced studies, like engineering, science, medicine, accounting, and law. This isn't the case anymore. Today, the only way to join the rank of salaried professionals is with a college degree, despite the fact that 85% of college graduates eventually find jobs in a field different from the one they graduated in. This is no surprise, as normal office job functions generally require little knowledge of underwater basket-weaving, *19*th century Hungarian clog art, or other things of academic interest. A college degree has thus come to serve as an admission ticket to the white-collar job

market, as employers deemed that the selective process of getting through a college education is perfect for selecting the most mentally disciplined workers. Salaried, white-collar jobs are desirable because they're thought to provide superior and stable pay and fringe benefits. They're also perceived as less strenuous and less dangerous than manual labor. Today, there are notable exceptions to this perception. Lifestyle diseases associated with sedentary stress caused by pushing paper forms around with little autonomy and few tangible results diminish the health advantages compared to the small chance of having your arm ripped off in a centrifuge, say. In addition, a skilled machinist or driver can often make more than a mid-level office worker with equal years of tenure, and be able to find work anywhere. A self-employed electrician or plumber should be able to clear six figures and set his own hours. Yet young people seem unaware of this, and thus everybody, even those with no aptitude or desire for intellectual challenges, try very hard to get into college no matter how it may impair their future earnings and financial independence.

While the service sector has slowly grown, and as employers have come to prefer college-educated job applicants, demand for college degrees has gone up. Colleges and universities have responded by lowering academic standards and raising their prices, much like other producers of consumer goods and services respond to rising demand. This has resulted in an overabundance of college-educated people with useless degrees. This creates structural unemployment, which is generally bad for society, bad for the unemployed, but good for employers. Hence, the continued calls for more education, even though it's sometimes hard to see the reason. For instance, it's not unusual to see job advertisements along the lines of, "Must have a Bachelor's Degree *and* be able to lift *50*lbs," to get a store manager job that would have been held by a high school graduate a generation ago. Perhaps one will need a PhD just to man the cash register at a burger franchise one day...hey wait, what?!

As universities keep lowering their standards and thus decreasingly serve as centers of higher learning, they increasingly function as issuers of credentials, where students have little purpose other than trying to maximize their grade point average once they get in. Hence, admissions standards become the dominant factor. Consequently, universities focus on screening methods, while students focus on how to get around them. Many resources are spent on an endless war of attacks and counter-attacks as students and their parents attempt various strategies, including hiring highly compensated admissions consultants, to beat the admissions standards.

Many parents realize that their children will have an advantage if the children start building their résumé a little early, such as in preschool. In an

effort to build credentials as early as possible, parents push their children into advanced classes, expect high grades, and call the children's teachers if they don't get top grades. Super-parents will put in any amount of effort to ensure their children's "success." At age three they'll send the kids to day care centers that command a heavy price to make the children multilingual and continuously engage them in mentally stimulating activities for eight hours a day. Parents will gladly relocate to another school district to ensure that their children go to the best schools. Parents will manage their science fair projects for them, projects that at the high school level are beginning to look more like undergraduate-level research projects, complete with outside collaborations. They will pay for tutors and test prep materials, the latter of which prioritizes cramming for and passing a test rather than learning the underlying material, and they'll make sure that little Suzy and Johnny have the correct solutions for their math problems if they can't figure them out themselves. Rather than being left to figure out their own playtime, children are pushed into highly structured, adult-supervised extracurricular activities which take up most weeknights, to pad the résumé with the awards and honors they need to make their college applications stand out amongst the thousands of others who follow the same strategy.

Once inside, the main mission has been successfully accomplished. This is the end of the journey rather than the beginning. Students just have to pass the time during four years of "edutaining" lectures on arcane subjects while maintaining their grade point averages like they did in high school, dutifully cramming a few weeks before the examination date, only to forget most of what they learned as quickly as they memorized it.

If you are sufficiently smart and ambitious to get into a top-ranking university, the value added by the educational institution apparently doesn't matter for your future success. In other words, top-tier institutions don't add value to create talent as much as they select or discover it. Thus, if you were smart and ambitious enough to actually get into an expensive top-tier university, you don't actually need to go to a top-tier university to succeed in life.[8] The ambitious and smart people realize this, drop out and go start their own companies. Those that are merely smart, stay, but quickly learn to select a college degree tailored to their desired job or income-level, and to select the courses with the highest grade-to-effort level in order to maximize what employers are looking for. I knew several people like that--very boring people--they never knew anything outside of their textbooks, and two weeks after an exam, they had forgotten practically all of what they had crammed for. Today, they're highly successful white-collar workers! The educational system works, just not according to its stated purpose: to educate.

As students have come to view education as a product, and parents are still only a phone call away, professors are "encouraged"[9] to make education "edutaining." Students now think that if they don't learn anything, it's a failure of the teaching process, or the teachers, rather than their own failure to study. After all, they paid for it. It's not what you can do, it's what you can buy, which matters.

With student evaluations now determining the career path of young professors, and young professors determining the career opportunities of young students, professors and students have adopted a nonaggression pact: Professors give entertaining and easy courses in exchange for good evaluations. This way, professors get tenure so that they can get back to publishing papers and writing grant proposals to bring in grant money. Such "soft money" is sometimes a substantial part of their salary, and often the reason they got hired in the first place and sometimes the only way they get to keep their job. Students get their degrees, and everybody is happy--except those that came to learn and be challenged, and in many cases went deep into debt for the privilege. It's not so much the educational growth of the graduates that matters, or the teaching skills of the professors, as much as it's the image of the school, the imposing campus buildings, and the habits acquired from several years of following procedures, executing consistently, meeting deadlines and solving closed-end problems with limited degrees of freedom, statistically quantified into a single grade point average for convenient ranking and quick sorting.

In the grand scheme of things, the functional purpose of universities is thus to sort students into future vocations rather than the commonly believed purpose of broadening their horizons in a useful manner. Ask a college graduate when the last time was that they read a book from one end to the other; the answer may surprise and depress you. Despite this, it's possible for individual students to get a broad background in college. Smart, if not street-smart, people abound. However, it will come at the cost of a high grade point average, as the student focuses too much on particular interesting subjects or courses which may not economically provide the optimal grade point return on student effort.

While college means different things to different people--whether it's a place for higher learning, a two-to-four-year binge party, or simply a brand name admission ticket required by the job market--the increasing demand for education and resulting higher cost mean that many students take on debt. Student loans are often considered an investment in one's future. What most students forget is that the only way that they can sell this asset is by working off their debt. Also, except for possibly MBA students, few people do a discounted cash flow analysis to verify that their "investment" actually has a sufficient

internal rate of return. It's perhaps surprising that many trade schools have higher rates of internal returns than college educations. They cost (much) less, have shorter times to graduation, and due to the overproduction of people with college degrees, the latter no longer bestows as much economic benefit compared to the trades as it used to. Despite this, many young people keep believing that their best shot at a middle-class lifestyle is a college degree, just as the lower class spends almost 10% of their already limited income on lottery tickets to achieve their financial dreams. Yes, 10%![10]

# Career

Most career people's lives are dominated by schedules and procedures. They get up at the same time every day. They take the same route to work and sit at the same desk and do the same things day-in and day-out for many years. At the end of the day, they go back along the same route. They have various chores and activities scheduled until they go to bed at the same time. Maybe they occasionally go to a restaurant, the movies, or a sports event. Weekends are like evenings--structured around chores that didn't get done during the week, like laundry, cleaning, and sleeping. Vacations are arranged in the same manner--if not taken between job transitions, vacations are spent a few days here and there as people spend one day traveling and then frantically go around and try to see everything they want to see before they head back, exhausted. The reward for running on this treadmill occurs not through the satisfaction of doing a good job, but from the semimonthly paycheck.

Similarly, much effort goes into spending money. Money is spent as a reward for the drudgery, but also because people perceive that there's nothing better to do with it. Often, money is spent in the most inefficient way possible, by using credit cards, then making minimum payments, thus paying for the item twice over in interest alone. Enjoyment is often limited to buying things because there's no time to use them, since the buyer has to get back to work and earn more money. Measured in terms of gross domestic product (GDP) growth, this cycle is highly productive, but it could be argued that the net effect is not very productive at all. Thanks to advertising, nobody knows when enough is enough, even though running out of space in the garage should serve as an indication. Material wants are universally believed to be infinite in scope.

On top of that, everyone seems to want a cut of your earnings. The harder you work, the greater the cut. The tax authorities want their cut, and the more you work, the more they want. People want money to manage the money you don't spend, and money to take care of the things that you don't have time to take care of yourself. This requires more work and, hence, even more costs in terms of day care, business clothes wear and tear, expensive haircuts, power lunches, and snack bars. People run harder and harder but somehow don't seem to get ahead, continuously bleeding money as luxuries become wants, wants becomes habits, and habits become needs, and so they slowly die a financial death by a thousand nibbling ducks.

Living to work and spend, it's not surprising that people derive their main

identity through their job title and their purchases: "What do you do for a living and which brand names do you buy to express your lifestyle?" Despite a doubling of productivity over the past two generations, our culture is still perpetuating the old ritual of eight hours of work, eight hours of sleep and eight hours of spare time, even though this should have been reduced to four hours of work, eight hours of sleep and 12 hours of spare time by now. Maybe people are just doing what they have been told to do by parents, friends, politicians, and others. There is massive stigma associated with occupying one's time with things other than working and buying advertised goods.[11] A tremendous amount of effort goes into career advancement, to earn more money and buy more stuff. Countless books are written and many workshops are given on how to stay late to appear dedicated, how to leave early to appear efficient, where to sit and how to sit, how often and loud to speak at meetings to be noticed by the boss, how to handle performance reviews, and how to worry about other things that are essentially beyond your control anyway and thus cause a lot of stress. Similarly, experts explain which questions are asked in a job interview, which responses to give for the best impression, and how to word a résumé so that it'll stand out amongst the hundreds of other résumés that follow exactly the same advice. While such advice appears to be helpful, it only serves to increase the competitive pressure. It's just like Hardin's Tragedy of the Commons. In turn, employers make a big deal out of finding employees with the right fit, people who either learn or are naturally talented at playing the games of the system. The nascent consumer should already have had practice at fitting in and being popular from high school. In fact, high school athletics is a good preparation for today's corporate world due to importance of "team play." Similarly "having no life" (nothing wrong with that, but you know what I mean) is a good preparation for life in academia.

The Darwinian "survival of the fittest" often has undertones of "survival of the best," a belief that the "fittest" are happy to reinforce. The distinction should not be forgotten, though. In competitive environments, the selection isn't for the best but for those that best fit the environment. People are not selected for the best attributes, they're selected for the fittest attributes. A world without trees selects the short-necked giraffe, which is better adapted. Similarly, the career track selects people who are willing to give up their lives for the sake of work.

Most promotions are governed[12] by the requirement for seniority. This means that a superior has to be promoted, retired, or fired before an inferior can be promoted. Naturally, this predictable trajectory of promotions is subject to demographics. Hence, if you want a good estimate of your career prospects,

have a look at the birth rate as a function of time. Also, during periods of economic growth and rapid expansion, promotion is much easier than during periods of contraction or stagnation. If you ever wondered why your boss is incompetent or why it's so hard for you to advance, chances are that he started his career during a period of economic expansion, which required scraping the bottom for all the new positions to be filled, while you didn't, relatively speaking.

Salaried wages lead to an employer preference for longer work hours. Also, employers have fixed costs and thus prefer workers to work the capitalized assets as hard as possible. By paying higher wages and limiting the number of jobs on high salaries, employers can make workers compete for these jobs. Advancement doesn't work on the model of a ladder as much as on that of a pyramid. As workers spend more time on the job, it leads to a dependence on the job, since little time can be spent on alternative pursuits. Having several income streams is in fact highly dangerous to worker motivation. This is why capital income is generally cordoned off into special retirement accounts with penalties for withdrawal. This is also why many employers discourage workers from working competing or even noncompeting jobs. In addition, debt plays a major role in locking people into working for most of their lives. It used to be that marriage was seen as a lock-in: Unlike a bachelor, a husband would need a job to take care of his dependents. Today this is no longer the case and being single is more of a lock-in since the family income isn't diversified by a working spouse.

A consumer life is one of intense specialization. Most do a single job without much concern for the greater whole. This is why such great importance is placed on fitting in and being a team player. Conversely, it also means that few participants in society really have or attempt any understanding of larger issues like climate change, geopolitics, and population issues, or why, despite our advances in technology, we still work as hard as our grandparents did. Such problems are typically left to "them," but do "they," the experts, really know what they're doing?

## Specialization

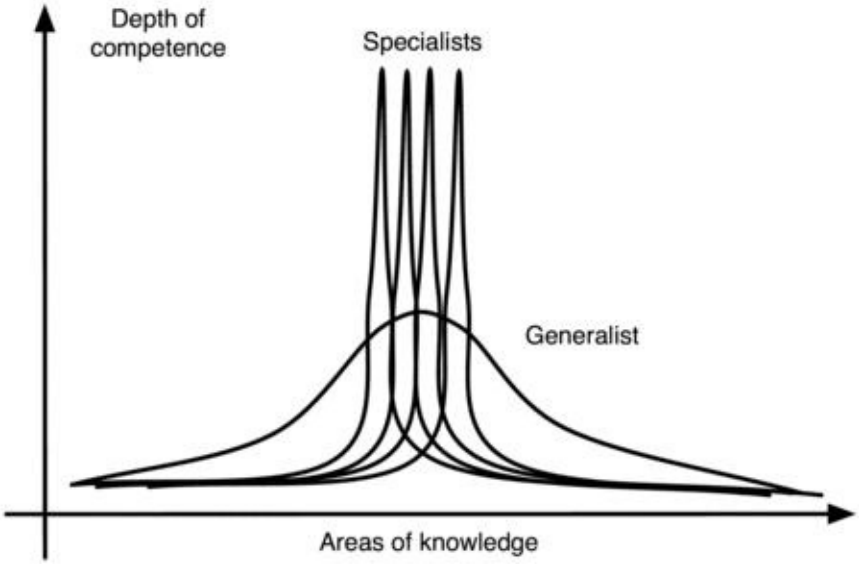
Our educational system and our business leaders all advise us to "become a specialist." The reason is that while generalized skills are very beneficial, they don't fit well into the existing system. The existing system requires specialists--cogs that fit into a system that has already been built. Specialist knowledge is much cheaper to acquire for mass production purposes than is generalized knowledge. Imagine all the skills one would need to acquire to build a car from

raw minerals that were dug out of the ground. It would take a lifetime to acquire sufficient skills to make a single car, after which one would be too old to make more. If, instead, several people learn just one simple skill and are organized into an assembly line, the reduced time spent on learning allows them to produce much more. Given the limitations of human intelligence and lifespan, specialization is the only way to rapidly produce sophisticated products.

In that sense, the complex skills of building a car have been transferred from the master craftsman up to the factory system, which has gotten very complex, with computer-controlled assembly lines and inventory management. Conversely, the system tries to divide labor into as narrow specializations as possible to cut costs. Using again the example of manufacturing a car, specialization can be narrowed to the point of replacing people with robots that weld a single piece of metal.

## The cost of specialization

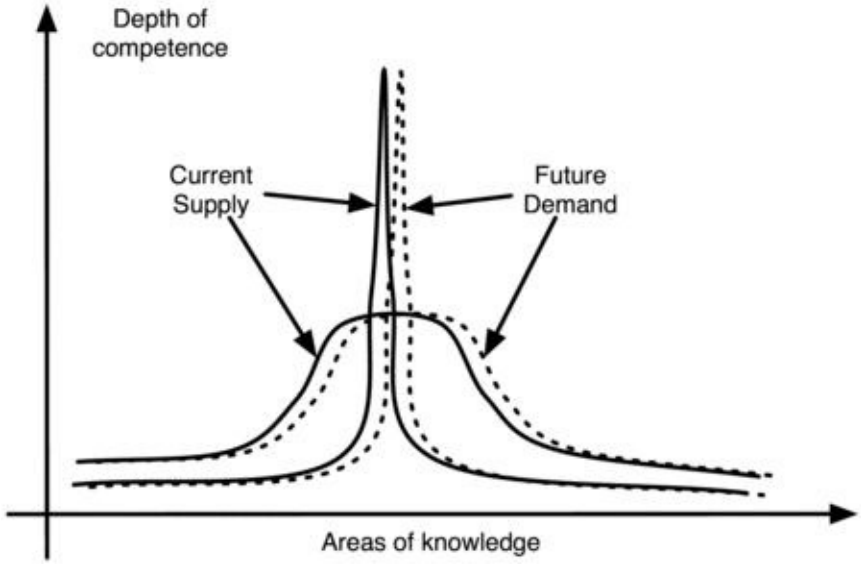
It's obviously more expensive, both in time and money, for Person A and Person B to gain the required amount of knowledge in both fields X and Y than it is if A were to concentrate on X while B concentrated on Y. In this way, both can gain the same depth of knowledge in half of the fields, in half the time. Alternatively, they can get twice as much knowledge in the same field in the same time. It follows that the more a field is further split up into subfields, the less expensive this knowledge gets. These cost savings can be used to reach even deeper levels of competence (see this figure).




The knowledge of a natural philosopher in the 17th century was so broad that he would cover several fields such as mathematics, physics,

chemistry, meteorology, etc. (illustrated by a broad bell curve) Compared to a modern-day scientist the natural philosopher's knowledge on a specific topic could be said to have been remedial at best. On the other hand, a modern scientist knows very little, even when it comes to basic things, outside his own field of specialization. This is solved by having many more scientists, each covering their own narrow subfield.

It's important to realize, though, that just because humans are getting more specialized doesn't mean they're getting smarter. Given these limitations, it's clear that the depth of specialization comes at the cost of narrowness of specialization. Having a narrow but deep knowledge means that one doesn't have much broad knowledge or broadly applicable skills. The marketplace compensates for this by making available, at a price, the products produced by other specialists. However, the individual specialist is subject to the risk of being stuck with a useless skill if the demand for their particular skill suddenly vanishes due to outsourcing, or stagnating wages due to competition. Specialists that have invested their entire knowledge in skills useful for employment risk suddenly finding themselves without income in a changing world. Hence a lot of effort goes into continuously acquiring new skills while discarding old ones. Many find it stressful to keep up with the technological drift of their specialization as new methods are continuously introduced, requiring them to discard previously acquired knowledge.




This figure shows a narrow delta function representing the skills of a specialist. A dotted line and an arrow represents the shift in demand. The demand now lies almost entirely out of the specialist's supply. This requires the specialist to work very hard to stay on target. The figure also shows a wider bell curve that represents the skills of the generalist. During a similar

demand shift, the overlap between the new demand and the generalist's supply is substantial.

Here, a large problem is that previously acquired, specialized knowledge can't be used as a foundation for new specialized knowledge--by definition, only generalized knowledge can serve this purpose. The only thing the specialist knows is how much effort it took to reach the level of the former specialization and that this must now be repeated probably several more times throughout his career.

In other words, a specialist has acquired a lot of specialized knowledge at a cheap unit cost in order to be competitive. However, given the low unit cost, this knowledge is not a solid basis for further professional growth; rather, it's expendable. The means to survival for a specialist is his ability to rapidly learn new subjects, quickly produce saleable works, and then move on. This is called skimming. It's the same strategy pursued by weeds, to use an ecological analogy. At the expert level (see Gauging mastery), a person needs 80-100 hours a week to stay competitive. For masters level, it's 60-80 hours, and to remain competent requires 40-60 hours a week.

The professional need to forget and relearn can be hard to accept, especially for dedicated specialists who personally identify with, self-actualize through, and take pride in the knowledge they have spent years acquiring. These are people who consider their work an expression of who they are. They usually produce the best work, the "cathedrals" of their professions. Conversely, they're also at the highest risk of burning out when the market or their employers force them to tear down their cathedrals and build something else. Those who maintain a professional distance from their knowledge and treat it like school courses and exam-passing fare better. These are the people who build the "cookie-cutter homes" of their professions, which are ideally suited for mass production. These are the "professionals."

Creating a system based on specialized production thus increases productivity, but at the cost of increased risk to and pressure on the individual. Another feature of specialized work is that it depends on expending resources such as time and energy. Therefore, specialization is not an optimal strategy for those who seek balance in their life. Those who take some time or energy off to pursue other interests will surely be overtaken by another specialist, who sleeps less or does not have other responsibilities. The competition is intense.

A further problem that causes systemic inefficiencies is that advancement inside the system is subject to the Peter Principle, where people are promoted as long as they're competent in their current specialization. This creates a problem as specializations change, and a person might get promoted to a specialization,

typically management, where he isn't competent (his highest level of incompetence) and never will be. In such a system, work is only done by those who are yet to reach a position in which they're incompetent. Although some institutions have made efforts to eliminate the detrimental effects of this principle, it's still observed in many places.

## Job competition

As mentioned above, specialization has another problem. Competition is very difficult because it's hard to compare the actual skills of the specialists. In some cases, the desired skill level for a position is reached by several competitors, who are all sufficiently good. If there are plenty of competitors, the decision process breaks down, becomes fuzzy, and starts depending on things that are less connected with the skills in demand. In those cases, getting the job begins to depend on intangibles which are generally outside the control, and certainly outside the specialization, of the worker. Of course, there are plenty other specialists who will sell advice on what to wear, how to format a résumé, which clubs to join, *etc.* This is good for the system, but less beneficial for the individual.

Large amounts of time are spent picking the few winners of this game. One might argue that the function of a college education isn't so much to provide education as it is to produce college dropouts, who are willing to accept lower paying jobs. In other words, a college education is a sorting mechanism. It does not stop there, though. A so-called career provides a similar sorting mechanism. People frequently talk about climbing the corporate ladder. However, a ladder implies that if one climbs hard enough, one eventually will get to the top. In reality, it's more like a corporate pyramid. Not only does one have to climb hard; one also has to beat the other climbers as the pyramid gets narrower and narrower.

While this system tends to promote those with the required skills to best play the game, it causes much stress and wasted effort. Since so many are used to thinking that employment-based income is the only way to get ahead, they spend all their effort on their job to the detriment of their home life, despite employers paying lip service to work-life balance. Here, one solution is to moderate one's career ambitions. After all, realizing at an early point that going all the way not only depends on skills, but also requires 100% dedication, reading time, and possibly some ethical compromises, one can aid in the sorting process by consciously seeking positions suitable to one's more moderate aims and avoiding unnecessary competition. Those with less foresight are forced to lower their aims

through career burn out.

In summary, the work system is designed so that most people have been specialized to as far down the production chain as possible. Specialization makes people replaceable either directly through advances in technology or through competition between many others with similar skills. Specialists are like cogs in the system and they tend to have very simple interfaces with it.

# The pursuit of stuff, status, and happiness

Our culture was founded on the idea that maximizing production equals maximizing happiness. In the past, pursuing this goal was admirable since any increase in production resulted in an increase in well-being: better food, better medicine, better clothing, better housing, better work, and better living. At some point the focus changed from better to more: more food, more medicine, more clothing, more bedrooms, more bathrooms, and more work. But can we honestly say this still results in better living and greater well-being?

The changing focus--from *better* to *more*--signaled the transition from a producer economy to a consumer economy. Whereas the biggest problem of the producer economy was how to produce and distribute enough goods to survive--a problem that still hasn't been solved on a global scale--the biggest problem of a consumer economy is how to clear the market of overproduced goods.

There are two ways to solve this problem: either produce less or increase consumption. Various strategies for working less, such as more vacation time and longer educations, decrease productivity.[13] Yet, there are many more strategies for consuming more--government strategies as well as corporate strategies.

Government strategies, driven by the political currency of popular votes, comprise inflation-inducing monetary policies, which cause people to spend their money now rather than save it for later, and fiscal policies, which promote government projects ranging from military expenditures and wars to job-creating projects, such as building bridges to nowhere, to direct stimulus packages for the consumers--formerly known as citizens.

Many profit-driven corporate strategies are based on fashion, planned obsolescence, unneeded upgrades, and masterful emotional manipulation --marketing--causing people to continuously replace goods which are still in good working order.

Although these strategies seem to fail tactically in an almost predictable fashion, with booms and busts, recessions and depressions, or simply chronic mismanagement, when centrally regulated and directed, the strategies have proven immensely powerful on secular time scales. One result is that humanity has used up half of the oil--an ancient resource generated millions of years ago--within a span of a century, while measurably affecting the world's biosphere and climate. Since such resources are finite, these strategies can't be sustained. Economic growth--how quickly resources are converted into consumer goods--is

considered desirable by the economic profession, while biologists, psychologists, and sociologists are tallying up the losses. However, if individual companies measured growth in the same way--by generating income while ignoring that the income is generated by rapidly burning through their capital assets--shareholders would be protesting. In a world where automation has eliminated pride in workmanship from the products and nobody has time for much else than work, status is based on acquisition and accumulation. The purchase and consumption of products has become a surrogate for creating and doing. Self-worth and status, then, are not about intrinsic values such as who you are, what you can do, or what you know; they're about extrinsic values like what you can buy, the car you drive, the number of bedrooms and bathrooms in your home, and the price tags on your clothes. Witness the popular shows about highly stylized homes with a TV in every room--TV being a way of consuming your time rather than your money--expensive furniture, and art prints on the walls. Now go and look again, but pay attention to the number of books on the bookshelves, the tools for the hobby projects, the work in progress spread out on the desk. There are none. What empty lives these people must live.

Having substituted consumption for creativity and technical skills, shopping becomes a form of self-actualization--there's no small number of teenage girls who associate personal growth with changing their wardrobe--"retail therapy" becomes an active way of feeling good. Shopping, then, becomes an end in itself rather than a means to an end. Rather than designing for yourself, purchasing professional designs or brand name-associated "lifestyles" becomes the preferred way of expressing who you are, and consumers start connecting with each other based on the things and brands they buy. Such consumption manifests itself in different ways.

For some, status-driven experiences are sought out. Rather than refining experiences, like learning to identify bird songs during a walk in the park, new and more exorbitant experiences are sought out, and travel agencies are happy to offer them up. Many such trips resemble harried business trips rather than relaxing vacations. "Work hard, play hard."

Others attempt to create meaning through collecting; that is, a systematic form of hoarding. Entire industries have been created that appeal to the hoarding instinct, creating things to collect with no use value whatsoever. These things don't even have any intrinsic or collectible value, but consumers collect them anyway and work hard to do so.

For many, status is associated with expensive items thought to be fitting for someone with a higher salary. Certain jobs are associated with certain levels of spending. This means that the price itself is often considered a complementary

good--the item is considered desirable simply because it's expensive. This locks one into a spiral of "upgrading": An expensive shirt leads to the purchase of an expensive suit; the car must match the expensive home. An increase in pay allows one to buy goods which previously seemed like a luxury. Another increase leads to another upgrade. Soon these become a normal part of life and people start identifying with them. When you identify with an object, you're defined by the object, then controlled by it, and ultimately owned by it. If you relate to your possessions, you're owned by your stuff, and it will make many of your decisions for you. This trap is not only mental, but also physical.

When moving into a new place, there's a tendency to rapidly fill all rooms with furniture (and TVs)--perhaps there's a taboo against empty rooms? Those extra rooms, which are rarely used--the so-called media rooms, the basement bar, the craftsroom--are then used for storage space and slowly fill with stuff that people "need" yet never use. In fact, in many houses, those rooms, like attached garages, serve no purpose other than storing unused stuff and furniture. This of course makes it challenging to move into somewhere smaller. In particular, the very idea of moving is rejected because it requires too much effort. So not only are people attached to their stuff, they're also attached to their homes.

Continuously accruing stuff soon makes any home too small, regardless of its size. Therefore much effort has gone into optimizing total square footage including repurposing the garage and parking the car on the street. People don't seem to realize that the quest to bring more possessions in through the front door is a chronic disease, and that the shortage of space is a symptom rather than an underlying problem. Consequently, modern homes are mostly big, poorly constructed, poorly located, and financially leveraged. Like the big gas guzzlers used to drive back and forth to them, they're very energy-intensive, and thus, in light of nascent resource constraints, are also outdated and old-fashioned.

Ironically, buying things is often used as a "deserved" reward for hard work: "Why don't you go and buy yourself something nice?" The idea is that work is drudgery, so in order to ease the pain, the money earned working is spent on some gadget, thus requiring more work. This spiral makes little sense, so either work isn't so bad, or perhaps there is another reason for this behavior. One reason may be that many people are salaried full-time employees. They can't choose to work any less, so they might as well spend the superfluous money they earn.

As a result, no matter how much someone earns, expenses tend to match income. This is called lifestyle inflation. Without the wisdom to determine when enough is enough, consumption is taken to its extreme and people still work as much as ever, if not more, despite doubling their productivity over the past half

century.

On the homefront the growing use of time-saving technology doesn't result in time saved either. Rather, it results in more being done. For instance, thanks to the washing machine, clothes are now washed more than ever before, and as a result households spend as much time doing laundry as they did before washers moved into people's homes.[14] It seems to be a tragicomic fact that every time-saving invention is immediately canceled out by an increase in activity or a change of behavior. When the automobile was made affordable to the masses, people moved further away from work and further away from stores. While transportation speed increased, transportation distance increased proportionally, keeping transportation time constant. It did, however, result in the creation of the auto industry, and thus created jobs.

On the surface, job creation may look positive, but all it has accomplished is to replace a previously simple and noneconomic activity, such as walking, with an entire industry of building cars, highways, and oil rigs to accomplish the same task of getting between places. Cars can go many places, but most trips can just as easily be done in an hour of walking by choosing one's home location wisely (see How to find shelter). If you wish to go further, there are other means as well.

Many other activities which people used to do themselves have also been turned into products. Consequently, people spend time working to buy products rather than learning and doing the activity themselves. The result is a downward spiral of fewer skills -> greater need for technology -> more work -> less time to practice the remaining skills -> further loss of competence. The more things consumers think they need, the more control they relinquish over their lives and the more their lives are shaped by the products they own. Thanks to the focus on technology, many skills have been forgotten--eggs can't be boiled without egg boilers, bread can't be toasted without a toaster, and the counter can't be cleaned without dye-colored chemical products. Walking five miles is now considered an ordeal to be avoided. Nobody with a conventional frame of mind would spend one hour walking every day when they could drive. Yet people don't stop to reconsider spending 10 weeks each year working full-time to pay for that car just to avoid the inconvenience of a daily hour of "laborious" walking and fresh air.

This idea of economic growth seems to be a very intricate version of digging holes and filling them up again. It creates economic growth in the traditional sense, but so does breaking a window and replacing it. What is ignored are wasted effort and natural resources, which should be subtracted from the growth calculation to reveal a more accurate number of how well people, not the "economy," are doing.

# The problem with personal finance

Finance is the process of exchanging cash flows between one period in time and another through the use of financial contracts. The cost of this exchange is the interest paid by the borrower (see Financial cash flow cycles). The longer the time period, the higher the interest. The interest will always be paid in the future, by definition. The only possible cost in the present is a fee. A typical example is the simple interest loan where the lender lends the borrower a sum--the principal--in exchange for regular payments of interest until a day in the future when the borrower will pay the full principal back to the lender. Another example is the fully amortizing loan where the lender is paid back in constant payments comprising decreasing amounts of interest and increasing amounts of principal over the period of the loan. Typically a fee is also added to the payments.

Financing is a useful business tool. A business is an organization that exists primarily to generate profit for its owners through the sale of goods or services to consumers and the employment of workers. Others would say that businesses exist primarily to keep folks busy--that is, to provide jobs. Using financing, a business can leverage its operations by borrowing money to spend on investments to increase future revenues. Future payments of debt and interest are then made using the higher revenue. This shifts the cost of money from a less productive present to a more productive future and allows the business to earn profit faster and earn more profit compared to a business that operates without debt.[15]

## Mortgage, car-loans, and consumer debt

Unlike businesses, consumers rarely use debt to invest and generate an income. Instead, they use debt to purchase consumables like vehicles, houses, furniture, and electronics, which don't generate income. In this case, interest is no longer the cost of doing business. It's now the cost of living beyond one's means. This cost ranges from typical mortgage rates to typical credit card rates multiplied by the outstanding debt. Over the lifetime of a consumer this adds up to substantial amounts of money. Consider a typical six percent mortgage that runs 30 years. Here the total interest over the years is ~105% on top of the cost of the home. For those who are just starting their repayment, interest and finance charges comprise almost all of the monthly payment--home equity is mainly

built towards the end of the repayment. It's very hard to become wealthy and financially independent this way, and predominantly making interest payments is more accurately thought of as paying rent while being responsible for all the expenses associated with home ownership.

All debt comes with a contractual obligation of repayment, which is usually structured to last 30 years to minimize individual monthly payments, but definitely not to minimize the total number of payments, which is maximized by increasing the maturity of the loan as much as possible. If the maturity is extended in perpetuity, the interest payments become similar to rent. If the only means of repayment is a job, this means that working must also last at least 30 years. This way, a single decision just after leaving school turns into a lifelong commitment that can be very hard to escape, given that the borrowed money has been spent on increasing consumption rather than increasing production.

Most major consumption is financed. This means that money spent on major consumption has not been earned by those who spend it. This has a drastic consequence for the way the market sets the price level of anything that can be financed,[16] and today, anything--even a fast food meal at a burger franchise--can be financed through unsecured credit. Specifically, things are priced not according to how much money people have saved, but how large a monthly payment borrowers and lenders think can be made in the future. This is set by the interest rate, which is partially manipulated by the government, and credit ratings, which are partially manipulated by individual consumers, lenders, and credit rating agencies. These facts change the way people think of money. What you have saved becomes less important than what you can potentially borrow.

The consequence is that the cost in terms of hours worked is no longer fully appreciated, and people work and spend more--sometimes far more--than they would if they paid cash, counting on being able to pay it back in the future or rolling over the debt, thus being forever locked in. Many even spend so much that they can't pay it back, leading to misallocated resources which could have been spent more fairly by those who earned the money.

The systemic consequence of this waste is that prices in a debt-driven society are higher than they would be in a cash-driven society, simply because more money (credit) is chasing the goods. This leads to bubbles and crashes due to credit being either too cheap or too expensive, and a psychological lag leading to a bipolar economy of alternating optimism and pessimism.[17] It would appear that economists, or the effective majority of individuals who engage in lending and borrowing, haven't yet been able to perfectly model future demand and supply, and thus an economy that is built on predictions of future demand and

supply (by the pricing of future payments in the form of the interest rate) is inherently unstable.

Ideally, personal finance shifts cash flows around in time so that money is available when it's most wanted and paid back when it's least wanted. However, this shifting comes at a price in terms of fees and interest charges. In particular, many people who don't know any better will simply make the standard choice, which effectively involves contractual obligations to work all of their life in exchange for houses, vehicles, furniture, electronics, and other stuff. To wit, a salary or even the potential of a future salary seems to be a gateway to the debt drug; so many people could probably reduce the risk of getting into debt by simply quitting their jobs.

## Savings and investments

When credit and consumer financing is widely available, the personal savings rate is close to zero. Few really want to save when they can count on credit cards for large purchases or to carry them over in case of a job loss. As such, interest works in reverse. Rather than saving up money and receiving interest along the way before spending it on a purchase, credit is used to make the purchase immediately. Over time, the debt is paid off, along with interest, until the payments are sufficiently low that one can go into debt again. This inverted sawtooth pattern happens on several different time-scales, the longest being the mortgage, with shorter time-scales for car loans, home equity loans, and lines of credit, with credit card loans being the shortest. Often, the latter are rolled over and thus constitute a permanent drain on one's earnings. Naturally, this is an inefficient and costly way to handle one's personal finances.

It's risky too. First, if new loans are the only way to raise cash, because all existing income goes towards bills and cost of living, and new loans are not available because credit has been maxed out, then a sudden need for cash--for example, to fix a leaky roof, or any other emergency--is a serious problem. It can typically be solved, but only at very high interest rates. Sometimes interest rates are capped by usury laws, thus preventing a legal market solution. Second, paying off the loans typically requires steady monthly payments. If the debtor misses a payment, perhaps due to a temporary job loss or the aforementioned emergency, interest rates may be raised substantially, or the lender may repossess collateral. To prevent this, people either spend money taking out insurance against such a situation, either with the bank and credit card companies themselves or with third-party insurance agents. Self-insuring by keeping a number of months of expenses in a savings account, which people with jobs,

debt, bills, and other financial obligations call an emergency fund, is becoming an increasingly popular alternative.

Other common reasons to save include down payments on a house, car, vacation, education, or health. These expenditures can't be financed because they're unsecured or because the lender requires the down payment as a demonstration of financial responsibility. Naturally, other lenders are often willing to step in to finance the down payment at higher interest rates, thus eliminating the risk control of the primary lender's requirement for a down payment. Retirement for those who are too old to work and take care of themselves can't be financed by credit because of the difficulty in paying back the loan. Traditionally, those who are too old to take care of themselves have relied on having children and instilling a feeling of filial duty. However, those filial feelings are perhaps no longer as strong as they once were, with parents having sent their children off to institutions from a young age and only really interacted with them for a few hours a day, being busy with their careers and lawns. Children thus often prefer to send their parents to institutions of their own during old age, in turn.

Therefore it falls on institutions, in the form of the government and private companies, to provide for people during old age. The plans offered by private companies are either defined contribution plans, where the individual takes all the risk, or defined benefit plans, where the institution takes all the risk. In the latter case, the government is betting on the willingness of future taxpayers to pay a sufficient amount of taxes, and the companies are betting on the willingness of future customers to buy their products.

These plans are generally meshed with tax legislation, yielding tax benefits at the cost of losing access to the money until the officially sanctioned retirement age. This means that any such plan presumes that everybody will work until they're 60 to 70 years old, and that the tax-advantaged limits are set so that a majority of people will be able to save just about 10-20% of their earnings without losing the tax advantage. In turn, this means that workers need 30+ years on the job to gather enough to replace their working income with savings withdrawals (see Financial independence and investing). This also means that your typical financial planner will presume that everybody desires to work until they're 60 or 70 years old. Most importantly, it means everybody assumes that working until 60 or 70 is the only way to achieve retirement. With this frame of mind, it's not surprising that retiring at 50 is still considered early, despite the modern possibility of retiring decades earlier.

Thanks to a secular--possibly demographically driven--asset boom, it has become increasingly popular for individuals to save for retirement by investing

directly in the equity/financial markets, a job that has previously been handled by banks and businessmen, using the savings of the customers. This kind of "investing" is thought of as a savings account compounding at very high interest rates that are believed to manifest themselves as practically risk-free by waving one's arms and mumbling something about "the long run." However, dollar cost averaging--in the form of regular and typically automatic monthly contributions to a retirement account based on financial investments--is conceptually not much different from establishing a savings account in a foreign currency, except this one is denominated in company equity. Both suffer from the risk of needing to sell in a down market.

Dollar cost averaging naturally provides steady employment for fund managers and most everyone else associated with the stock market. Regular contributions are therefore sold to the public as something that is beneficial. In reality, dollar cost averaging is a double-edged sword. Proponents usually imagine a scenario of an initial market decline that recovers. In this case, even though the starting and ending price are the same, the average cost is lower, thus resulting in an overall investment gain. Now consider the scenario of a rising market that subsequently declines. In this case, the average cost is higher than the start and ending price, and the investor will have lost money. In fact, given that markets rise much more slowly than they drop, a dollar cost averaging investor is more likely to make an entry and invest larger amounts while the market is rising than during its decline. At its best, dollar cost averaging provides no benefit, but regardless, dollar cost averaging is an excellent way of providing steady work for Wall Street, which collects fees and commissions to invest the steady stream of money from workers.

The mutual fund industry typically charges around one percent of all assets annually, which over the years adds up to a substantial fraction, regardless of performance. Since the risk-reward profiles of most, but not all fund advisors are skewed--that is, fail conventionally and you're okay; fail unconventionally and you're fired; win conventionally and you're okay; win unconventionally and you're a genius--mutual fund advisors that wish to keep their jobs tend to flock together and behave like a herd. This has resulted in the growing popularity of "buy and hold" index funds, which simply mimic what everybody else is doing, on average, at less cost. Of course, the emerging behavior of such a strategy is eventual chaos, as nobody leads and everybody follows each other.

Buy and hold is an investment strategy with no exit strategy. What this typically means is that stocks are usually liquidated when money is needed, rather than taking into account when a given stock is overvalued. The aggregate effect of workers investing in this manner is to turn the stock market into an

elaborate demographical Ponzi scheme, where the value of investments depends on how many people are retiring and how many people are entering the labor market. In particular, it depends on the level of confidence that the most recent entrant has in the system, and hence this becomes a policy matter. Diversification doesn't prevent the effects of something as systemic as this. Instead, it reinforces the problem, as everybody behaves the same. If stocks are supplied and demanded according to how many are entering and leaving the workforce, then market price becomes dependent on demographics.

The consequence of retirement accounts and the reliance on automatic savings in equity markets is a large class of people who have very little equity ownership compared to their level of consumption. Nobody thinks of using improvements in technology and productivity to allow people to work less and require fewer assets to achieve the same standard of living. Instead, while everybody is richer, at least in terms of stuff, no one is any wealthier. Their wealth is "safely" out of reach. If it weren't, how many would still show up for work the next day?

Individual investment in productivity other than personal ability to work harder remains dismally low. Only a few entrepreneurs spend money on increasing their productivity to increase their current cash flow. Others have few asset investments outside of their retirement accounts.

# Retirement

Retirement is a relatively new phenomenon. It comes from people having decided that rather than using the time-saving technology and inventions that appeared around the first half of the 20th century to live a life of leisure, they would live a life of shopping and work until they could no longer function as useful--that is, income-earning--units in the production chain and had to be set aside.

With the institutionalization of society, where work and life and practically any and all activities are separated in space as well as time, people who were institutionalized as children are inclined to institutionalize their aging parents in retirement homes in return (see here). At these retirement homes, retirees spend their time doing the equivalent of after-school activities, with the family dropping in during major holidays, if they can find the time. This is considered normal.

Those who have accumulated a large amount of savings earlier than everybody else thanks to uncommonly high savings rates or stock options sometimes take early retirement. This kind of early retirement resembles a long vacation, which is essentially what it is. The retiree has no immediate plans to be productive, and if he did, he would just go back to his old job where his earning power presumably would be highest. Instead, money is spent flying to exotic destinations, sporting events, or far-flung friends and relatives, although golf, fishing, motorboating, and other nonstrenuous physical activities have gained some popularity. Although relatively rare--after all, there can only be so many financially independent people in a society--this is the kind of early retirement most people are familiar with and dream about, the kind of retirement that revolves around spending money.

# Breaking out

People stuck in their traditional ways of thinking often believe that the path to freedom and happiness lies in earning a little more money than they currently earn, regardless of how much they earn. However, despite our productivity--and, hence, our earnings--having doubled compared to two generations ago, I doubt anyone feels freer or happier about their earnings. The real problem is not how much we earn; it's how much we waste, perhaps to demonstrate our supposed wealth, when we spend it. As our productivity has gone up, we've increased the size of our homes and filled unused rooms with unused purchases, which just wait to be thrown out or given away. We're surrounded by the inedible landscapes of lawns and asphalt. We've moved far away from work and the market so we can waste time driving there, and money on maintaining our multiple cars. In our spare time we waste time watching TV, waste our bodies eating junk food, then waste money treating the results of those habits. These behaviors make no one better off, except those who sell the enabling products, who, as mentioned above, are often ourselves.

We have counteracted our increased productivity at work with an equivalently decreased productivity at home, and consequently we're no better off than before, except we work much harder and waste more resources. It should be clear that we don't make trees grow taller or better by planting more of them, as long as we keep cutting them down, but this is exactly the philosophy that is driving our current behavior.

Anyone with access to rich resources has two choices: turn those resources into waste or turn them into wealth; that is, they can be consumers or producers (see Foundations of economics and finance). What happened after industrialization took hold was that a few people became wealthy, ruthlessly eliminating waste by focusing on efficiency. Many more people started prodigally wasting the abundance of resources and goods that were suddenly at their disposal. This has now turned into a collaborative/exploitative arrangement, where a few get wealthy selling waste to the many, while the many are employed in arrangements in which they have little control over what they produce. Often, their only idea is to work harder and be more productive, or somehow join the few by finding a clever way to cash in on selling wasteful, low-value products and services.

As previously remarked, "It is impossible to solve a problem with the same kind of thinking that created it." Yet this is exactly what we're trying to do again

and again. You don't make a poorly designed engine run better by making it bigger (or smaller for that matter). The reason we do so anyway is that we don't know how to redesign it or that there are too many vested interests who benefit from not having it redesigned.

Recent years have seen many proposals for such designs. Some designs are social, requiring everybody to change; some designs are individual, but require the rest of society to stay the same lest they fail; and some designs, like the one in this book, work either way and thus remain robust while being immediately actionable. In the last case the social design will emerge from the widespread adaption of the individual design, as likely or unlikely as that may be.

The design presented in the rest of the book rests on three pillars.

- First, reduce waste and increase efficiency. It's possible to live with the same benefits as the rest of society for one quarter of what the average consumer spends. Many of these expenses are eliminated by only owning what is actually used, and maintaining what is bought. If widely adopted, the air will be cleaner, products will be built for easy maintenance, and things will last for decades. Many old businesses will shut down but be replaced by new businesses with a focus on quality and durability. People will have more time for each other. They will know the names of their neighbors.
- Second, having significantly reduced expenses, invest the difference in businesses. If widely adopted, businesses producing obsolete things which are no longer in demand will shut down, but new ones will appear, and it's a lot easier to change investments than it is to change careers. Alternatively, those with greater control over their income can choose to work less at higher efficiencies and save the money for intermittent periods without income. This works well for small business owners or contractors, who can decide to only take on the most profitable work and stop working when they no longer need money. It's difficult to run a small-time business and make an average income, but it's easy to make a quarter of an average income through multiple income streams (see A modular design). It's a lot safer, too, compared to the risk of losing a single income stream from a job. This is also useful in case the world as we know it ends and businesses and trade all break down. This has happened once in recorded history--namely, the Dark Ages, (see Leaving the Dark Ages and Investing and reasonable return rates) and being widely skilled (see Human capital and necessary personal assets) is better insurance against such an event than being an expert in pushing buttons on an assembly line, or pushing papers or

business plans at a desk.

- Third, find something meaningful to do instead of work. If your work is really meaningful to you, you can keep working, knowing that you are living a less wasteful existence and that you have the financial security to leave your job at any time. The latter in particular seems to make quite a difference in terms of what employees are willing to put up with or which customers business owners are willing to keep around. Initially, working at reducing waste will occupy some time, but once the methods are learned, this won't take longer than the usual method of buying a gadget or hiring a professional. Instead, it's necessary to find something else to occupy your time with. I don't cover this in great detail, having never lacked the imagination to find activities that are meaningful to me. Currently, I spend my "retirement" volunteering on the board of a small nonprofit, tending our garden, improving my hockey game, crewing in yacht races, learning how to repair mechanical watches and bicycles, blogging, and writing books such as this.

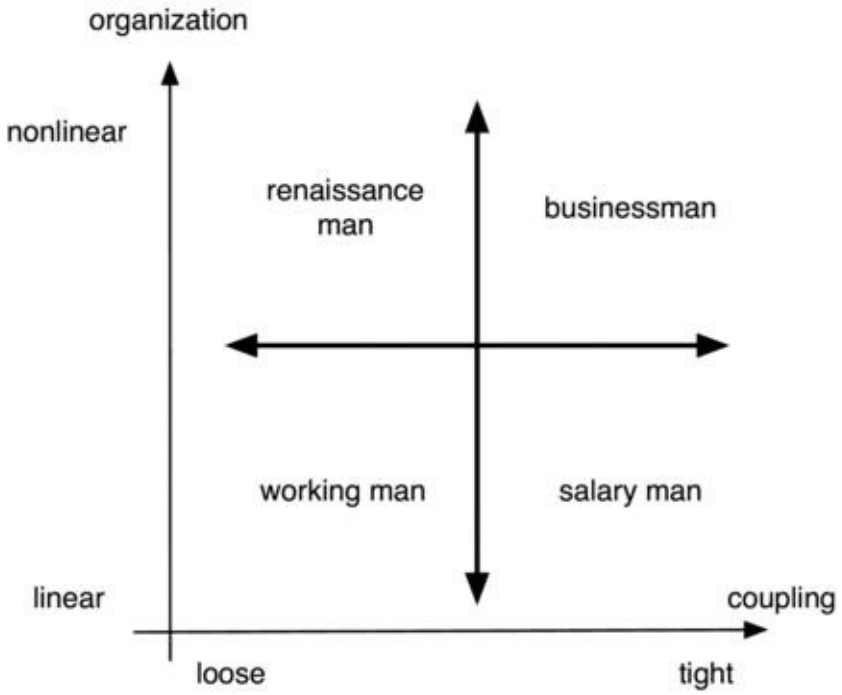
These three pillars can all be pursued simultaneously and they can interact synergistically. Each reinforces the other two, but none of them rely on the others. The money saved from reducing waste can be invested, and the method leading to savings can be cast as a meaningful activity. Conversely, meaningful activities can often provide income in a way that reduces waste. In addition, savings allows one to invest in better quality--for example, paying eight times as much for something that lasts ten times longer, instead of being stuck with a low-end model that only serves to increase waste and money losses.

# Economic degrees of freedom

To understand a system and its constraints, it is often helpful to identify degrees of freedom to see what possibilities exist within the system. For instance, a train has one degree of freedom: It can move forwards or backwards. A car has two degrees of freedoms. It can move forwards, backwards, left, or right.[18] However, when one degree of freedom has been hidden it can be difficult to identify it. For instance, if all cars were sold with a locked steering wheel, cars could only go forward or backward. Soon this restricted behavior would become normal. Roads would be designed to make driving without turning the wheels easier. The purpose of the steering wheel would be forgotten. First it would be turned into a clothes hanger, like much home exercise equipment. In later models it might be eliminated altogether.

A society that worships conformity has zero apparent degrees of freedom. This may be hard to understand in a consumer society which prides itself on choice. However, while the choices are abundant, they're restricted to a fairly narrow range. Consider shaving kits for men. These are restricted to various multi-bladed safety razors, in which a below-cost handle locks the consumer into a product line, after which more expensive replacement blades can be sold to recover the cost. It's getting increasingly hard to find the old flat single safety razor blades that can be sharpened. A straight razor can only be bought from barbershops, hairdressers, or specialized shops on the Internet. Not shaving at all is sure to make a person stand out. Thus, this is an example where the degrees of freedom for the consumer have been eliminated. It also shows the possibility of finding other solutions.

In democratic societies with a free market, and certain other societies as well, the economic possibilities of a member of society can be described with at least two degrees of freedom, as shown in this figure. One axis describes the *linearity* of the person's activities, while the other axis describes the *coupling* between the person and the activities, typically through an economic system.




Domain of economic behaviors described in terms of coupling and organizational structure. This divides the domain into four types.

Coupling is a measure of a person's dependence on the world, economic here. In principle, it also measures the world's dependence on the individual. However, except for billionaires, leaders of totalitarian countries, and rock stars, it's doubtful how much impact individual people have on the world.

A tight coupling means that one part depends strongly on another part of the system. For instance, the front wheels of a car are tightly coupled to the steering wheel, which is good. When the steering wheel turns, the front wheels turn as well. For a consumer, food, shelter, etc. are tightly coupled to a paycheck, which is not good. Much effort in engineering goes into establishing tight couplings between some parts--for example, the steering system mentioned above--and removing couplings between other parts--for example, not having the steering system coupled to the engine system. A tight coupling or a complete lack of coupling makes the response predictable. This is also useful in social engineering. For instance, a consumer that is fully dependent on a paycheck is more likely to stay employed and not quit his job. Hence, employers can make the supply of labor more predictable by only offering full-time jobs, which makes employees unlikely to go home early, and tying in generous benefits, which makes employees unlikely to quit.

A loosely coupled system is less likely to fail. Loosely coupled systems have slack. They're flexible and resilient. This means that they function within a range of parameters rather than at just a single value. While slack in the steering of a

car is not preferred, it is preferred, for example, in large organizations where tight couplings can lead to bottlenecks if there is only one person in charge of approving a specific form. Personal finance is another area where loose couplings are desired. For instance, a person who bought less house than he could afford is less likely to lose his home if his income drops or the cost of living increases.

It naturally follows that slack or loose couplings have a cost, in that they're less efficient under normal operations. Conversely, they're less costly under disrupted operations, such as in catastrophes. Changing the tightness or looseness of a coupling is therefore a way of adjusting risk versus profit. Here risk is defined as uncertainty rather than loss.

Linearity is different from coupling. The opposite of linear is nonlinear. In general, nonlinear processes and activities have feedbacks which influence the process itself, changing it, while linear processes lack feedback. For example, consider a worker who is able to produce two unrelated widgets, A and B. If producing twice as many A widgets requires twice as much work and if the production of A widgets does not influence or depend on the production of B widgets in any way, the widget production is linear. When activities are linear, the result from adding activities or from increasing the effort is very predictable. Work can be very complicated, but still be linear. Surgery, for example, is linear. Twice as many surgeries take twice as many resources, and performing brain surgery on patient A is not going to speed up or influence the operation on patient B. The output is clearly defined by the input. Nonlinear activities have a less than clear relationship between input and output. This is because part of the output also acts as input; this part of input becomes new output which again goes back and influences the system all over again. Unlike the simple arrangement of a linear organization, a nonlinear organization can be very sophisticated. Consider a business which sells widgets A and B. It can distribute money between production, product development, and advertising. If widget A is advertised, it will influence the sales of both widgets A and B through brand name association, but decrease product development and possibly production. Yet if sales increase, it will allow economy of scale savings on the production. Estimating the output based on the input is difficult.

The best general example of linearity is assembly work. Linear assembly work turns specific inputs into specific outputs, always. The inputs are the assembly worker's time and energy, and some components from another assembly worker. These inputs are added together to form other components which are handed over to the next assembly worker. While the assembly worker's job itself may be very involved and require many skills, the process is

still linear. An outside observer can count on the fact that, given twice as much time and energy, the assembly worker can construct twice as many predictably identical components.

Contrast this with the nonlinear work of an entrepreneur, a scientist,[19] or a football coach. In a nonlinear problem, the whole is different from the sum of the components. What makes the whole different is the structure connecting the parts. For the assembly line, the structure is the assembly line or conveyor belt itself. For a car, the structure is what makes the individual parts of a car. In football, the structure of the plays is sometimes more important than individual players.

Nonlinearity is inherently much harder to deal with than linearity. In fact, a tremendous amount of effort goes into linearizing problems to make them understandable and solvable. There are several methods.

The first method is to reduce the degrees of freedom by reducing the number of objects and the number of connections between the objects, thus making the problem easier to understand. This simplifies the problem, but it runs the risk of eliminating degrees of freedom that are essential to the problem. The solution to the simplified problem is not necessarily the solution to the original problem. Furthermore, the simpler problem does not show the richness of solutions of the original problem. This method of simplification is probably the greatest source of error and inaccuracy; particularly because the answers to simple problems are generally precise--but let's not mistake precision for accuracy.

The second method is to break big problems into smaller problems in a reductionist way. Each subproblem can then be tackled linearly -- if not, it is further broken down. Once the subproblems have been solved, the solution to the big problem is found by adding the sub-solutions together. Unfortunately, this doesn't always produce the optimal solution. For instance, one can't bake a loaf of bread by first heating the flour for half an hour, then heating the milk or water for half an hour, then heating the yeast for half an hour, and then mixing them all together at the end. Baking requires complex interactions between the flour, the yeast and the liquid prior to baking for the optimal solution. It's not trivial to find this solution.

Unfortunately, we haven't found a mechanical method to find optimal, clever--or as mathematicians would say, elegant--solutions to complex problems. Such solutions often rely on intuitive "insights." Intuition is a result of complex neural connections in the brain suddenly firing in a way that connects with a real problem. This requires two ingredients. The first ingredient is the network itself, which can be established by studying many other similar problems. The second ingredient is thinking about the problem at hand. Combining the experience of

similar solutions with the current problem results in new and creative solutions, often accompanied by statements such as, "I was contemplating [something] when I suddenly was inspired by [something unrelated]." For instance, Alfred Wegener, the discoverer of plate tectonics, the theory that explains the motion of land masses, allegedly was inspired by looking at the collision of pack floes while camping on the ice.

Until such a method is found, there's likely an upper limit to the level of complexity humans can handle. On the other hand, it's my opinion that adaptation/complexity is exactly what makes us human. Compared to other animals, there's always some other animal that is either faster, taller, bigger, stronger, or better-looking. However, there are no animals that beat us in the decathlon of life, and this is why humans are at the top of the food chain. Adapting to complex situations makes it possible to substantially increase the level of resources and the number of possible solutions. It's like having a toolbox instead of a hammer when it comes to problem-solving.

# Economic classifications

The two degrees of freedom in this figure describe four different types. I call these *the salary man*, *the working man*, *the businessman*, and *the Renaissance man*. In most cases a person will identify with aspects of all four, yet a person's behavioral habits from one type tend to dominate those of the other three, allowing us to classify any person as one of four types.

The totality of all people forms an ecosystem or a culture of four interdependent types of differently behaving and differently thinking kinds of humans. Each type of human tends to fill a different niche of society. In different periods, different types will dominate the culture. The nondominant types will be considered undesirable or unrealistic, whereas the dominant type will generally be considered the "right" way of doing things and, soon, "The way we have always done it." People of the dominant type effectively characterize the culture and will justify their actions saying, "Everybody likes to..." or "All normal people like to..." Those living differently will be questioned, "What would happen to the present institutions of society if everybody started behaving like you do?" For example, the alarmed economist questions what would happen to the economy if everybody stopped consuming and started living on a quarter of what they used to. The answer is simple: The economy would be different. Some institutions would vanish and others would form (see Succession and the cycle of change and Breaking out).

## The salary man

Most salary men are specialized wage earners who earn money from one source only. Often, they have no control over the source of the money. For instance, they can choose between having a full-time job or having no job at all. This scarcity creates competition for full-time jobs (see Job Competition) rather than a continuous and less competitive distribution of effort between all wage earners. The jobs which specialists are typically hired for comprise a fairly narrow set of tasks. Their job is to use certain resources and turn them into certain parts of a final product. Thus, salary men have little control beyond their well-defined job descriptions.

Salary men have options, but they do not create options. This linearization makes them predictable and subject to indirect control. This control is exerted by providing a choice within a narrow range. "You can choose between the

following three models of cookie-cutter homes. You shouldn't modify them or your resale value will be impaired." "You can choose to drive a car subject to various rules and regulations." "You can choose between the following two political candidates. You shouldn't vote for others, or your vote will be wasted." "You can choose between the following 25 different, heavily advertised breakfast cereals, but don't think of starting your day with anything but breakfast cereal." "Choose the size and type of your TV and the number of channels, but don't consider not watching TV, or you might miss out." This gives the illusion of freedom while retaining control.

With both work and consumption being well-controlled, the salary man may be thought of as a brick in a wall or a cog in a machine. The associated cash flows are relatively simple. In the simplest case, time and energy flows from the specialist into a wage-earning job. Money from the job, in turn, covers 100% of expenses. Thus, the professional puts time and energy into his work that pays him a wage income, which is used to pay for stuff that he subsequently consumes. Wages are typically preset to be "economic," meaning that there is no profit nor loss in it for the professional. The "profit/loss" in this setup goes to the owner of the machine that the cog fits into. It's obvious that the professional in this case is tightly coupled to his job. Many people's budgets are tightly coupled, since they've been encouraged to spend everything they earn. Why work if you can't spend your paycheck? After all, you deserve it. You earned it. In fact, many financial planners implicitly assume "expenses=income" in their calculations. Therefore, any decrease in income is felt instantly. An industrial example of a tightly coupled linear system is a manufacturing plant. If any part of the system runs slow, the entire plant runs slow and output decreases. The incentive is therefore to make sure that all parts are equally fast or equally slow and work together as a team.

Most consumer products are also engineered as tightly coupled linear products. For those products, it's optimal if all parts have about the same rate of failure. If one component lasts a lot longer and the product isn't designed to be repaired, that component is deemed to be overengineered and it will be replaced by a cheaper component which would create more profit. Thus, if a product hasn't been designed to be repaired (most consumer products), one will experience the curious phenomenon that once one part fails and is repaired, other parts will start failing soon after. It wouldn't be an exaggeration to state that many consumers' budgets work in a similar manner.

The example above demonstrates the typical cash flow of people without credit. People with access to credit can go into debt, and they usually do. In this case, debt can be used to pay for more stuff and wages can be used to pay for

debt, such as from credit cards, car loans, mortgages, student loans, *etc.* This allows people to buy more than they can presently afford in exchange for less income in the future.

Few people pay cash anymore and "financial success" depends on being good at managing debt. As an ironic twist, like grade point averages in school, debt management skills are also evaluated in a single number called a credit score. It's not clear exactly how a credit score is computed, and therefore much time is spent trying to outguess the system. Personal finance, as opposed to business finance, operates on the concept of *consumption smoothing* also known as, "Fake it until you make it," as it allows consumers to buy products which they presently can't afford due to lack of savings, but will be able to afford by making payments over time. Unlike a business, which invests the money in assets with a higher return, allowing businesses to use debt as a leverage, consumers "invest" in higher consumption. The lack of return on assets to pay the interest means they must either work harder or longer for their consumption, and so they do. Add *lifestyle inflation* (see The pursuit of stuff, status, and happiness) and you have a process that inherently demands more and more work while quite possibly providing less and less contentment. This is the definition of a wage slave. Wage slaves are free to change their job, but they're not free to quit their job. Wage slaves are free to choose other products as long as they can afford it, but they're not capable of creating alternatives to buying products, because they're too busy working.

## The working man

A working man is someone who doesn't collect a salary or other associated benefits. His income is uncertain, possibly because he takes on smaller projects that only last days, weeks, or perhaps months, and he knows and plans for this. It's likely he does some form of freelance consulting or works for multiple employers in short order, one at a time. A working man should therefore not have a tightly-coupled budget like the salary man, as job loss can result in homelessness or the inability to purchase products. Therefore, the working man often establishes an *emergency fund* (see Financial cash flow cycles) to introduce some slack into the system, which allows him to continue consuming during periods with less or no income. This fund covers the budget, at least temporarily, if the money flow is reduced or cut off. An alternative is to purchase unemployment insurance. A similar alternative is to use credit cards. However, with sporadic income, credit will be more expensive for the working man compared to the salary man, who earns a steadier income.

The purpose of an emergency fund or unemployment insurance is to cover unexpected expenses or lack of income for the amount of time it takes to find another job. An industrial example of a loosely coupled linear system is a mining operation, where miners carry their own rebreathers. Normally, a mine functions like an assembly line, but if one link fails, which would be catastrophic if everybody was hooked up to the same line of oxygen, it doesn't impact the entire line catastrophically. Mining operations are loosely coupled for precisely this reason!

The principal financial difference between a salary man and a working man, as defined here, is the amount of fiscal coupling. The salary man has easy access to credit, and if he chooses to accept this burden, he must maintain a job to shoulder it. A working man will also often, but not always, have easy access to credit. This means, as mentioned above, that the working man must maintain a financial buffer to create slack in the system.[20] The lack of easy credit also means fewer obligations. Working men are closer to a situation where they can decouple themselves from a particular job or career. In fact, working men tend to have a much easier time finding jobs than professional specialists. The latter must go to where the jobs are, which can often result in steep costs of living, whereas less specialized jobs can be found everywhere. If the working man puts some effort into job searching, he should be able to move through a succession of employment contracts. While the lack of a steady paycheck may seem risky, it's actually safer, as the working man has been conditioned to the situation of having to find new jobs--he actually thinks of them as clients rather than employers, and thus considers it normal. A salary man is rarely without a job, but when he is, it's a high-stress event, almost like a death in the family.

Still, the consumer pattern of a working man is similar to that of the salary man. As working men generally earn less, there's a drive--you only need to watch a commercial from your local college to see how this works--from the working class to the salaried class, as the latter is able to spend more and is hence is perceived to live a better life. The public perception of a link between cost of living and quality of life is strong.

## The businessman

The difference between the businessman and the working man or the salary man is that the cash flow, which is directly associated with the personal consumption of the businessman, is just a fraction of the total business cash flow he controls. The money under control is typically retained earnings from

operations, paid-in capital, or simply borrowed from other investors. Hence, the businessman sets up a business by using a combination of his own and other people's savings--that is, other people's money (OPM, pronounced "opium"). This business may take many forms, from owning a rental home to sole proprietorships and partnerships, to corporations of various sizes. A business generates cash flow by converting assets into income. The businessman inserts himself into this cash flow. By being in control of more than just his own time and energy, he controls more cash flow and thus earns more.

Some businessmen create jobs by putting together assets and resources in a structure that is profitable, making it possible for workers to earn a wage. This combination creates a solution to a problem in the form of a product that can be sold. The problems are typically those of consumers, who buy the businessman's products, but they could also be problems related to government, military, or other business operations.

The cycle has thus come full circle. The salary man and the working man spend all their time working and little of their time solving complex problems using assets. This kind of problem-solving is done by the businessman in return for profit. However, the businessman still relies on other people to turn assets into profit as well as for his income.

Profit generation is complicated by the presence of competitors, who tend to drive down returns and decrease profit margins. Decreased profit margins mean that the businessman has to use leverage or become much more competitive to keep making a profit. This leverage is obtained by using OPM to increase the size of the cycle, thus resulting in a tight coupling of the business cash flow. If something in the cycle fails, it doesn't take much to significantly impact the profit margin. The slack in this system is given by equity, which is the slack between assets and liabilities (debt) in the cycle. The smaller the equity is relative to the assets and the earnings, the more vulnerable the business is to perturbations of the cycle and the higher the returns or losses will be. Competition may therefore require the businessman to restructure his operations, diverting cash flows elsewhere as parts of the operation are "creatively destroyed."

While a lot of value can be destroyed, the broad industry knowledge survives to a large extent. For instance, with the introduction of new technology or the decline of rental income in certain neighborhoods, the structural knowledge of the businessman remains the same, as do most of the procedures of doing business. Only the assets are replaced. In a recession, the procedures of doing business may change--some specialists (assets) may be laid off, but the technology remains the same. In the figure, this situation would correspond to

shifting the generalist curve a bit. Unlike for the specialist, shifting the generalist's curve still leaves substantial overlap with the market. The risk of the complex-coupled businessman is thus not of losing his job, as it is for the specialist, because in principle the businessman doesn't have a job, and he'll always be able to work. His risk is in the loss of profit, as profit depends on customers buying his products. In that sense, companies owe their existence to consumers (see Foundations of economics and finance).

Unlike the salary man and the working man, the businessman doesn't risk losing his job, though he does risk losing his business. Like an exuberant artist or scientist, he is internally driven towards finding solutions and he does not wait for employment to start working--the businessman is an entrepreneur. The risk for the businessman comes from the tight coupling between shareholders and bond holders on one side and consumers and workers on the other side, all of whom must be satisfied with the businessman in the middle, lest capital and profits vanish. Some companies reduce this risk by having no long-term debt or by having special classes of shares. Others reduce it by having many customers or clients or easy access to labor, either by outsourcing, offering attractive benefits or simply due to an abundance of workers in a given field. However, as long as there is a drive for profit, there will be competition and innovation, and those risks are hard to eliminate without monopoly pricing power, political favors, and other barriers to entry. Since profit is the income of the businessman, and since the businessman needs income to buy stuff for himself, he too is at risk. Many businessmen and entrepreneurs take steps similar to employees and establish emergency funds (see The working man). However, those that desire to retire early either need to earn a lot of money fast or find an alternative solution.

## The Renaissance man

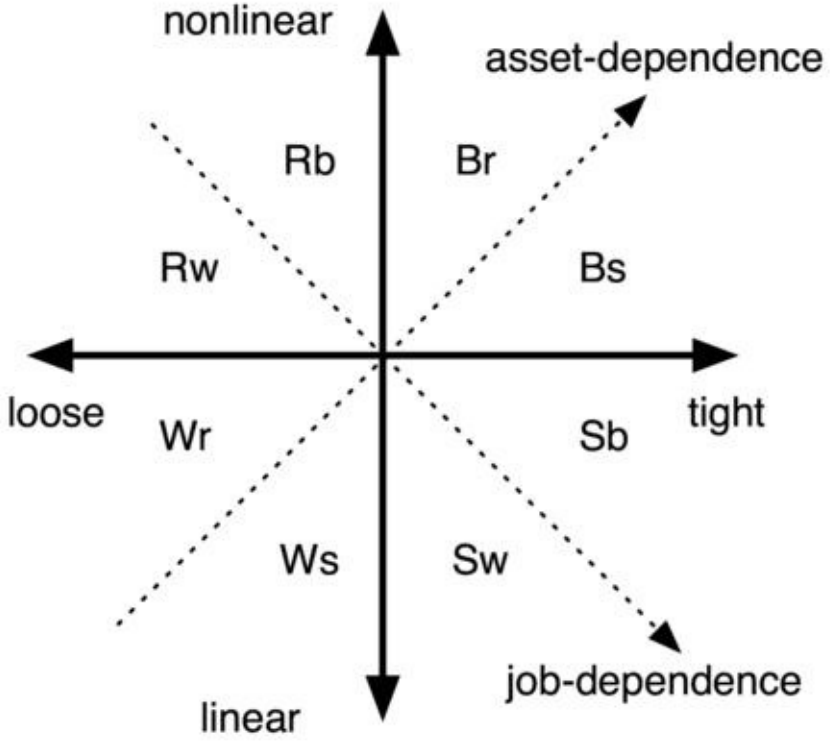
A Renaissance man is a person who is competent in a wide range of fields, covering intellectual areas as well as the arts, physical fitness, and social accomplishments. This contrasts with the more modern, specialized approach, where a person is encouraged to build skills in a single vocation and use the income from that to pay for everything else. However, I think it can be argued that a specialist is not a well-balanced human. Many people strive for a sense a balance between work and life without ever achieving it, leaving some areas underdeveloped and others overly so. This isn't the case for the Renaissance man, who develops all sides of himself to their full potential. Furthermore, generalized skills allow a Renaissance man to reach creative solutions for most of his needs. Because of his ability to solve problems, the Renaissance man is

fairly independent of the marketplace since he no longer has to buy nearly as much to satisfy his needs. Rather than buying a product, he puts solutions together using social skills (borrowing, bartering), technical skills (building, reengineering), artistic skills (designing, creating), and physical fitness (humanpowered tools). Buying less means that he doesn't require millions to reach financial independence. For the money he needs, jobs are much easier to find. The Renaissance man can apply for different jobs in different fields rather than just a single one. Although they don't pay as well as a highly specialized career job, less money is needed. Complex solutions based on multiple different skills don't require leverage. They may result in profit, but profit is merely a side effect of the construction, and therefore the Renaissance man isn't subject to the same risk as the businessman. The main purpose of the Renaissance man is to solve a problem as a human rather than as a part of the "work-spend" system.

The Renaissance man is capable of many different things and doesn't restrict himself to vocational skills. He does his own taxes and researches his own investments. He can fix a computer or a broken appliance. He knows how to drive and fix a car, but he has enough time and athletic ability to ride his bicycle 20 miles instead, or run five miles to get groceries. Physically, he keeps up with people decades younger than himself. He can play an instrument, dance, paint, or write creatively. He can create interesting meals from scratch rather than recipe. Socially, he knows who to ask for help, who needs help, and how to put people together to efficiently solve problems. He is a leader or an inspiration to other people, whether it is personal, local, national, or global.

The Renaissance man has the best of all worlds. In this figure, we can draw a line of increasing job dependence from the highly independent Renaissance man to the highly dependent salary man, with the working man and the businessman having a sort of semi-dependence. Similarly, we can draw a line of increasing asset independence from the highly independent working man to the highly dependent businessman. These dimensions are illustrated in this figure, which provides another way of looking at the types. This can be thought of as an alternative four types or a further splitting into octants to more precisely describe the leanings of a person. In the latter case, each of the four types fall into a given wing. The nomenclature of the figure should be self-evident. For example, a Renaissance man could be leaning towards asset-backed job independence of a businessman (Rb) or he could be leaning towards the jack-of-all-trades approach to job independence of a working man (Rw). Similarly, the salary man could lean towards starting a side business or investing in stocks to provide more income to replace or add to some of his job income (Sb), or he could reduce his need for job income by divesting some of the things he has financed and finding

ways to do more and spend less (Sw). A working man could engage in longer-term consulting projects (Ws).




An alternative way of looking at behaviors in terms of dependence on financing and having a job. Taken together with the previous figure, this describes eight types.

Independence is not something one has; rather, it is something that one is. This is good news, because it means that it is possible to change one's behavior and economic interactions in a way that fosters greater independence, or less, if so desired. The salary man can work on reducing his dependence on money by learning and creating alternative solutions, thus reducing his dependence on a job. Such activities are best started through one's hobbies. Similarly, the working man can also learn to create solutions rather than buying them--in particular, it is quite likely that the working man will already be creating some of his own solutions, like car repair, lawn maintenance, plumbing, *etc.* This could free up money for his legacy or charity, or the money could simply be used to buy time for early retirement. Finally, the businessman can discover other forms of profit than strictly monetary, like social and environmental. Health and good relations could just as easily be optimized, and when business size is subject to diminishing returns, why not aim for a smaller but more efficient business (see Appropriate response)? That is, the business of finding solutions for just a handful of people rather than leveraged solutions that control and serve thousands or millions of people. Doing this, the businessman will find that the

leveraged bond eventually eases and money will flow to him freely.

# Succession and the cycle of change

As mentioned in Economic classifications, different types dominate a culture during different periods. It's possible to model this change as an ecological succession of groups of four different agent species--Renaissance men, businessmen, salary men, and working men--where each type feeds on the culture created by the previous type, but, in turn, sets up the next dominant type, which eventually will suppress and dominate it.

In nature, succession is initiated by the formation of new, unoccupied habitat--for example, through lava flow, wildfires, or colonization. If soil is not present, the barren land is first populated by pioneer plants like moss and lichen that can live in cracks, where water and dissolved minerals collect. These plants break down the rock into its mineral components and form soil when they decompose. The soil, whether already present or formed in the aforementioned process, is populated with annual weeds, which also die and contribute to the soil formation. Subsequently, perennial weeds, shrubs, and small trees like aspen or pine take over in competition for resources like sunlight. Larger trees, like oak and elm, subsequently block the sunlight for the shorter trees, which die out, and thus the habitat finally reaches what is known as a climax stage or community, which is stable, barring any disruptions such as forest fires or lava flows, which restart the cycle.

For an example of succession that is easier to relate to for a "civilized" person, consider how cookie-cutter housing developments easily populate undeveloped land, like weed seeds. These dwellings are unable to survive without cars forming long roots back to shopping centers in the city. As suburbia takes hold, strip malls appear closer to the development. These draw in more people, which increases the price of land and makes closer-spaced, but higher-quality homes more economical. This in turn attracts small general shops, eventually forming a shopping street or downtown area. Sidewalks appear, followed by multi-story buildings in the city center. As the succession proceeds, old species like cars and sprawl are eliminated, eventually leading to the climax community of a city.

The same thing occurs in the world of ideas. A group of people or a single person get a bright idea which is completely different from all other ideas. If the idea has merit, other people pick up the idea and create their own personal variations on the idea, perhaps giving different names to the same object, or perhaps using different methods to arrive at the same conclusion. These people

compete for dominance of their ideas, eventually reaching a point where only a handful of different methods are used. The next generation uses those methods to discover new details, but they don't compete on methodology, and hence it remains static. As the intellectual field matures, the rate at which details are discovered increases. As competition grows more intense, the scope of discovery narrows, specialization increases, and politics becomes increasingly more important, as happens in any complex society where resources--in this case, the number of remaining discoveries to be made--are no longer abundant. The idea has reached its climax stage a point where no new understanding occurs; just increasingly smaller adjustments of the details.

Some observations:

- Each "species" is adapted to thrive in a very specific environment.
- If the conditions change, the existing species will be outcompeted by a species which is better adapted to the new conditions.
- Succession occurs because the dominance of one species gradually changes the environment.

These are the most important observations. Keep in mind that one species may be dependent on other species or live together with other species in communities. A community is known as a seral stage. Seral stages merge gradually into each other until they reach the climax stage. The climax stage is stable, but may change due to external or internal disruptive events (lava flows, the invention of the steam engine).

## Ergodicity and destiny

It is possible to change "species." Regardless of the initial state or large bumps along the way, people gravitate toward the outcomes their behavior induces. As "species" have different types of behavior, one must change behavior to change species. There's no faking it, nor is there any "buying" it. People do not change due to a single clever idea; they are what they are based on the totality of their behavior.

In other words, luck is only important in the short term. In the long term, luck has little to do with success. For instance, a financially irresponsible person doesn't become a millionaire by winning $1 million. He merely becomes a financially irresponsible person with $1 million, and eventually the lucky money will be gone. A person becomes a millionaire by becoming the sort of person who "deserves" $1 million. He keeps it by being the sort of person that does not

risk it, or he loses it by engaging in risky business. In the latter case, he'll likely quickly reacquire the money by starting another business, though.

The statement that people end up where they deserve does *not* imply any moral judgment, nor does it imply any form of entitlement. In particular, it's not meant in the modern marketing sense, that people "deserve" anything they can imagine. Rather, it means that attitudes combined with actions lead to habits which, over time, tend to deliver certain *deserved* outcomes. The mathematical term for this property or statistical connection is *ergodicity*. In popular psychology, it's known by various other names such as positive thinking, synchronicity, and praying. These concepts are often described as magical thinking because the new habitual actions which result from mentally focusing on a goal and the statistical connection with the actual outcome go unseen. This doesn't mean these methods don't work; they do, but not for the reasons their believers promote. However, understanding that they work due to the aggregate effect of many small but congruent actions, and using this understanding methodically, makes transitions more effective. As an aside, it's interesting to note that the popularity of these books and methods increase if they also make the untrue statement that you can have whatever you want merely by wishing for it to come true. This only holds during periods of prosperity, as "a rising tide lifts all boats." It is, therefore, not surprising that such books sell mainly during economic boom times. Yet while there is no physical connection between wishing for something and actually achieving it, there's no denying that by making something a priority and constantly thinking about it, you will influence your actions. There are two additional ingredients to this: First, you must pick the right actions; second, your vision must lead to a mission--that is, actions must be initiated. To give an example of the wrong way to go about it, imagine that your dream is to become a millionaire--a very common dream, to be sure. The wrong way to dream about the million dollars is obviously thinking about what you're going to spend the money on once you have it. If you dream like that for too long, soon you'll find yourself spending money you don't have yet, rationalizing that it's okay, because you'll have it someday (many student loans are spent along this line of thinking). The right way is to realize that in order to become a millionaire, you must earn at least $1 million more than you spend. Your every thought should therefore be about how you can a) earn more money and b) spend less money. Since $1 million is a lot more than many people earn, the majority of your thoughts must revolve around how to earn more money rather than how to spend less. Conversely, my dream was financial independence, which means that investment income safely covers expenses. Hence, I spent most of my time thinking about how I could a) lower my

expenses and b) increase my investment income. Hence, I didn't have a particular net worth in mind, nor did I think particularly hard about ways to make more money.

**Agency**

Humans with an internal locus of control--the belief that they're in control and that they're the masters of their own destiny--possess agency. Agency resists and reduces stress. Anyone who has been out in the world for a while and experienced a lot of different situations has a good idea of what is normal, and thus can describe a bad situation as what it is: simply a bad situation. Conversely, people with less agency and a belief that they are not in control of their destiny are more likely to be stressed and to suffer the associated health effects. Combined with self-confidence, agency is the attitude that any problem can be fixed, given enough resources in the form of time, effort, and determination. This attitude rests either on a thorough knowledge of or training in what is to be done, or on the surety that such knowledge or training can be attained. This attitude is often transferable from one field to another, completely unrelated field. Doing something that is considered very difficult at least once in your life is highly recommended.

# Our current world

I submit that we currently live in a climax stage.[21] We have a political model that is based on leading in the popular polls--a model where barely differentiated political leaders pretend to be different by steering voters away from important issues and onto subjects that, albeit emotional, are of little consequence to most people--a model where the election is won by the person with the best marketing, and where consistency and integrity are irrelevant.

We have an economic model that is based on pulling resources out of the ground and mostly turning them into unnecessary products, getting people to buy the products by convincing them that they need them, then getting them to throw the products away because they're obsolete. This makes people buy the next model and bury the other one in the ground. The sole goal of this seemingly pointless exercise is to work faster and grow the gross domestic product, which measures the resource churn.

We live in a world where the money necessary for our way of life comes out of a slit in the wall as long as we keep showing up for work, yet only experts understand the fiat-based money/credit system. We live in a world where food can be heated in a microwave oven at the touch of a button, yet only experts understand how this works. This goes for most of the other technology we use. All we know is that if we press this or that button, things magically happen.

We are aware of large-scale problems, but most of us believe that we can't do anything about them. Instead, we believe in a mythical They who will find a solution, just like They have provided all this wonderful technology we surround ourselves with.

We may be more technologically advanced as a group, and correctly but myopically hold up technology as our one indicator of "progress,"[22] but in terms of individual understanding we have not come far, and once again live according to old concepts. In fact, we might have turned a full cycle from the last climax stage: The Dark Ages.

## Leaving the Dark Ages

The Dark Ages was characterized by an old and mature society set in its ways. Ruled from the top down by kings and governed by religion, it was a world of superstition and magical thinking, where the individual had few options and all cultural trends pointed towards more of the same (see The lock-in).[23] It

was a world ripe for new ideas.

The Dark Ages gradually ended six centuries ago with the Renaissance, which seeded new ideas for a different world. The Renaissance ideal dominated our culture until three centuries ago, from the 14th to the 18th century, when it was superseded by modernism. Not surprisingly, this human ideal has almost been forgotten in our culture. The Renaissance, literally "re-birth", was a revival and rediscovery of classical Greek and Roman culture following the decline of culture, trade, and technology during the Dark Ages. Human achievement was once again put into the center of human focus. A Renaissance man strove to develop his capabilities to their fullest extent.

As mentioned in Succession and the cycle of change, the colonization of new habitats, whether physical land as in the discovery of a new continent, physiological "land" as in breaking the four-minute mile barrier, or intellectual land as in the discovery of new ideas, immediately initiates a succession.

As soon as those idea-seeds were sown, businessmen took unstructured but complex ideas and started commercializing them. Competitively, it's easier (but also riskier) to gain an advantage by leveraging complexity than it is to specialize while keeping the slack of the loose coupling, because the latter requires a lot of effort. Businessmen essentially move the structure from skilled artisans to factories by setting up a structure as described in The businessman. At this stage businessmen focus their efforts on competing with other businesses, until the structures for production are settled in large companies (for example, a handful of computer companies instead of the initial hundreds) and the industry is fairly stable. While businessmen may behave in a cutthroat fashion toward other companies, they're fairly honest with their employees. There's a need for loyal employees to fill the jobs, and at this stage, the beginning of industry and the formation of the big corporations we still see today, the businessmen, the salarymen, and the working men form a natural symbiosis.

The culture moves from growth to steady state when consumption equals production. At this point, all the niches have been fully filled and inter-company competition has reached a state of consolidation and "cease-fire." Now the salary men are motivated by fear of losing their job and a need to keep paying their bills rather than the desire to work for the best company. The focus is thus on following the rules set down by the businessmen to regulate the business. However, the spirit of those regulations are still directed towards the competitiveness of the company.

Eventually, some discover that they can maximize their personal benefit not by supporting the company, but by supporting themselves. In other words, they become decoupled from the business. They start thinking about their "number"--

money in retirement accounts, broker accounts, net worth--and they develop a fascination with tax deductions and gain impressive résumé-writing and interviewing skills. The entire system moves to finance, services, and politics--all intangibles. Having forgotten the historical background of their cultural setup, people adopt firm "social-social" beliefs that any problem can be solved in the social sphere as long as someone is given enough money to make it happen. Any connection with nature and most connections with technology are lost. There's a belief that nature is irrelevant and that anything can be solved using the current methods--now technology; previously magic or praying. We have finally arrived at a stage where people will sell their soul to build their résumé, as long as they don't break the law; where people will work in polluting manufacturing plants while being against greenhouse emissions. This progression follows a clockwise cycle in this figure, which desribes the full development of a field; each type will be dominant at some point during this progression.

# The next generation

When a new field is invented, it's not the salary men, the businessmen, or the working men who dominate it; it's the inventors--the Renaissance men. A new field does not need to be commercial, nor does it need to sweep the world or usher in a new era. Whether it's raising goats or a family, starting an ecological community or an IT company, or preparing for the end of the world, the Renaissance man is the one who will get it done.

For several generations many people have been preoccupied with the mundane details of earning and buying as an end rather than a means. They spend their most productive hours and years in a job which they don't really care about, after which they go home exhausted to deal with spouse, kids, dinner, bills, trying to keep up with the neighbors, and languishing in front of the TV because they have little energy left.

New generations have begun to question the wisdom of joining the scheme known as the rat race. Some have decided not to fight for a top spot in the corporate pyramid scheme, which in the previous stage was more akin to climbing the corporate ladder; instead, they bypass the gatekeepers of traditional career paths and search for new venues to populate so as to avoid the overcrowded traditional job market.

The big question is therefore whether to play the games of modern consumer society or whether to start something different and, dare I say more creative? We live in a consumer society where the focus is on service and finance, due to a declining natural resource base. We also see the emerging problems of consumer society--stress, overwork, inflation, lack of balance, lack of paradigm-shifting innovation, stagnation, and loss of control--both on a personal, and occasionally a national scale. This indicates that this figure is beginning to come to a full circle.

It's not clear which direction the next cycle will take humanity--brave new world, information revolution and the discovery of commercial fusion, or peak oil/water, irreversible climate crisis, and the decline and fall of civilization.[24] Yet this will all be decided by those who live now; in part by you, and none will be more ideally prepared for a changing world, indeed to *change the world*, than a Renaissance man.[25]

# The Renaissance ideal

A Renaissance man excels in a wide range of subjects. He is also known as a universal man, a polymath, or more derisively as a jack of all trades. In our modern, highly specialized world, the term jack of all trades typically implies master of none, but the traditional Renaissance man mastered one and often more subjects while being competent in many subjects.

There is some modern controversy as to what it means to be a polymath, and thus by association what it means to be a Renaissance man. Several hundred years ago, when the terms first came into existence, the amount of human knowledge was still relatively minute and thus a dedicated person could eventually master many different fields of knowledge. However, thanks to an immense number of researchers, the amount of available information today is equally immense.[26] It is hard to master even one narrowly scoped field of knowledge (see The cost of specialization), let alone two or more. Some people therefore claim that it is impossible to be a true polymath anymore. In my opinion, the modern ideal of a polymath should therefore not be an absolute measure of mastery in all subjects. Instead, the objective should be to strive for competence in a range of important subjects. Don't worry about whether you can eventually become an expert (see Gauging mastery). Rather, try to constantly improve on the subjects you already know and seek out useful things to learn.

With a process-oriented attitude you'll eventually master several subjects. Once a threshold is reached, the synergy between different subjects will help you create new solutions. Since all human knowledge is based on a limited number of mental models, the stronger and wider this foundation of models is, the easier it is to gain new knowledge. A similar principle holds for physical abilities, emotional maturity, social networks, economic power, technical understanding, and one's ability to integrate with the world. Perhaps now more than ever there's a need for people who understand and are able to connect different interdisciplinary topics, lest we end up in a Tower of Babel situation where specialists and experts no longer understand each other.

The ability to connect disparate fields or items in complex ways and reach new creative solutions creates paradigm shifts. It was the universal ideal that led to the discovery of the scientific method, the rediscovery of democracy, and the settling of a new continent, all of which created the world we see today (see Succession and the cycle of change). It's also the universal ideal that spurs the

occasional renegade to discover something completely different like the general theory of relativity, string theory, or chaos theory.

Conversely, the present methodical, milestone-governed specialist approach is largely a mopping-up operation which leads to increasing levels of detail but no new ways of understanding things. This way of thinking has dominated our culture for some time, where problems are formulated and solved within the present framework of thinking, leading to the world and way of life described in The lock-in. If you want to change your life, don't be tempted to outsource your life or your operations. You'll never know which kind of connections or synergies you're missing and you'll only make yourself more dependent on your suppliers.

# Human capital and necessary personal assets

As mentioned in The lock-in, it is interesting that we refer to "primitive" people[27] as primitive, when every primitive person is able to build his own tools and shelter, make his own clothes, provide heat and water, and knows what food is edible and what isn't. How many of us are capable of that? His technology may be primitive, but his general knowledge of his world far surpasses ours. A "primitive" can competently participate in every aspect of what his culture does. In contrast, we only know something about a very limited number of things in our culture, such as our job training and functions, and the only thing we share in common are opinions about local restaurants, the fictitious lives of the characters in a couple of TV serials, and a rudimentary understanding of the weather forecast. In that regard, our society is more akin to a highly developed insect colony where specialized members work for the greater whole.

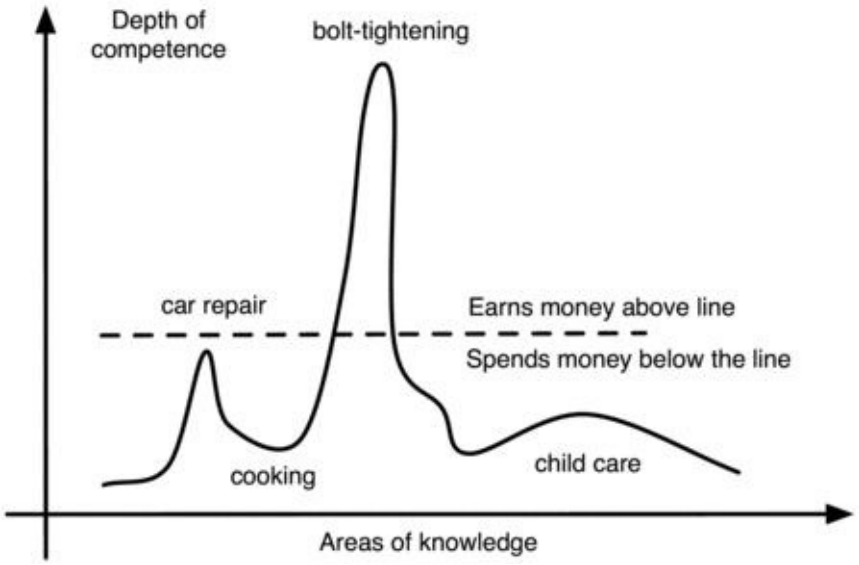
Given the lack of diversity of individuals' skills, the popular measure of how well we're doing is given by a single number: Our net worth, or salary for those who don't have a net worth. Open any book on personal finance and one of the first numbers introduced is the concept of net worth. Your net worth is equal to the sum of all your financial assets, house, investments, and possessions minus the sum of all your financial liabilities, mortgages, and loans. This can be positive or negative, but it is still a one-dimensional number.

Net worth is only useful as a measuring stick if everybody plays the same game and has the same form of consumption. It is only useful in a world where money is earned with one skill and the lack of all other skills is compensated for by spending money.

However, real people, even specialists, are not so one-dimensional. A person may be able to cook his own food (reheating pizzas or boiling noodles is not cooking!). Compared to a person that needs to go out to eat or buy more expensive preprocessed food, that skill is an asset, because the person needs less money to eat. Yet how does one put a price on this asset?[28] Similarly, a person with a high-paying job may be chronically stressed or sedentary and thus at a higher risk of developing various lifestyle diseases. Yet how does one put a price on this liability?

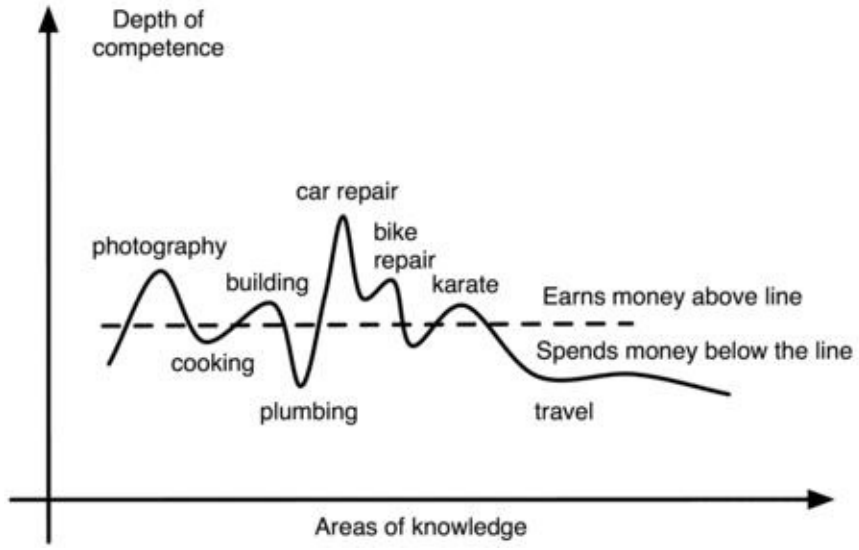
It may not be possible to put a precise price on such assets and liabilities, but it's possible to draw a diagram that illustrates them. This figure shows the scenario for a locked-in person as described in The lock-in. On the *x*-axis is shown various areas of a person's life--working, living, eating, *etc.* Also shown

is a dashed line that demarcates areas where the person is paying and where the person is getting paid. A locked-in person has almost no useful skills. The one skill they do have provides all of their income. Consequently, a locked-in specialist gets paid for only a single area, but he is paid a lot, as the tall spike indicates. This is the same spike as in this figure. Yet all other areas are below the dashed line, indicating that those areas must be paid for.




This figure shows the degree of skills for a locked-in person. The dashed line demarcates the point where a person neither spends nor receives money. In other words, the person is able to do this activity for free. Notice that for the locked-in person, most activities cost money. These activities are all supported by a single skill-based income.

Contrast this with a person who has multiple personal skill-assets, as in this figure. While there may not be time to develop a skill to the same remunerative level as the specialist, he nevertheless compensates by being able to earn some income in several areas while needing less money in other areas, because he's able to do some work himself and to shop for lower prices. This is a person who is less dependent on the market system than the specialist. It's a person for whom net worth is less relevant. In extreme cases, money may even be irrelevant.




This figure shows the degree of skills for a Renaissance man. Notice how he pays very little for most activities. Also notice how he's able to derive money from several activities.

It is curious that experts recommend that investments be broadly diversified, while at the same time recommending that job skills should be highly concentrated. The Renaissance man has a lot of diversified human capital, but it will be difficult, though not impossible, to sell it on a market tailored for specialists. Selling isn't the point, though. Rather than focusing on how to sell, it's often more efficient to focus on how not to buy! And a wide assortment of skills can substitute for a lot of otherwise required income.

According to experts on expertise (yes, there is such as thing!), it takes 1,000 hours of focused effort to be considered competent in a subject, 3,000 hours to master it, and 10,000 hours to become an expert (see Gauging mastery).[29] Considering that the average person spends four hours a day or almost 1,500 hours a year watching TV or playing computer games, it is not an insurmountable task over a period of years to become an expert in a field while simultaneously becoming competent in several other fields, perhaps even mastering one of them.

Which skills should one focus on? The Renaissance men of the 17th century strove to increase their ability to

- defend themselves with a variety of weapons.
- play a variety of musical instruments and paint.
- debate politics and philosophy.
- advance knowledge and the sciences.
- be an accomplished author and poet.

For our modern purposes, the fields can perhaps be grouped into seven generic fields--physiological, economical, intellectual, emotional, social, technical, and ecological. Initially, it may seem overwhelming to master such a wide array of subjects, and perhaps the idea is even incompatible with your personal preferences. However, the universal ideal doesn't require total mastery of a subject; it only aspires to it. Keep in mind that effort and results are not linearly related over the entire range (see Sigmoids, logistic curves, and the maximum power principle and this figure). Ideally, effort should be spread equally between all subjects, though due to personal preferences and talents a person may decide to focus more on some areas than others.

## Physiological

Many people spend more time maintaining their house and car than they do their health. Too many forget that they live in their body first and their home second. To be at home in the world is first to be at home in the body. After all, where else are you going to live? Hence, taking care of the body should take priority over taking care of the rest of the world.

For some reason, many people give up entirely on physical activity after leaving college, thus commencing an ongoing physical decline, losing muscle and bone mass from their thirties until their death due to inactivity. It is common for a trained 60-year-old to be in better physical shape than a sedentary 30-year-old.

Physiological goals for someone aspiring to be a Renaissance man are to

- maintain optimal levels of physical and mental health.
- know how the human body functions and physiologically adapts to imposed demands like stress, overeating, lack of exercise and their opposites.
- know why and which kinds of food promote health and which kinds of food destroy health, and why.
- maintain good eating habits and the discipline to avoid destructive foods. Know how to preserve food and how to tell when food is spoiled.
- be able to compete in local sports competitions (does not include jogging/walking a 4+-hour marathon). Those who focus on sports rather than one of the other five areas should eventually be able to compete on a regional level.
- be able to perform physically while exhausted, hungry, or tired. Be able to perform under the worst conditions such as carrying an unconscious person out of a burning house or pulling oneself up while hanging from a gutter in

case of a fall, or similar real-life demands. Know at least basic first aid.

## Intellectual

Throughout their education (see Sigmoids, logistic curves, and the maximum power principle), people have been told *what to think*, and throughout their careers (see Career) they have been told *what to do and what to say*. Being constantly bombarded with "facts" and opinions, many people simply adopt them as their own (see Succession and the cycle of change). Most people therefore do not think for themselves, but rely on others to do it for them. Consequently, many people follow authority, rely on experts, and get their opinions from pundits and the Internet.

Critical thinking doesn't come naturally. It is a discipline that can be learned, but unfortunately schools don't seem to do a good job of teaching it. When critical thinking is taught, it's typically compartmentalized to the student's particular specialization. Consequently, a person may be able to think critically when it comes to the life cycle of the fruit fly or late 19th century Indian fiction (see The cost of specialization), but is otherwise unable to apply the methods elsewhere, because the general principles of rational thought are not taught. Yet without critical thinking skills, there's no way of correctly solving problems yourself (see Building blocks) and no way of critically questioning your life and your surroundings. Relying on outside analysis of those areas restricts the scope of choices, whereas your own critical analysis and synthesis create new choices. It makes you a leader rather than a follower. The average person is a follower.

Aside from being able to think, one should also know what to think about. If thinking is the tool, knowledge is the resource. It's only by combining these that productive solutions can be formed. There are few combinations more dangerous than an intelligent person without knowledge, experience, and wisdom. In general, the wider the scope of one's knowledge, the greater one's ability to think laterally and the more creative the solutions become. The Renaissance man should therefore acquire knowledge from many different fields so as to have the intellectual horsepower to solve many different kinds of problems. Also, he should acknowledge that breadth of knowledge is inherently valuable and that learning should not stop when leaving school.

Intellectual goals for someone aspiring to be a Renaissance man are to

- be able to prioritize the relevance of information and be able to quickly research and find relevant information in many different areas. Learn independently and have an interest in doing so.

- have enough generalized knowledge to be able to understand the information and put it into the context of a mental framework, a model or a procedure, and use it to ask further questions.
- recognize which problems the model applies to, take the solution to one problem, generalize it, and apply it to another problem.
- be able to critically analyze the model, refine it, and combine different models to achieve an objective. Practice critical thinking in all aspects of life to reach a degree of rational certainty. Be open to new ideas but do not accept anything uncritically.
- synthesize interdisciplinary information and laterally connect similarities which are not immediately apparent, discovering new models and procedures.
- evaluate different methods, models, and procedures while effectively ranking them for utility, and picking the best one while recognizing the pertinence of other methods. Pursue relevant and correct knowledge persistently and consistently. Master the fundamentals.

## Economic

Economic skills are necessary to rationally evaluate and distribute resources, both personal and financial. Without economic skills, it is impossible to put a price on value (value and price are not the same thing!) and this results in inefficient and less-than-optimal choices. For instance, is it better to a) spend time learning a more effective method which will save time in the future b) use the old, slow, but verified method or c) go to work and pay an expert to fix the problem?

Being aware of one's values (see Emotional), wants and needs, and being able to prioritize one's efforts to achieve specific goals is the most efficient and least expensive way to live a good life. Prioritizing well requires planning and seeing the bigger picture to plan a strategy for achieving one's goals. Here the big picture includes not only the world as it truly is, but also the world as it can become if specific choices are made, including the results that will not obtain if the specific path is taken. Economic analysis reveals such issues.

In addition, financial skills are important. In particular, they become increasingly important for anyone who accumulates more and more assets. It's strange how specialists gladly spend a great deal of time perfecting their skills to pursue a five percent raise, while at the same time there is a fatalistic tendency to accept whatever investment strategies are currently fashionable on Wall Street

when it comes to generating passive income.[30]

When investments become fashionable (a result of emergent behavior of a system), by definition they no longer offer good returns, even though they have historically when only used by a few people. Handing over responsibility for one's savings does not make sense, especially for anyone whose investment income is comparable to one's expenses or worse, one's job income.[31] Such a person is not just an employee, but an asset manager as well. This person would pay a steep price[32] by outsourcing this to professionals without at least understanding the basics of money management himself. In fact, outsourcing *is* a financial decision that should not be made blindly.

Economic goals for someone aspiring to be a Renaissance man are to

- understand the difference between price and value. Value is psychological; price is determined by the market.
- learn to consider more than the immediate consequences of a choice. Also consider the future consequences--for example, opportunity cost and the time-value of money. Learn to see the unseen.
- learn to consider more than the consequences of a choice for just one group of people, but for all others as well.
- realize that economic agents all represent special interests that typically interpret the situation according to their own interests or political views.
- understand the difference between assets and liabilities. Understand leverage and cash flows. In particular, learn what is an investment (an income generating asset) and what is not an investment (items for personal use).
- know the law of supply and demand, the difference between savings and investments, and the difference between present and future value.
- understand how the stock, bond, and/or real estate markets work, both in theory and practice.
- be able to do your own tax return, make a budget, and balance a checkbook.

## Emotional

Emotional awareness is necessary to align action and goals (see Contingency goal-setting) with personal values. Such authenticity is important to ensure long-term happiness, despite our culture making a virtue out of *professionalism* in which, for example, a pacifist works in the weapons industry or an environmentalist works for a company that sells bottled water. Having a firm

relationship with one's personal values is also important in the short term. It allows one to make choices without being swayed by advertising and other manipulative methods. Our values are frequently manipulated. Choices will be made because they feel good or out of fear. In general, rich societies place a high value on luxuries (extreme wants) and safety, and most ideas can be sold if those values appear to be threatened.

One's values must be known accurately to determine the right lifestyle, and they must be known precisely to make good choices that maximize personal utility (see Building blocks). Given a decision, an accurate understanding of values reveals whether the decision is good. Given two choices *A* and *B*, a precise evaluation makes it possible to choose between them. Without precision to determine the price, trading becomes inefficient.

In addition to internal emotional awareness, external emotional awareness is also important. Aligning action with values requires persistence, mental fortitude, an ability to handle stress, and a strong character. These attributes are all a consequence of agency--the supreme belief that you are in control of your own life, rather than the belief that your life is controlled by luck, destiny or powerful others.

Emotional goals for someone aspiring to be a Renaissance man are to

- be able to appraise value in all matters to make sound decisions.
- not waste time, money, effort, or resources.
- not be subject to emotional manipulation or engage in wishful, magical thinking, believing things are true because he would like them to be true--or worse, believing he can influence external events by thinking positively about them.
- have a strong character, persist, cope with adversity, be resistant to stress, be calm, and displace frustration.
- develop a passion, appreciate the arts and what it means to be human, rather than just a "human resource".
- be empathetic and understand that people and situations are complex.
- make social connections and increase the value of interpersonal relationships.
- be able to patiently await a better solution and be willing to compromise and accept something that is close, but not exactly your ideal.

## Social

Modern societies have become an aggregation of individuals. The complex

structures that hold people together have been delegated to the marketplace. Instead of having a network and knowing who can fix a problem, we just pick up the phonebook, call someone, and pay them to fix the problem. Unlike in the rest of the world, we have no social capital; only financial capital.

This lack of complex social structure has led to neighborhoods where each household has their own power mower that they use for 15 minutes a week to mow their postage stamp-sized lawn. Multiply this by practically every other activity that people now do alone and one realizes that the replacement of community requires a tremendous amount of resources. Of course, this is great for business, but a person with some skill in creating a community can save a lot of resources and generate a lot of utility by connecting with people.

Social goals for someone aspiring to be a Renaissance man are to

- get to know people outside your profession, hobby/club, religion, political party, socioeconomic stratum, country.
- start or join a co-op. This can be anything from buying groceries to participating in a tool shop, to sharing movies with other people.
- learn how to sell, barter, swap, and give things away.
- learn how to network and build your social capital.
- get involved in politics on some level.

## Technical

Thanks to specialization, the average person uses many more kinds of technology than he actually understands. This lack of understanding makes us unable to distinguish quality and allows marketing and slogans to influence purchases. As a result, people frequently end up with products and tools that are either less than optimal or just plain unsuitable. This leads to frustration and additional purchases, and allows the experts to charge more for what should be simple operations. In addition, technology often replaces what used to be considered a skill. For instance, some people no longer know how to boil an egg thanks to the invention of the automatic egg boiler. On top of that, consider how many other life skills have been lost during our transformation from craftsmen to technology users. Not only does this leave us without the ability to solve the simplest problem when something breaks down; it also leads to enormous dependence on experts and specialists, and thus on an income to pay for their services, completing the circle. It's commonly thought that independence is mainly achieved through a large income. Rather than working to establish such a large income, it can, however, just as easily be gained by acquiring skills instead.

Technical goals for someone aspiring to be a Renaissance man are to

- have knowledge of the skills of different professions to be able to critically judge the services of professionals.
- have a working understanding of all the technology you use to understand its limits and benefits.
- learn how to select the optimal tools for your use, how to maintain them, and how to repair them when they break down (see Economical above).
- learn a common trade to be able to barter your skills for other things.

## Ecological

All systems possess ecological knowledge intuitively through evolutionary means. Being part of an ecological system, humans used to possess this knowledge as well. However, technology has created an aberrated bubble, screening people from this knowledge. Most people are therefore no longer capable of thinking in ecological terms. Indeed, it has resulted in a new kind of system which, like all young systems, is more focused on exponential growth, production, expansion, and quantity rather than stability, protection, consolidation, and quality, which are the marks of a mature system.

Unfortunately for the existing mature systems in nature, the rapid expansion of the human bubble is destroying them. Unfortunately for us, we can't exist without them any more than a living person can exist without oxygen or a body can exist without a head. In this sense, it is actually a conceptual error to define the environment as the rest of the biosphere save humans, and think of ourselves as apart from it, since we can't exist without it.

Aside from the continued existence of humanity, ecological understanding includes many principles about the organization of complex systems which are very useful for living as a Renaissance man. Ecological goals for someone aspiring to be a Renaissance man are to

- know the names of five grasses, five birds, five trees, etc. local to your area, and be able to recognize them.
- know which food is in season and how much oil, water, and fertilizer it takes to grow/raise the food (out of season, out of location) and how it is sensitive to Liebig's Law of the minimum.
- grow and sustain a garden without using pesticides, hybrid seeds, chemical-based fertilizer, *etc.* A garden and indeed any system will achieve maximum integrity when it is in balance, and when growth is stable and resilient

without ongoing external interference.

- promote functional diversity to retain adaptive capacity, to allow evolution to happen when the environment changes. Adaptive and evolutionary potential should be considered before interfering. Actions always have reactions, and so action is not always a good idea.
- always consider the system and understand both the parts and the whole. No parts exist without the whole and the whole doesn't exist without the parts. Everything is related to everything else, mostly indirectly. Thus, changing one part will change the whole.
- recognize multiple bottom lines, flows, and balances in terms of primary, secondary, and tertiary consumers, producers, and decomposers.
- use the maximum power principle (see Appropriate response), which states that systems strive to maximize the rate of useful work--that is, to not waste energy to its environment.
- understand the concept of characteristic scales in terms of change and the effect of limits on competition and cooperation. Understand the difference between positive feedbacks and negative feedbacks (both are needed) and how linking feedbacks lead to cycles, runaways, or overshoots.
- study the structure and principles of different systems to build a collection of models, in order to understand other systems.

# The Renaissance education

The most important purpose of education isn't getting a degree, nor is it memorizing a collection of facts in order to win on quiz shows. Education is supposed to transform and build the character, mind, and body of the students. The point of an education is to learn a systematic way of improving those aspects--exercising, researching, and figuring things out to build a foundation for continued learning for the rest of one's life, so that one may live his life to the fullest extent possible. Learning must become a habit (see Ergodicity and destiny) that is applied to all aspects of life before it can be said that a person is truly an educated person. This means that learning never stops. Sadly, this point is entirely missed by our current educational system, or at least by the students who consider education to be a product and who stop learning as soon as they get their degree.

Education widens the focus while training narrows it.

Training teaches skills and methods. Aside from training in research and perhaps one vocation, learning more skills in depth isn't important, if the methods are restricted to one field (see The cost of specialization and this figure). Besides, in a book like this, it's impossible to cover all the skills of Human capital and necessary personal assets in detail. This would be training, and it's almost guaranteed that specific methods are going to be incompatible with the needs of specific readers, given all our individual circumstances. In addition, training creates contentment and a tendency not to seek answers outside traditional procedures. This is detrimental to you if you need to think for yourself, but a benefit to you if you need others to think for you. Education never provides simple answers. Fundamental principles, concepts, or structures are more important than technique, because it is only possible to understand structures in the world if one has formed a corresponding structure in the mind. The more structures the mind has to draw on, the quicker it is at gaining an understanding of other subjects, as well as synthesizing new information, as the neural patterns in the brain are already in place (see Economic degrees of freedom).

For instance, in the sciences, a young, technically adept person will be able to quickly crunch numbers and manipulate equations, while perhaps not quite understanding the underlying concepts of his chosen specialization, whereas a more experienced person will quickly understand the underlying concepts of even unfamiliar subject areas. In physics and mathematics, such experienced

people are said to have physical intuition or mathematical maturity, respectively.

Sadly, many educations focus more on technical details because they are more easily testable. Even without the need for testing, many authors and educators are guilty of obscuring the fundamentals by giving equal time to all pieces of information.[33] Automatically grasping what is important only comes with experience.

Now, there are many ways of measuring experience, the most popular being tenure. However, working in the same place for five years does not imply five years of experience. If you've been doing exactly the same thing, day in and day out for five years, and it only took a day to learn, you have one day's experience, five years over.

People remember most of what they do, some of what they say, but little of what they see or hear.[34] It's therefore important to do things. You must experiment systematically to understand the underlying fundamental principle. In cooking, try to leave ingredients out or substitute in new ones to see what happens. In sports, practice unmastered techniques actively and put them together with other techniques. In finance, try investing in different things. Don't be afraid to try new things. Education also requires being open-minded. After learning a complicated subject, see if you can explain it to your mother[35] or use it in an otherwise unrelated field. Only after doing that do you own the knowledge.

# Gauging mastery

There are several ways of measuring expertise and mastery. One common method is using tenure, for which there is a whole classification scheme that reflects relative competence fairly accurately.

1. [0 hours] Novice--knowledge or skills that any reasonably intelligent layman possess.
2. [300 hours] Apprentice--some skills, but can't be trusted to do independent work.
3. [1,000 hours] Journeyman--competent technician, capable of independent routine tasks.
4. [3,000 hours] Master--proficient mechanic, capable of almost any task.
5. [10,000 hours] Expert--superior proficiency, capable of original work.
6. [30,000 hours] Genius--legendary proficiency, capable of extraordinarily original work.

These terms which, except for the top level, have been borrowed from the professional trades, are known in the educational system as high school, Associate's, Bachelor's, Master's, and PhD degrees; genius is beyond what can be obtained educationally. Note that the levels are close to being logarithmically spaced, suggesting that they are governed by a scaling power law. In other words, competence is judged by the rarity of the willingness and ability to put in the effort. The level at 30,000 hours is reserved for the Mozarts and da Vincis of the world, who spend every waking hour on their field of expertise. The hours are active learning hours. Mindless repetition doesn't count towards the total. Five years of experience isn't the same as one year of experience repeated five times. The nominal rank isn't important either--we all know people whose work is better than their title suggests, and vice versa--rather, it is the degree of accumulated effort that distinguishes one level from the next.

Since not all effort is the same and not everybody learns and develops at the same pace, it's more useful to look at expertise by considering the following list, which parallels the development mentioned above.

1. Copying
2. Comparing
3. Compiling
4. Computing

5. Coordinating
6. Creating

In the first stage, a person is unthinkingly *copying* what he sees in his surroundings. A person at this stage is entirely at the mercy of his surroundings. For those learning the skills of personal finance, good role models instill good financial behavior, whereas bad role models instill bad financial behavior. Many people live all their lives at this stage (see this figure). This is the novice level.

In the second stage, the person becomes aware that there's more than one way of behaving, possibly by *copying* other people who behave differently. Keep in mind that many people never get to the second stage. Sure, everybody probably *compares* themselves to others to some degree. Keeping up with the Joneses is one such comparison, but such comparisons are comparisons in degree, not in kind. Sometimes, however, a person might realize that there's another way to do things, such as living without debt or taking cold showers, and that this other way is preferable and actually achievable. Often, though, the other way is simply dismissed as being impossible. The preponderance of people in stage one and two explains why advertising works.

In the third stage, the person is actively collecting ways of doing things differently. Many personal development books and blogs operate at the third stage, *compiling* large lists of tips and tricks, each describing a fragment of what constitutes good behavior.

In the fourth stage, the person is able to apply several of these tips to everyday life. For instance, the person will be able to make a budget and follow a plan. This stage is about implementing a plan. Many blogs, books, and TV shows also discuss this stage. Stages three and four are mostly about the technical aspects, the journeyman stage, of mastery. They concern the nuts and bolts. Stage three is about collecting them and stage four is about pairing them together, screwing the nuts onto the bolts.

In the fifth stage, the person will be able to *coordinate* and refine different tips to achieve specific objectives. There are relatively few discussing this problem, which falls under general lifestyle design. These lifestyles share the commonality of being built out of existing ways of doing things. This is the master stage. Here, the whole lifestyle becomes one big "tip."

In the sixth stage, a person will be able to synthesize and *create* entirely new ways of doing things from seemingly unrelated concepts in a lateral fashion. The important becomes unimportant and vice-versa; usually this is manifested in a "return to the fundamentals", which--surprise, surprise--turn out to be of fundamental importance. Things become holistically and efficiently integrated

with no superfluous expense of energy or money, and tactical side effects are either eliminated or made beneficial. This is the expert stage. At this point, the expert could be seen as copying other experts, but the expert is not copying what the others are doing, but rather what they *are*.[36]

# Decoupling and increasing complexity

Complexity provides an advantage over simplicity because of its greater functionality. To wit, more is possible using a set of tools compared to a single tool. Complexity allows understanding/manipulating/using the same thing in many ways, which is useful for perspective, and understanding/manipulating/using many things in the same way, which is useful for synthesis (by using analogous methods). Complexity, therefore, results in flexibility. Increasing complexity always increases capability and adaptability. The human species is probably the best example of this. Humans have the most complex brains of all species, and as a result, we've become the dominant species and been able to adapt to practically all parts of the Earth.

However, complexity also has a cost because maintaining increasing levels of complexity requires increasingly more effort. For instance, the human brain uses an enormous amount of energy relative to the size of the body it controls compared to other mammals. This implies that there is an optimal point of functionality where the efficiency--that is, the ratio of functionality to maintenance and storage cost--peaks. The purpose of education, living, interacting, and growing as a person should be to increase complexity--that is, to progress through the stages from copying to creating as described in Gauging mastery. Without this progression, the brain is overwhelmed by the sheer quantity of facts, stuff, relations, appointments, *etc.* If information is simply accumulated (compiled), one should expect at some point to be forgetting practically as fast as new things are learned--it is just the brain's way of being efficient on its own.[37] This is particularly true when the focus is on compiling facts instead of reducing facts to principles and synthesizing more general theories (see Gauging mastery). The same principle holds when accumulating things without learning new and better ways to use them, or when building relationships without connecting them into a community. Similar arguments can be made for computing--that is, taking on more and more work, hobbies, and responsibilities. The maintenance costs simply grow larger and larger, and if no complexity is created, adding another fact, thing, or relation to the "collection" will eventually grow functionally by *O(1)*--that is, not at all, due to the "one thing at a time"-constraint, whereas the maintenance costs will grow by *O(N)*.

The main mistake when dealing with an overwhelming amount of data and stuff is to reduce it, rather than relating to it on a more abstract level. It's always easier to cut away than it is to create, but it's not always the best solution.

While abstraction reduces the number of concepts (see Building blocks) to deal with, decoupling further reduces it by decreasing the number of relevant interactions or "degrees of freedom." It's very difficult to deal with more than a few degrees of freedom because the number of possible interactions has super exponential growth.[38] Decoupling decreases the strength of the interaction between parts. Interaction may either be described as static, instant, or dynamic, depending on the characteristic (time and/or space) scales of the parts. Think of a static interaction as dealing with a wall--it stays put no matter how you push it. A dynamic interaction would be like pushing a person--the other person responds to your pushing, but you can't just extend your arm freely. An instant interaction would be like holding a ball in your hand--if the hand moves, the ball moves. It's more difficult to come up with a good analogy for space, but having a large room with plenty of storage to spare would correspond to the static situation--you could put your thing down anywhere in the room. Having "a place for everything and each thing in its place" corresponds to the instant situation, while the dynamic situation would be a room that's almost full and where one would have to rearrange things to fit things in. Other dimensions such as financial, physiological, intellectual, emotional, *etc.* (see Human capital and necessary personal assets) are also relevant and obey the same guidelines.

In general, interactions are easiest to deal with if they're not dynamic. For example, the "hurry up and wait" approach in many complex organizations is the attempt by one agent (your boss) to make the output of other agents (you) appear static in his world as he consequently deals with a world of static problems. This is the optimal solution for your boss as you can't be expected to solve problems instantly, and dynamic interaction would require far more interaction and planning from the management side. Conversely, making this coupling dynamic, thus increasing the degree of freedom (to fail), is frequently a source of profit since "hurry up and wait" is an inefficient strategy when agents are only capable or allowed to do one thing because a complex system has not been developed. From this it immediately becomes clear why "hurry up and wait" management strategies tend to dominate complex organizations, whereas smaller organizations are more dynamic.

This coupling problem often comes up with workload management. For a creative person, workload management with external constraints is especially stressful. A manager executing simple procedures may more easily divide his day into 15-minute slots and do different things in each slot.[39] A creative person and even a craftsman can't do so, as both need time to retool. For the creative person, the retooling happens subconsciously, and when the retooling is

complete, inspiration suddenly strikes. This means that it's perfectly possible to switch between things, even rapidly, according to where the inspiration strikes. For instance, at any one time I have four to six simultaneous projects going. If I restricted myself to just one project for the sake of simplicity, or tried to switch projects on a pre-arranged schedule dictated by time management, there would be a lot of downtime when my subconscious was processing a problem while I would be sitting around doing nothing and being underutilized. Hence, not allowing yourself to do anything but focus on one specific task will actually not increase productivity for *creative* work. It will only increase productivity for assembly line work (see Economic degrees of freedom) or the management thereof.

If the dynamic dependence between parts is reduced or eliminated, failure does not require a dynamic fix. One can either fix it instantly or simply leave it be and declare the part dead. The lack of cascading interactions increases resilience. It should be clear that the more diverse and independent the parts of the system are, and the more complex the system itself is, the greater its survival rate. Conversely, a simple, specialized system with interdependent parts, like a career professional, is likely to break as soon as circumstances change (see this figure and this figure). The dynamic response of a single part can further be reduced by introducing reserve capacity (a buffer), which ensures the ability to maintain a dynamic response over a greater range of circumstances. Closely related is the increase of peak effort, as it makes what was previously extreme, normal. In some cases maintaining this reserve has a maintenance cost, but in many cases it does not.

# Strategy, tactics, and guiding principles

The development of a *strategy* follows the progression given in Gauging mastery--copying -> comparing -> compiling -> computing -> coordinating -> creating, and parallels the development of expertise. The first two levels, copying and comparing, correspond to defining an *objective*--that is, a goal, such as getting out of debt, becoming a millionaire, retiring early, or running a marathon. The next two levels, compiling and computing, correspond to following a *plan*, which is a sequence of individual actions or tactics ("tips" in personal finance parlance). Don't confuse a plan with a strategy. A plan comprises a goal and a sequence of actions, but it doesn't describe the guiding principles. A strategy requires all three ingredients and thus requires coordination and creativity.

Now, there are many plans available on the market following a permutation of a formula of the type, "*X* days/tips to success in *Y* using the *Z* method," where *X* is a number (typically 7, 21, 30, or 365 days or 10, 12, 50, or 100 tips), *Y* is something desirable (typically $1,000,000, losing weight, getting a date, etc.), and *Z* is some kind of secret or, often, the author's autobiography. A plan can be thought of as a sequential set of instructions. "If you do this, followed by this and that, and several additional steps, you'll end up at the goal."

Plans work well if the number of degrees of freedom (see Economic degrees of freedom) is limited so that few things can go wrong--that is, not according to plan. However, the more complex the situation--and life is generally more complex than assembling a piece of Swedish furniture--the greater the chance of something going wrong due to

- unknown unknowns--uncertain factors that nobody is aware of, also known as surprises,
- unknown knowns--certain factors that you're not aware of, meaning that you got the wrong plan, also known as "I told you so",
- known unknowns--uncertain factors that you are aware of, meaning that the plan is correct but lacking precision, also known as bad luck or bad design.

The construction of a plan--that is, the way the tactics are coordinated and

created--follows a set of guiding principles. If a plan shows how to put instructions together, then guiding principles show how to put a plan together and create a strategy. Strategic thinking--that is, the creation of plans--is what separates the last two levels, coordinating and creating, from the first four levels. Compared to a plan, which may be thought of as a *string of actions*, subject to complete failure if it breaks, a strategy is better thought of as a *web of actions*. A web does not fail catastrophically if it's cut in a single, or even a few places. It's resilient, whereas a plan is not. This is why having a strategy is much preferred to having a plan. A web comprises and connects a person's thoughts, ideas, experiences, memories, goals, values, desires, connections, assets, liabilities, predictions and expectations. Here, a larger inventory of the aforementioned means there's a greater variety of possible strategies and that any given plan becomes more flexible. Focusing solely on the coordination aspect and ignoring the tactics can result in "clueless manager syndrome." Conversely, focusing solely on the knowledge of tactics or skills described in Human capital and necessary personal assets would only produce a person with a multitude of hobbies. Only the combination of skills and coordination will unleash the creativity of an expert. Creative synthesis occurs when you're able to see principles as an abstract model representation and apply the abstracted model elsewhere. With experience, you'll see that the number of such models in the world is actually quite limited. What this means is that any kind of human understanding is based on a small number of representations that are repeated over and over. Perhaps this is because humans are only capable of thinking in certain limited ways, so the same methods are discovered independently over and over by successful experts in different fields, or perhaps experts tend to borrow from each other, seeking inspiration elsewhere; it is probably a combination. This means that one doesn't need another 10,000 hours to become an expert in another field, even if it's only marginally related. It means that it's easier to master several different fields than is commonly assumed.

It's important to understand that doing the right thing (good strategy) is much more important than doing things right (good tactics). This is why this book is short on tactics and long on strategies. Strategy is about defining the end-goals. Tactics is about the means to those ends. One thing that was crucial in formulating the strategy towards a Renaissance life with financial independence was that the means be widely available. A strategy that relies on means that are impossible to replicate for most people, like inheriting $1 million, winning the lottery, being the rare inventor or author that actually gets his great ideas commercialized, being the first one in on a new technology, or simply riding a leveraged asset in a financial bubble and getting out at the right time, or relying

on yet-to-exist communities or ways of life, are not very effective. For fear of repeating myself and boring the reader, the strategy is what is going to create success and it is to a large extent what separates successful people from unsuccessful people. The tactics, less so, as most are capable of good performance on the tactical level.

For progress, it's essential to base goals on a *consistent* strategy that guides individual tactics (see Ergodicity and destiny). There's more than one way to spin a strategic web and some ways are better than others. Given a capable and intelligent person or group of people, errors rarely originate in the execution of a plan, though the plan itself may fail. Instead, errors occur in the principles underlying the development of the plan. Therefore, it's important to base a plan or a framework on the correct principles.

Consider again the different types in this figure. Each type is characterized by very different strategies. As indicated in the diagram, the Renaissance strategy is based on a combination of consilience--a specific way of weaving widely different tools and ideas together to solve complex problems--and resilience, which is based on the principles of modularity, diversity, and slack (loosely coupled feedback processes). Resilience is the foundation of most behaviors observed in nature. After all, if they weren't resilient, they would be extinct. While not completely equivalent, consilience shares a lot with typical businesses strategies which can be transferred to the individual sphere. Combining resilience and consilience defines the Renaissance man, and they will be used in A Renaissance lifestyle to form a complete strategy that will make a committed person financially independent in a handful of years.

## Strategic principles

The best way to understand the Renaissance man is through the use of an analogy--a university. Most universities research and teach a wide variety of subjects that are further split into courses taught by corresponding experts. In other words, the subjects are diversified. This means that if any one or even several subjects suddenly became obsolete, the university as a whole would still function. The experts are gathered into departments and institutes. Typically, experts within their respective departments are strongly connected (Physics-Physics). Usually, they will also connect somewhat more loosely in interdisciplinary studies with other departments in the institute (Physics-Astronomy), and sometimes they may go outside the institute and connect with experts at other institutes (Physics-History). For a university, each institute and each department functions almost independently of the other. In other words, a university is modularized, and through the collaborations that connect different kinds of expertise, new knowledge and complex solutions are created. Therefore, a university is consilient. Despite its complexity, a university isn't subject to catastrophic failure whenever a professor has to cancel a lecture due to illness or a meeting, or whenever students don't come back in time after spring break, or when equipment doesn't show up on schedule or a laboratory gets flooded by a rainstorm. People (professors, students, and administrators) simply rearrange and reschedule without issue, because the entire system is built on a foundation of loosely coupled feedbacks. Hence, jarring one part of the system does not noticeably affect the other parts.

Compare this to the businessman, who in many respects is similar except that loose feedbacks, which in the business world are known as inefficiencies (because time is money), are now tightly coupled feedbacks.[40] A business is like a nuclear power plant, which is a complex and tightly coupled system. Here many failsafes (over a dozen for some parts) are in place to keep the system operating within its tolerance limits. If one failsafe breaks, another picks up. Another example is the financial system. Rather than focusing on stable operation like in nuclear power plants, financial engineering was used to leverage to maximize profit using relatively tiny differences between the strong opposing forces of assets and liabilities--that is, in the most general sense, by borrowing large amounts of money at a low interest rate and lending/sending it back out at a slightly higher rate. This tight coupling led to cascading failures, where failing parts caused other parts to fail, and so on, until a buffer was

created by the taxpayers with the government as a proxy. Any part that is so tightly coupled that it can't be saved in the time it takes to decouple, will fail.

The salary man is the simplest to understand, but not necessarily the simplest to live as. Real world examples of something that is simple but tightly coupled includes most technology, as "simple and tightly coupled" is almost the definition of technology or a tool. Examples of industry thus comprise Industrialism 1.0, with its heavy, centralized engines--that is, dams, water supply and waste water treatment, many conveyer belt systems, power looms, printing presses, and so on, down to most consumer technology. In short, these can all be stopped by throwing a switch, but their stoppage will not begin to affect other systems. The reader may note that those tool or cog-like qualities are actually ideal for a work force, though not for the individuals themselves, many of whom have little control over their work and are just one paycheck away from being unable to pay rent or put food on the table. This is generally not a very desirable position to be in, so the aim for anyone in this category is to bring in more income by entrepreneuring complex systems as a businessman or by introducing slack, like emergency funds. Despite its inherent problems of lacking resilience and consilience, salaried work is amazingly popular among employees. It is heavily promoted by employers, who keep calling for better tools (career professionals) to operate their ongoing concerns. Most books on personal finance or productivity focus on this area.

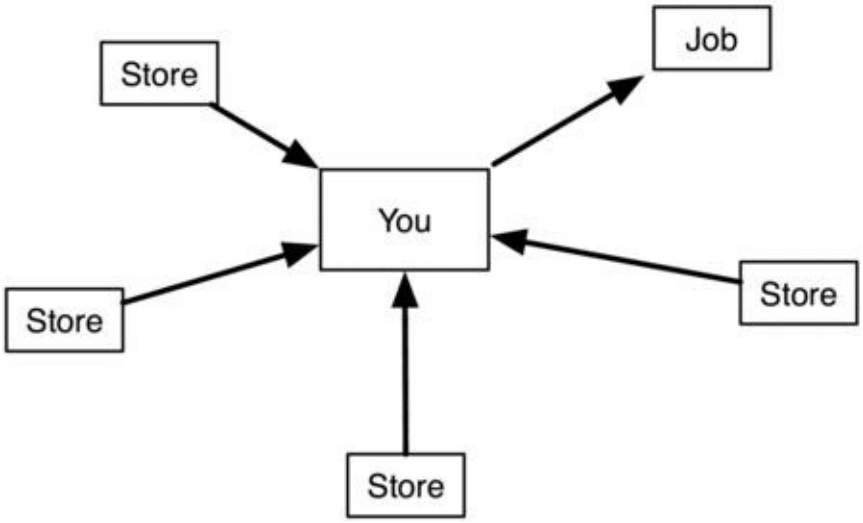
The working man can accommodate shocks and short-term failures (like job loss or car breakdown) without destabilizing. Any industry that operates on a franchising or similar model (the Post Office) and any industry that has seen outsourcing is an example of this. If a supplier fails, other suppliers are found within the time it takes to run out of inventory. Similarly, a new job is found before the emergency fund is depleted. However, since the strategy is preset by society (see The lock-in), improvements are limited to tactics such as introducing more slack through reserve funds, using the proper amount of savings and insurance, and simply running the operation faster--hence the fascination with lifehacking, productivity, time-saving strategies, and the almost fanatical discussions of exactly how large the emergency fund should be and how much one should spend on each budget category.

Now, knowing the difference between the categories is one thing, but if you have ever been involved in a start-up or gone through any other kind of transformation, you'll know that the underlying thinking and feeling of the finished stage can be very different from the thinking and feeling in the intermediate stage, which again is different from the initial stage, exactly because it's a complex, nonlinear process. Therefore, we'll now look at principles

for creating the initial stage of consilience and resilience in a life strategy.

## A modular design

Consider the cash flow of a salary man who puts effort into a job that yields a wage, which is then spent on stuff that is used or consumed in an endless cycle. This figure shows how the dependencies look in greater detail and in extreme conditions this can be a literal depiction, where the boxes are buildings and the arrows correspond to driving a car between the boxes. There's a box for the home, a box for the job, where the consumer drives to get money, and boxes for stores, where he drives to exchange the money from his job for entertainment or stuff which he drives back to his home.




Consumer culture shows a modular structure where problems are solved by driving to different stores to buy parts of the solution. This activity is made possible by driving to a job and exchanging time for money.

This figure shows a tight coupling between the consumer, the job, and the stores, respectively. Here the *stores* should be thought of broadly as shops, gyms, restaurants, dentists, plumbers, *etc.* If the coupling to the job is severed, the advanced consumer with good credit, savings, or insurance can draw on those, but he still needs to go to stores for his needs, since everything requires external interaction in the form of regular trips to stores--"I'm going to the store, need anything?"

This is the consequence of specialization. The solutions to his problems, except the very specialized problem detailed in his job description, have been outsourced to the marketplace and personal competence has been lost or replaced with information on "where to find good deals." Eventually he comes to depend strongly on this marketplace and hence on his continued employment.

The individual consumers depend as strongly on an aggregate of stores as the stores depend on the aggregate of consumers. This explains advertising and the insistence for expert solutions, at least as far as the experts are concerned, for they need to earn money at their jobs too.

This is outsourcing taken to its logical extreme. Many believe that extreme outsourcing such as hiring assistants to write personal letters, walk their dog, and maybe talk to their spouses, is the way to go, counting on lower offshore living costs to maintain their comparative advantage, or even common outsourcing such as buying cake mixes, eating out, or having a plumber fix a clogged pipe. There are three reasons for this line of thinking. The first is misinformation. Consumers have become convinced that experts are needed for anything but the simplest task. The second is lack of personal skills. Knowing how to provide basic needs, like householding skills or how to stay happy, can be tremendously valuable. They can often be had very inexpensively compared to what the market offers. For instance, imagine the value of a support network of family and friends, or meaningful, unstressful work, compared to the hourly rate of a psychotherapist or stress-relieving prescription drugs. Or that preprocessed food, which only needs to be heated, takes about 15 minutes of salary work to pay for, which is comparable to the time it takes to cook a similar meal from scratch. The third is lack of choices. When the market mainly offers full-time jobs and the culture expects you to spend the rest of your time shopping and watching TV, it leaves little time for anything else.

For individuals, outsourcing and comparative advantage can't remain advantageous in practice if taken to extremes. Yet in many ways it has been taken too far already when people spend eight hours a day for 30 years to buy electric can openers and marble towers.The solution is to reverse the outsourcing of ordinary life skills and gradually *insource* skills that were previously acquired in the marketplace to

- become less dependent on a single source of income.
- become less dependent on a multitude of store services.

This is both simple as well as tremendously challenging, because it requires a different kind of thinking. To get started, make a list of services and things acquired in the marketplace (see Building blocks for how to get a better idea of *how* to look for them) and start learning them on a need-to-know basis (see The Renaissance education). Here is a short list[41] of suggestions:

1. Hair cutting. If necessary change your hairstyle into something you *can* do.

Be flexible!
2. Mending clothes and darning socks.
3. Cooking, preferably from scratch. Heating something in the microwave or mixing powder with water doesn't count. Again, if necessary, change your diet.
4. Buying something used instead of new or swapping something. There are now many websites to facilitate this.
5. Getting somewhere without a car. Use public transportation, commute by bicycle or try walking a few blocks to the grocery.
6. Borrowing a book from the library. It's amazing how many people do not take advantage of this free resource.
7. Planting a garden of edible vegetables. Start with spices. Move onto high-cost/low-effort plants like tomatoes (not potatoes). Look into permaculture and intensive gardening.
8. Making simple nontoxic household agents from scratch, like laundry detergent, toothpaste, insect killer, window cleaner, or beer.
9. Bicycle, motorcycle, or car maintenance. At least start by washing it yourself. Move on to fixing flats, cleaning, changing oil, and lubricating parts. Graduate to disassembling the drive train and engine.

A very common and very good piece of career advice is not to work to earn money but to work to learn new skills, gain new connections, and create new opportunities. Similarly, life advice like the above should not exclusively be for the purpose of saving money--although it'll come in handy later in Important financial ratios--but to build social cohesion and connections and learn and exercise skills that can later create opportunities. This way, saving money won't be seen as consumer deprivation but as producer manifestation; you're now making something rather than buying it. In my opinion, that makes you a more interesting person.

Another very common--and in my opinion very bad--piece of advice, at least for the purposes of attaining success as a Renaissance man is to pick and focus exclusively on one thing, say hair cutting. This may be fine if you need to make a career out of it, but if you only need to provide for yourself and possibly a few friends there's no need to specialize and develop all skills sufficient to be marketable; just focus on your own hair.

However, without changing one's frame of mind from that of a consumer, solving daily problems by learning a bunch of new things and doing them yourself runs the risk of turning into a multitude of hobbies (see here), as supplies are ordered from stores, clubs are joined, or projects become overly

ambitious, at least in terms of acquiring the tools and supplies. This could therefore easily end up strengthening the dependencies of this figure, first running out to stores to buy supplies and then running back to work to pay for them, leaving little time and room for the project, which eventually moves out to the garage with the rest of the stuff.

Therefore, a requirement is to make each project self-supported. To understand what this means, divide the projects into three groups (and everything in between)

- **Projects that cost money**
  Projects with start-up costs and regular fixed costs (see Depreciation schedules). You need to buy equipment and pay subscription fees or replace equipment that wears out on a regular basis. Many sports fall under this category.
- **Projects that are "free"**
  Projects with few start-up costs, no fixed costs, and no cash flow, but possibly network connections of learning skills or providing some value. These projects are free. This can include using things you already have, such as a computer and an Internet connection.
- **Projects that earn money**
  Projects that are saving you money or--even better--making you money; not as in a hopeful future, but now. This could include learning how to cook, fixing computers, mowing people's lawns (for the exercise), babysitting, *etc*.

It's of primary importance that a project *produces value*, even if that value isn't money, and doesn't destroy value.

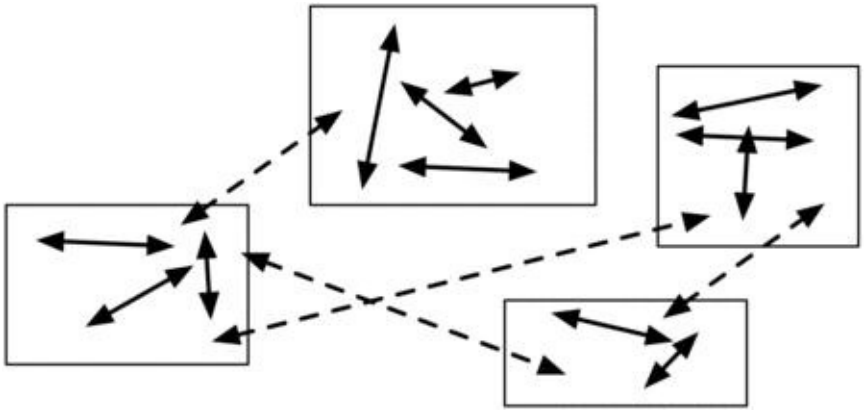
Money leaving your pocket is a big warning sign that your activities fall into the first category. These should be avoided as much as possible and replaced with or modified into activities that are "free" but provide the opportunity to learn, meet new people, and possibly earn money eventually. It's often quite possible to find a direct, yet free, replacement for a cash-negative activity. For instance, rather than going to the movies, you can borrow the DVD from the library or a friend about six months later if you just change your perspective. Don't get too ambitious about making money right away. Serendipity plays a larger role in the long term. For example, I replaced my fascination with buying computer hardware (expensive money sink) with learning about the *nix operating system (free) and eventually ended up as the system administrator of the department I was working in simply because I was the one who knew the

most when the previous admin left. Later I turned the knowledge of emacs and LaTeX from writing scientific articles into a freelancing job as a copy editor, which covered all my expenses working approximately 30 minutes a day on average. Blogging was another activity that started as a constructive way of channeling my writing and eventually turned into this book, which I typeset myself using what I learned as a copy editor. My interest in economics grew out of my interest in geopolitics, and eventually turned into an interest in investing, that I combined with my savings, which came from my interest in not spending money by doing more things myself, and so I was able to devise a custom-made portfolio that suited my particular investing temperament.

Over time, this approach automatically develops several diversified streams of cash, as well as many more means to save money and keep that cash. Yet, cash flow is not the only measure of independence. Some develop a social network so large that they can travel anywhere with little cost (look into courier services and couch surfing), and others develop such a wide set of skills along with an ability to sell those skills that they can work for room and board as well as a small stipend.

Conversely, it may be that an activity needs certain other connections. For example, using the company gym for free requires working for the company. In fact, companies often attempt to strengthen their employees' dependence on the company by providing "benefits" like health care, retirement plans, and other perks which can be thought of as golden handcuffs. This must be kept in mind when resolving dependencies, especially connections to things outside your immediate control.

The optimal solution in terms of dependencies and connections is shown in this figure. Here each project is modularized and acts as a holon. This means that the connections within the project are strong, whereas the connections between a project and the external world (other projects) are weak. Consequently, any given project doesn't depend very much on other projects, and vice versa. They are also self-supporting and able to contribute to each other without depending on each other. It is resilient, much like the Internet is resilient by design, as it can still function even when individual servers are down, as no single server is critical. Now, can you say the same thing about your life with regards to your job? Or your car?



This figure shows how to organize your activities. Much like an industrial conglomerate, dependencies between the projects are weak. Strong dependencies are contained inside the projects.

Another aspect of this figure is that no single module dominates. The modules are diversified into approximately equally large sizes, which decreases risk. For instance, consider the university departments in The Renaissance ideal. Each department in a university is about equally large and strong. This is unlike most people where one skill completely dominates all others--for example, one may be paid $25,000/year for one activity (one's job) but less than $25/year for one's next highest source of income, which is very likely to be the interest from a savings account. With proper diversification, if one income-generating module fails, it doesn't cause shockwaves through the rest of the system because the external coupling to other modules is weak. In addition, if the external couplings connect to different modules, rather than connecting to the same module, this lack of centralization protects the system from disruptions and cascading failures. Furthermore, the wider the diversification, the greater the likelihood of taking advantage of opportunities in the unique environment you reside in, or which you may find yourself residing in due to changing circumstances--this is the quintessence of adaptability. If you find yourself in a situation where you can't solve a problem, solve another problem--an omnivore always has more options available when solving the problem of eating.

Note that simple, small, and slow modules are easier to manage than complicated, large, and fast modules. In managing modules, your reaction time should be faster than the characteristic time scale of anything you interact with and you should be able to understand and control anything you engage with/in as well as have the time to oversee the operation. While increasing size and complexity initially offers better benefits, the benefits decrease as increasingly higher costs of unforeseen problems swamp the system. Here the answer is to offload the complexity, but where do you begin and where do you stop?

Communities like the Shakers and the Quakers have thought about this and decided on some ground rules of what complexities to avoid. In general, the avoided complexities are the tightly coupled complexities.[42] They will gladly borrow those, but they won't own them. To wit, they use a modularity strategy with loose couplings to avoid many problems.

Slowness can be achieved through delayed gratification. In a world of scarcity, instant gratification is the optimal strategy. In a world of abundance, delayed gratification is the optimal strategy. Genetically, there's a preference for the former, which means that a mature person with a measure of self-control has an advantage, being able to wait for bargains. It also means if you have patience and don't depend on speed, there are fewer costs to be paid for the additional power that speed otherwise requires. It's helpful to master the art of waiting. We are prone to action, but often the problems we perceive as urgent turn out to be less than urgent. Sometimes they will even resolve themselves without any interaction.

**Using the modules correctly**

The problem with most non-Renaissance goal setting is that it is either linear--that is, typically advancing along a predetermined career path--or it is separated from life--that is, a businessman may have many goals for the business but few goals for himself. Similarly, salary men and working men are likely to concentrate on only a single goal, such as maintaining a certain grade point average, getting a raise, accumulating a certain amount of money, getting promoted, providing for a family, *etc.* If there are multiple goals, they're likely to be separated by the work-life mantra (see this figure). Here one goal could be to provide for the family, and the other, unrelated goal could be to reach a more ideal bodyweight. For the Renaissance man, however, the end goal is to blur the line between work and life rather than a balance between work and life. Consider that almost any work becomes drudgery if you have to do it all day every day, whereas scrubbing toilets or filing forms might not be too bad if you only have to do it 15 minutes a week.

Ultimately all modules should produce value in some form: better health, new/better connections or skills. And no module should consume the value produced by another. In particular, different productions should never cancel each other out, something which is all too common these days. For example, the invention of faster transport was canceled out by increasing travel distances, larger productivity was canceled out by greater waste, *etc.*

With each module being self-supported, self-sufficient, internally integrated, and loosely coupled, with no module dominating the others, modules should be easily substitutable, but connected in a loose confederation of "independent entities" aligned in a common goal, so that the sum is greater than the parts. In other words, arrange your life like an orchestra or a sports team, which don't depend on any single player.

## Contingency goal-setting

When pursuing a goal with an externally preset strategy, there's a strong tendency to focus on tactics to increase productivity. Crank the machine faster to get done sooner. "Here's how you can save five minutes while brushing your teeth, and here's how you can more effectively respond to e-mails, and here are 500 additional tips." The reason is that, other than working faster, most people really don't have a lot of freedom in terms of strategies for reaching their goal, since their strategies are locked in (see The lock-in) either externally by association--for example, company procedures--or internally, by habit or tradition. The only way is therefore to use *slightly* more effective tactics. Consider, for example, a factory floor, where the only allowed means of increasing productivity is to run each station faster. Now, admittedly, if you have a million employees, you can probably save a million minutes by getting your workers to spend one minute less on a given task, and if you're the business owner, it all adds up, maybe to $1 million for you and one million curses from the employees. Perhaps a redesign of the factory floor layout, that is a new production strategy, would be more effective than reusing the old strategy with slightly better tactics? For the individual person, who is saving a minute here and a minute there to spend working towards his goal, another goal-seeking strategy would be more effective.

Thus, to increase effectiveness, the focus must be on improving on the strategy rather than improving on the tactics. Rather than using better tactics to reach goals, the goal-setting method must become better. Traditional goal-setting is one-dimensional. It follows a process that essentially draws a line between *A* and *B* and then divides that line into small steps of actions that are taken in an incremental fashion. The problem with this approach is not so much the division into steps, which can be psychologically helpful or a way of maintaining managerial control or measuring progress. Rather, it's in the goal-setting itself, in particular the drawing of a straight line between *A* and *B*.

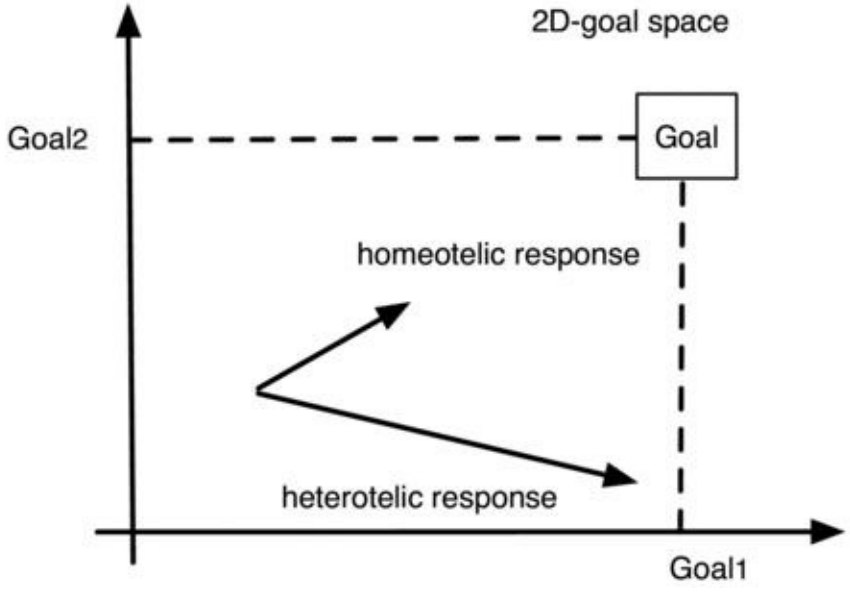
This rarely works, since real-life goals are seldom straightforwardly one-dimensional. Most actions have side effects. This has a very important

consequence:

You can never do just one thing!

When focusing on a single goal, side effects are ignored. For instance, the most popular single goal is building a career. This goal tends to ignore the sometimes adverse side effects such as complete dependence on the job, complete identification with the job, alienation from the spouse and any children, failing physical health, stress, and so on. If one manages to maintain a strict focus on the goal, then by the time the goal is reached, this strategy will have caused so much collateral damage that the work is not complete; the damage must be fixed first. Often this "fixing" creates additional problems.

Consider a two-dimensional problem (see this figure). A rudimentary example of a two-dimensional problem is achieving the famous "work-life"-balance. While I don't believe there is such a thing, it will serve as an example. In this example, the challenge is to solve two problems simultaneously. The first problem, $goal_1$, is the "work" problem, presumably working enough to build a career, display skills, gain power, money, awards, merit badges, or whatever. The ideal point is marked on the *x*-axis. The second problem, $goal_2$, is the "life" problem, that is having a happy home life, whatever that entails. The ideal point is marked on the *y*-axis. Together they form a two-dimensional goal $(goal_1,goal_2)$ marked with the box "Goal."




This figure requires a rudimentary understanding of vector spaces from "linear algebra 101." It shows the difference between a heterotelic and a homeotelic response in a world that only has two possible goals. The homeotelic response moves closer to both goals whereas the heterotelic response, while moving further towards goal-1, actually moves away from

goal-2.

Also shown in the figure are two possible strategies. Both strategies have side effects and affect the pursuit of both goals. The heterotelic strategy moves you closer to goal-1--you went in the right direction along the *x*-axis--but away from goal-2--you went in the wrong direction along the *y*-axis. Heterotelic, a term borrowed from ecological philosophy, means *different goals* (telos is Greek for goal). A heterotelic strategy includes finite behavior that is misdirected. This behavior is behavior that works against you. The homeotelic, meaning *same goals*, response, on the other hand, moves you closer to both goals. From a systemic perspective, the homeotelic response is the right strategy, because it works against you the least.

Another way to think of a heterotelic response to a problem is that it aims to fix a single symptom of, say, a disease. If the response causes undesirable side effects, additional drugs are taken in an attempt to fix these side effects. Here many arrows are used in the figure to try to get closer to the desired goal. The heterotelic response makes particular symptoms more bearable and tends to encourage more problem-causing behavior. If hiding the symptoms is effective, then Liebig's Law of the minimum suggests that additional symptoms will appear. If these in turn are treated heterotelically, then eventually the underlying problem will become so large that the system fails catastrophically (stress -> burn out -> depression -> heart attack) or simply becomes unsolvable.

Conversely, the homeotelic response aims to fix the entire problem--that is, cure the disease. Naturally, this is the ideal approach, but it requires a wiser approach to the problem. An important part of the systems thinking approach is to continuously increase the number of different problems that the strategy aims to solve or the number of different goals that the strategy intends to meet.

A good strategy solves multiple problems at the same time!

Yet enormous amounts of resources in our society are aimed towards solving problems heterotelically. Sometimes the solution is the cause of a new problem, but thanks to short-term thinking, the focus is often on responding to problems rather than preventing them. Our culture seems to have an ongoing fascination with action, and "reaction" is ironically more visible than "proaction."[43]

To solve the problem, the cause of the problem must be understood. However, this is difficult and often impossible! Often there isn't one single cause. The human brain seems to be almost incapable of dealing with problems that have multiple causes. For instance, what is the cause of a financial crisis? It usually has at least ten different causes, exactly because a crisis can be postponed by treating individual symptoms, after which the system collapses altogether; any reasonably intelligent person blaming just a few of the many

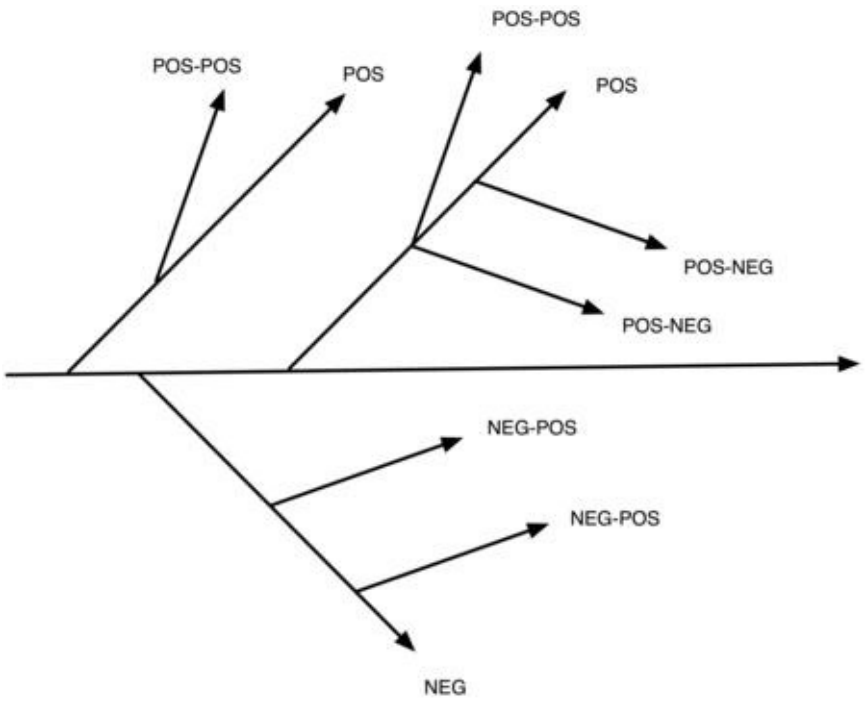
causes probably has other motivations. To simplify problem-solving, it's paramount that problems remain "small, slow, and diversified." This, of course, is anathema in a culture that prides itself on being bigger, faster, and more focused. Nevertheless, small, slow, and diversified must serve as a natural delimiter to remain on top of the situation. While this may not be understood by everybody else, it's fortunately possible to live a life based on this simple philosophy on your own, by not engaging in things that are beyond your comprehension and control.

**Effect-mapping**

Having realized that it is impossible to do just one thing, it follows that any action or behavior has a number of positive or negative side effects or consequences. Here, each side effect corresponds to a dimension in the figure. If you take all your actions, which are now vectors in "goal-space" and add them, this will give a strong indication where in "goal-space" you are likely to end up (see Ergodicity and destiny).

This figure shows a complementary way of mapping out the consequences. For those familiar with "fish bone" diagrams, this is the reverse of one. The taken position is a zeroth-order effect and it has first-order effects. Positive effects go over the line. Negative effects go under the line. Each effect also has second-order effects. Positive effects go over the line. Negative effects go under the line. It's difficult to say if a position that has a weak positive first-order effect with a strong negative second-order effect or a weak negative first-order effect with a strong positive second-order effect is net positive. If this can't be determined, the behavior is too complicated and should be avoided (see here). Hopefully this won't be a problem and second-order effects can be ignored. However, sometimes second-and even third-order effects either add up or accumulate undetected for a long time before triggering spectacular event.

As a general rule, if adding up the side effects doesn't create a positive bias, then the entire goal structure should be reevaluated.




The goal is the horizontal line. This goal has two positive (POS) and one negative first-order side effect (NEG). The first positive side effect has a positive second-order side effect (POS-POS). The second positive side effect has one positive second-order side effect (POS-POS) and two negative second-order side effects (POS-NEG). The first negative side effect has two positive second-order side effects (NEG-POS).

Let us consider a few examples.

- [Hobby] The zeroth-order goal is to have fun. The first-order negative side effect is that it costs money. Another first-order negative effect is that it may require space. This space requirement has a second-order negative side effect in that this too requires money. A first-order positive effect may be meeting new people. A second-order positive effect of that is that this could allow for professional networking. A third-order positive effect is that this could lead to a job.
- [Side business] The zeroth-order goal is to learn how to run a business. Startup costs are a first-order negative effect. Income is a first-order positive effect; for many, income might be the zeroth-order goal. Running a business has a time cost which may be positive or negative. Regardless, a positive second-order effect of this is that this time is not spent spending money.
- [Job] The zeroth-order goal is to earn money. Developing a career is a first-order positive side effect. Being stressed or unhealthy is a first-order

negative side effect, as is the cost of business attire and keeping up appearances. A second-order negative effect of this is spending money to make up for this, either by taking drugs or shopping.

These are just examples. For instance, the zeroth-order goal of the job may be to develop a career rather than earning. In that case, put career as the zeroth-order goal and the money as a side effect. If clothing is supplied, this is a positive side effect rather than a negative side effect.

Now, think of your own reverse fish bones in terms of how you spend most of your time and energy. This may also include family, education, sports, religion, retirement, etc., and things you're not currently doing but could be doing.

Consider the sum total of all the effects of your actions. Since adopting specific actions will lead to specific outcomes, *all effects can be considered goals*, whether you actually want to achieve them or not. You may find some of these goals to be counterproductive. Some goals involve saving money, while others involve spending money. Some goals involve getting or being healthy, while other goals are unhealthy. Indeed, if you map out a typical lifestyle, you will probably find a lot of counterproductivity. When a strong positive goal is countered by smaller negative goals, the result is friction. Friction produces waste (see Breaking out). Waste is prevalent in modern life. Just consider how many people drive. First the foot goes on the accelerator, then ten seconds later it goes on the brake, turning kinetic energy into waste heat. Then it goes back on the accelerator again to make up for the loss of speed.[44] This results in poor gas mileage, as gas is used to heat up the brake pads, and equivalently poor *life mileage* when the same habits are used in everyday life. The same vehicle gets different gas mileages depending on the driver. Similarly, money gets different mileage depending on who is spending it. Conversely, if one positive goal is positively aligned with another positive goal, both goals benefit--the vectors point in the same direction in goal-space. To achieve such synergy, count up actions and list the effects. Effects may be positive or negative. Without synergy, negative effects will often cancel out positive effects or effects will be very scattered. Synergy concentrates the effects or goals. If you don't see a concentration of goals, you must change some of your behaviors and perhaps adopt new ones. For example, one of the things I had to do when starting on the path to early retirement was to replace my money-wasting and generally unproductive hobbies with hobbies there were free (see A modular design) and meaningful a) to not cause friction with my money saving, b) to provide meaning that was unrelated to work, and c) to learn new skills applicable to

work (programming and writing).

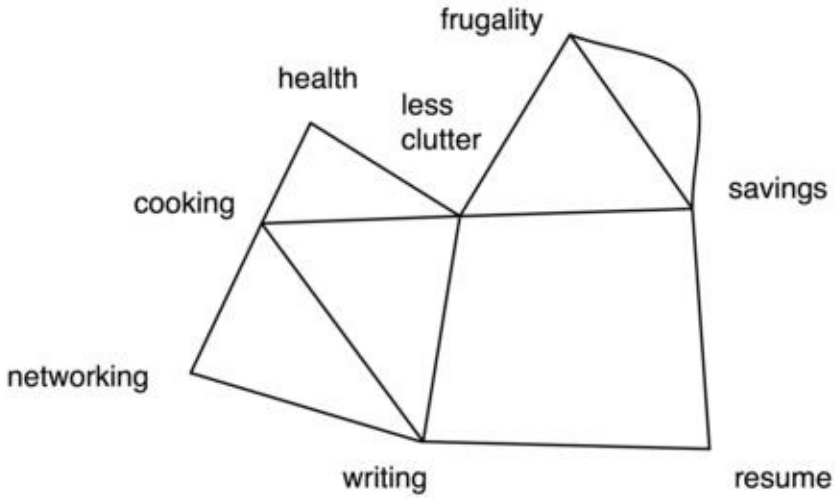
## A web of goals

Having thus whittled down the number of available behaviors to a number of strategies that have mostly--optimally, exclusively--positive benefits, at least to the first order (but feel free to continue the exercise to higher orders), it is possible to use a simple form of systems thinking to assemble modules for an overall strategy. Yet unlike the traditional approach to systems theory, which aims to include an increasing amount of existing problems to be solved, generally in a reactive fashion, since the previous lack of systems thinking created them in the first place, the *web of goals* strategy aims to solve problems proactively by creating solutions that could be part of a wider strategy in the future.

Another way to think of this is that this strategy maximizes opportunities and changes according to which opportunities bear fruit. It's an opportunist's approach, which incidentally affirms the Renaissance man's position in the economic and social ecosystem. Yet another way to think of it is, like the name suggests, a web that catches, covers, and holds all the individual issues that are important to the person such as health, wealth, and wisdom.

Here is how to build the web: Each module will have one to several goals, namely the zeroth-and first-order effects of this figure. Here I just ignore higher order goals because their impact is typically small. Suppose the *simple living* module has "frugality," "savings," and "less clutter" as goals. These form a triangle in the figure. Now consider the *career module* which has "savings," "less clutter" due to being engaged in the career rather than buying rewards for suffering through a job, "resúmé-building," and "writing skills." Those are four goals. This forms a square. The square shares two goals with the triangle, so draw them next to each other. Now add the *exercise module*. If bodyweight exercises are picked, the goals would be "less clutter," "health," and "healthy cooking." "Less clutter" already exists, so tag this triangle onto that point. The *financial independence* module has "frugality" and "savings" as goals. Tag this module onto the others by draw a half-circle. Add a "hobby" module, say healthy cooking and writing about it: "writing skills," "networking," and "cooking." This was just an example of a web--now make your own. It may be difficult to draw a sturdy web--however, take comfort if your goals are limited in quantity and you can find many activities (modules) that involve several of them. Like in object-oriented programming, naming the concepts can be the hardest part of this

exercise.




Interconnected goal structure. Each square, triangle, or semi-circle represent a distinct modularized activity. If one goal fails, the tensegrity will pull and refocus the remaining goals with little shock to the entire system. Similarly, each link could be thought of as a skill, or alternatively, each triangle could be thought of as a skill set.

**Tensegrity**

Having three goals (or more) for each module builds tensegrity into your plans and consequently your life. If one goal is pushed away, the other connected goals instantly pull your life in a slightly different direction. These goals can be thought of as back-ups or secondary objectives, but it is better if all goals are approximately equally balanced in importance. For any given activity, one of the goals should not dominate the others. This approach is very different from the standard advice that encourages you to put all your eggs in the single basket of your job. Having a single goal makes a person effective, but it also makes him vulnerable and subject to discontinuous changes. Plans have to be altered radically or even rewritten completely if this goal fails.

Because of its flexibility and adaptability, it is important to realize that the web of goals strategy essentially is a process-oriented strategy rather that a goal-oriented strategy. On the meta level, a process-oriented strategy is primarily aimed at living, with goals being accomplished as side effects, whereas a goal-oriented strategy is aimed at goals, with living as a side effect. It's natural that employers prefer employees of the latter persuasion, as they can just break goals into smaller goals and hire an employee for each sub-goal. As an individual or a business, the focus should be on the process rather than sub-goals, lest the long-

term perspective be lost.

This is perhaps easier to explain using sports as an analogy. Most sports require several skills such as strength, endurance, agility, speed, toughness, stamina, power, analytic aptitude, teamwork, etc. Here, training generally focuses on at least a few of those skills simultaneously for each training exercise, whereas the game ultimately requires all skills simultaneously. Playing sports with multiple requirements has at least two benefits. First, the more diversified one's sport is in terms of required skills, the easier it is to play any other sport. Second, if one skill is lacking, the other skills can still be built and they can, to a large extent, compensate for weakness in other areas.

# Tactical principles

Tactics are often presented as lists. These lists are both helpful and useless at the same time. They are helpful because they allow people to pick up a thing or two that they have not seen before, but they are useless because few people are capable of memorizing hundreds of little rules that might not even apply directly to their situation and remember to obey all of them. In that sense, tips are like a collection of pretty postcards or pictures of specific instances of a particular way of living. They are interesting to look at, but they do not substitute for a map of the lifestyle, nor do they substitute for navigating the map, and most importantly, knowing them does not make anyone an expert.

This is why lists and tips in any field, while greatly entertaining, often fail to deliver the desired results. Conversely, once the underlying principle has been identified, the approach becomes intuitive and automatic, thus obviating the need to follow lists and mechanical methods like budgets or diets.

The principle is to define a need or want and then proceed to fulfill that need or want with an *appropriate* response (see Appropriate response). An appropriate response to a problem is a solution that uses just enough resources to solve the problem--no more, no less. Since appropriate responses are rarely available in the marketplace, taking existing solutions and modifying them for things they were not intended for is a useful tactic to create more appropriate solutions.

## Identifying needs and wants

Spend much time reading about budgets or engaging in discussions about lifestyles and you'll notice that most of them focus on the difference between needs and wants. This often results in normative discussions of what other people should need or want, which usually degenerate into discussions about what is possible and what is not possible.

The fact that it is so hard to agree on which is which suggests that the differentiation has become meaningless and thus irrelevant.

There are no such things as needs and wants.

It's therefore pointless to argue about the difference or make lists of needs and wants. The problem is that needs and wants don't fit on two different lists. They fit on one list where they're ranked according to value rather than price (see Economical). Needs and wants are different in degree, not in kind.

Consider, for example, shelter. Here the list of choices may look like this:

1. Sleeping under open air.
2. Sleeping under a tarp, basha, or hootchie.
3. Living in a tent.
4. Couch surfing.
5. Living in a shack or a cabin.
6. Living in a ship cabin or truck cab.
7. Living in a car or a boat.
8. Living in an RV.
9. Sharing a room with other people.
10. Having your own room.
11. Sharing an apartment with other people.
12. Having your own apartment.
13. Sharing a house with other people.
14. ...

On this scale there is no demarcation of when a need becomes a want. Each step is slightly different and slightly more expensive than the previous step, with no clear indication of what the bare minimum is, other than having somewhere to sleep. At what point, then, does a want become a need?

It could be argued that sleeping under open air in Alaska or Finland will kill you, and that some form of shelter is therefore a need. However, it's possible for people living in Finland or Alaska to move south so shelter isn't an absolute need. Rather, it's shelter in Finland or Alaska that is an absolute need--insofar that staying alive is a need, but nobody *needs* to live in Finland or Alaska, even though I'm sure those are nice places.[45]

Even though the rankings on this list probably match the rankings of most people, it's by no means universal. Having experienced the freedom of living in an RV or a boat for a while, some people would never dream of substituting this for a 4,000square-foot McMansion with its endless cleaning and maintenance issues, and the need for walkie-talkies to find lost family members. The list is individual, because any choice has consequences in other domains (see Contingency goal-setting).

For each individual, there are similar lists for eating, clothing, transportation, health, time, tools, toys, activities, status, etc., each ranging from essentially zero cost to more than one can imagine. These can also be classified into tangibles like air, water, food, sanitary, shelter, communication, transport, health, and security, and intangibles, like time, relationships, affiliation, power, and

achievement. Some of these, like security and sanitation, we take for granted living in the developed world. For others, except perhaps air and clean water, there's a large range of possible "consumption" levels. For instance, the eating list ranges from roadkill and dumpster diving, to industrially processed "food," to gourmet meals and fine dining. Clothing ranges from going naked to owning just one set of clothes, to owning massive wardrobes full of shoes and tailor-made suits. Transportation ranges from walking barefoot to driving a "hooptie," to private airplanes and megayachts. Health ranges from being strong (physically and mentally), to being on prescription medicines, to being entirely dependent on advanced medical infrastructure. Time ranges from being a galley slave, to working 8-10-hour days in a tolerable job, to doing what you want, which may or may not include what is otherwise classified as work.

Completing these lists is left as an exercise for the reader. In fact, such an exercise is highly recommended. Try to make it as wide-ranging as possible and as complete as possible. It may range wider and include more dimensions than suggested above.

Each level on each list has a price and a value which is individually unique. The ultimate goal is maximizing total value while minimizing the total price. While the locked-in lifestyle described in The lock-in provides a default choice of levels, it's possible to choose one's levels very differently. For instance, instead of choosing a career in a cubicle, a five-bedroom/three-bathroom home on a 30-year mortgage, and a new TV on credit, one may choose financial independence and early retirement.

## Building blocks

The world is like a box of Legos. A box of Legos comes with blocks and instructions to build a particular model or product out of the blocks, specifically

*blocks + instructions = model.*

However, the world is normally not perceived as a box of Legos. Mostly, the accompanying instructions are followed slavishly and the fact that the blocks can be combined creatively into new models is forgotten. This turns the box into a kit model. Mentally, this reduces the concept of a building block from something that can be creatively combined in many different ways to being merely "part 27a" which is to be fitted with "part 27b" in step "8."

Even worse, much of the world comes preassembled. With the blocks thus gone, this reduces the equation to

*instructions = model.*

Often the instructions are reduced and simplified under the mantra of being

easier to use. This reduces not only the creativity of the user but also the operating skills, which are transferred into the model or product. The product turns from being low-tech but high-concept to being high-tech but low-concept.

The beauty of this from a business perspective is that each model can be turned into a profitable product and sold separately. This is the reason that we now have electric rice cookers, egg cookers, bread-makers, toasters, hamburger cookers, *etc.* and as a consequence people have forgotten how to fry an egg in a pan,[46] amongst other things. Hence, the equation has been reduced to

*product = model,*

where the only instruction people need to know is "Get into your car and drive down to a shop and buy the product. Then go to work and make money to pay for it."

At this level of incompetence, success can only come from buying a product. More products, more success. This is expensive and wasteful. Just think of how many times a pan and a heating element are replicated in the appliances mentioned above, not to mention that electricity is a really inappropriate source of heat.

To avoid this waste, we must relearn how to fry an egg, specifically by realizing that frying an egg first and foremost requires a surface that transfers heat and a source of heat, and not necessarily the "Wonderfryer 3000." In more general terms, we must once again perceive the building blocks to construct more economical solutions. This doesn't mean that you literally have to go and take your appliances apart. Rather, it means considering what kind of utility a product provides and what kind of need or want you have, and then *think* of other more economical means of solving a specific problem by using a different way of putting the blocks together.

Focusing on utility rather than consumer products or instructions is a key tactic. Success is then redefined from accumulating and consuming the maximum number of products or the most expensive products to deriving the maximum utility.

Having been raised on products, a key challenge for recovering consumers is to identify their actual core needs and wants. The reason that this can be challenging is that consumers are used to associating needs with products. For instance, it's hard to disassociate being free from headaches from taking headache pills or to disassociate losing weight from buying the "FatMaster 3000." Or to pick a simpler example: Imagine a dog needing to get onto a couch. The utility sought is the dog ending up on the couch, and there are many ways to achieve this before buying a dog ramp. If the dog can't jump or be lifted by a human, the dog needs something to step on. That's the utility sought: something

to step on, not necessarily a dog ramp. Consider the ubiquitous box. A box can be used for storage. It can also be used to sit on or support other objects (aha!-moment[47]) or block a passage. Ideally, a box could be used for many things at once, so that it takes up little space relative to its usefulness. For example, several storage boxes could be combined into a dog ramp (aha!). After being decommissioned, it could be cut up for firewood, unless it is made out of plastic, and its construction is simple, so you can make it yourself. Failing that, finding box-shaped containers is trivial.

A box, particularly a sturdy wooden box, has wide utility and would thus fit well into the web of goals way of thinking which was outlined in Contingency goal-setting. Most important, though, is that its wide utility exists mainly as a potential in your mind. A person with no imagination and few skills will only see the box as a container. Approach the world without prejudice, start seeing things for what they are and what they can be used for, not what you've been told they're intended for. To do this requires seeing utility from a fresh perspective. This is also called lateral thinking, a kind of thinking that improves with generalization and worsens with specialization, or out-of-the-box thinking, which really originates from having thought in many different kinds of boxes. In particular, it requires a shift in focus from products to components.

## Construction methods

Many rely on their connection to the market, through employment and purchasing, to satisfy most of their needs and wants. While this makes sense in some situations--for instance, building your own microwave oven from scratch would take a lot of time[48]--it makes less sense in many other cases (see A Renaissance lifestyle). In some cases, purchasing is even used to substitute, usually unsuccessfully, for other needs like recognition, meaning in one's life, self-worth, and even using and doing things (recreational shopping). Using the market to satisfy every need is expensive because the market solution is generally not the optimal solution.

Often, consumer products come with superfluous frills (side effects) that don't provide the desired utility. Such products waste money and take up space and time. The challenge is thus to distinguish between the need (for example, keeping warm) and the frills (for example, keeping the entire house warm) and then find an efficient--that is, economical-solution (for example, wear warmer clothing, be physically active, invite people over) rather than buy an uneconomical product (for example, central heating). One of the most important

aspects of construction is often the most ignored: good raw materials or building blocks.[49] In retrospect, that some ignore the building blocks may not be so surprising when considering the discussion above. If the building blocks are poorly chosen, constructing any kind of solution becomes that much harder. Choose the right building blocks using the guiding principles in Strategic principles.

Combining wholes/solutions/products out of parts allows for flexibility and substitutability (see this figure). Having a product that can't be separated into parts is bad. This is obvious when one of the functions on a gadget breaks. For instance, a modern desktop computer is typically built out of individual, mutually compatible parts which can be selected and replaced by the user. However, most modern electronics built after the introduction of the integrated circuit are problematic--complexity which is better outsourced--as it is impossible for nonexperts to understand what is going on. Conversely, mechanical, electromechanical, and thermomechanical (engines) objects built out of wood and metal are serviceable by intelligent users since their functionality is apparent by inspection. You can see what each part does and thus you can repair it if it breaks. Also, if a part breaks, a new one can be made. However, it your product relies on the 8086 chip (a widely used computer chip which first appeared in 1978), you may have a problem sourcing it these days and you definitely can't build your own--you are trapped.

Next, consider whether the something has multiple uses. Does it serve more than one purpose or can it serve alternate purposes? In particular, can it serve as one thing first and end up serving as another thing? A wooden spoon turns into firewood at the end of its serviceable life, for example. Obviously, raw materials are closer to being able to serve multiple purposes, but even completed products can have multiple uses.

For example, a computer can act as a media center, whereas a media center (TV+stereo+cable box) can't act as a computer. This isn't strictly a technology issue. Can any given shirt in your wardrobe be combined with any given pair of pants and look good? In the kitchen, the chef's knife is probably the most versatile, after the spoon and the pot--unless you're a vegetarian, in which case a serrated utility knife is better, as it doesn't require sharpening, nor a cutting board. What are the optimal ways of putting solutions together to find the maximum range of use?

Turn the problem on its head by changing it. Instead of looking for ingredients (blocks) for recipes (instructions), look for recipes for ingredients. This is strongly facilitated by carrying many recipes--that is, ways to accomplish something--in your head. This way, the complexity is internalized and becomes a

design problem rather than being externalized as a logistical problem. For instance, when shopping for groceries, knowing many recipes by heart allows one to tailor what's for dinner to whichever loss leaders are on sale, rather than venturing out with a shopping list and having to buy single missing ingredients.

If you only have a hammer, the whole world becomes a nail--the most common hammer is in the shape of a credit card. The more myopic the focus on a particular method, the more difficult the solution, if and only if the focus is on the wrong method (and it can't be correct all the time, if you only have one). For example, when tackling an obstacle like a heavy weight, don't remain confined to seeking out ways to make the weight lighter. A different solution is to become stronger. Changing the focus is similar to changing the problem, except in the latter case the idea is to collect many similar methods; when changing the focus, the idea is to know many different methods.

Most wants are internal, so focusing internally and "doing without" is often a less complicated way to solve a problem as it mainly requires strength of character rather than skills or connections. Rendering wants superfluous requires little technical skill, but it does require motivation and self-discipline. Giving up wants can be as tough or easy as going on a diet, giving up smoking, or changing other habits dependent on strength of character. However, doing without is often thought of as a sacrifice, especially when strongly attached to material comforts. It's quickly realized (after about a month) that happiness does not stem from being surrounded by possessions, but that being surrounded by them is the result of an addictive habit. Thus, it can be tremendously liberating not to "need" something to be happy.

Since humans need very little, eliminating various wants can go far in terms of solving problems. Can't afford it? Don't want it! Too complicated? Don't want it! Reduce and simplify. Reduce and simplify! An entire aesthetic can and has been formed around this principle, and so the pleasure from following this path can be as strong as the (previous) pleasure of accumulation. However, as there's a point of diminishing returns to the pleasure of accumulation, there's also a point of diminishing returns to the pleasure of giving things up. The optimal point is somewhere in the middle. It should therefore be kept in mind that while eliminating problems can be a very good tool, some will be very tempted to make it their only tool, in which case it becomes a hammer for which the whole world becomes a nail.

Once you've developed a greater freedom to choose by changing some "needs" into "wants," you can tailor your wants to areas that are supplied freely or at least inexpensively. Much free or almost free stuff comes from the tremendous amount of waste generated by a culture where things are being

bought, used once, and then put away in attics, garages, extra bedrooms, and ultimately the landfill. Methods for getting things for free are social in nature, relying on connections to others (these days often on the Internet with like-minded people), keeping track of who has or needs what, and making the connections, either through donations, swapping, bartering, or lending. Getting and providing things for free provides value to society insofar as it keeps things out of the landfill and reduces the sales price of newly produced things. Providing things for free provides value insofar as it prevents further consumption of finite resources and maximizes the use of our productive efforts.

It's somewhat likely that you're only going to use a given item a few times yourself too. Sending it along, thus instituting a kind of serial ownership, maximizes its total use. Serial ownership creates a form of decentralized library. While there are websites which bring serial owners together, availability is limited since people are free to keep things as long as they wish, and many do keep their things around, "just in case." Serial ownership can easily be developed as an attitude simply by selling things once they're no longer in use. To minimize depreciation costs, buy and sell used. The total cost of ownership will be minimal. Often things go out of use because they break and the owner doesn't know how to fix them. Such things can frequently be acquired very cheaply or for free. Sadly, they're often thrown out immediately, so if you're looking for broken things to rescue, you must be vigilant. Often, these things are easily fixable--bicycles with loose brakes and flat tires, lawn mowers with dirty spark plugs, furniture with loose screws--and a person with a few simple repair skills can fix them. Repairing many things is surprisingly easy. Most mechanical items are put together with nuts and bolts and only require a set of the right wrenches or screwdrivers. Beginners should at the very least be able to replace a broken part. The trick is to find out which part is broken, but keep using the replacement method and you will find the right part.

If you get your networking and repair skills down, you'll find yourself buying mostly the missing parts for your solutions and tools to fit them in--buy tools that last a lifetime and this phase will soon be over. After all, any finished product can usually be had for free. The most important thing to remember is that the price of anything is not determined by how much effort went into the production. If it was, I should be paid as much for writing this book as an actor gets for a movie. Nor does it depend on the level of specialized knowledge required for the job. If it was, I should have earned more than $40,000 per year after spending 10 years to acquire what corresponds to a master's degree in nuclear physics and a PhD in astrophysics, given that you can also earn this salary as a toll booth operator. Nor is it determined by any kind of inherent

value. If it was, school teachers would be paid more than professional athletes and bankers. It's strictly determined by how much the seller can get. This took the economics profession hundreds of years to figure out. Since there are different sellers with different levels of knowledge about their customers, prices vary.

When buying parts, tools, as well as new things, always try to get three different prices across markets (new and used) and time (do prices tend to go up or down? are they seasonal?) to get an idea of the effective price. Memorize the prices for anything you buy regularly--parts for food, also known as ingredients, come to mind. If memory is failing, keep a price diary. Only issue "limit orders"--that is, don't buy until the price falls below some predetermined level. Patience is rewarded more often than not. Let current purchases determine what problem you're currently solving rather than the other way around; adapt your plans to what is on sale.

Given the price, consider whether it's worthwhile to buy the part or manufacture it yourself. This comes down to valuing your time earning or otherwise making money versus your time fixing the problem directly. When buying products, you're paying for time, materials, and knowledge. You probably have plenty of time (you read this far), materials (especially when bought in bulk) are shockingly inexpensive, and often the knowledge required to do a job is overestimated. This means that most people do not properly value their own knowledge, having been convinced that an expert must always be consulted. However, if you can add and subtract, you can do your own taxes; if you can keep an appointment, you can garden; and, if you can peel a potato and tell time, you can cook. These days there are plenty of tutorials online and in books that will teach you how. With just a little experience, the only thing that will separate your work from that of a professional is that the professional can do it five times faster than you can do it--the first time.

This means that anything done more than once is worth doing yourself. To wit, I can cook my favorite food better than a restaurant because I have cooked this dish more than 100 times, while a professional chef may only make it once in a while. I can do it cheaper as well, since I work for myself for free. If I have a problem with the plumbing or a binding door, I can get immediate service because I can fix the problem myself. If the problem reappears, I know what the problem is and I can fix it much faster than calling a plumber or a carpenter. Once you can make things, you can also provide value to others. The greater the variety in the things you make, the greater the likelihood that you can contribute your skills.

Bodging is probably the first step in making things. Not to be confused with

the art of botching, which is the art of screwing things up, bodging is the art of improvising a working solution using whatever is on-hand. Duct tape comes to mind. A few people seem to possess this as a natural ability, but for the average man, bodging has been suppressed by a sea of experts and professionals. The general consensus is that now you better get an expert opinion before you engage in almost anything; better yet, just pay the expert and let him do it for you. Once this mental constraint has been removed, it becomes possible to bodge.

For example, did you know you can remove rust by scrubbing it with a pad of aluminum foil? I found out on the Internet. Make a pad out of the foil, put some light oil on it and scrub away. Once you understand why this works (aluminum foil is harder than rust but softer than the good metal and even most paint jobs), you realize that the oil is just there to provide lubrication. You could use anything, including spit.

For more advanced rust removal you can use electrolysis. While many hobbyists and mechanics use this method routinely, most have only seen this in action in a high school or university laboratory and haven't thought that the principle could be applied "outside the box" of a laboratory setting. Use a 2Amp nondigital car battery charger for the electric source and sodium carbonate (also known as "washing soda"[50] or "pH-Upper" or "booster" for your pool) mixed in water for your electrolyte. Attach the part to be cleaned to the negative clamp and some piece of scrap iron to the positive clamp. Bodging enters because you don't need to specifically use sodium carbonate. You could also use sodium bicarbonate, also known as baking soda. The only downside of sodium bicarbonate is that it doesn't work as well, but it will work. The concentration of sodium carbonate doesn't matter very much (more is slightly faster), nor does the current (higher is slightly faster). If you understand the principle of how ions move, you'll quickly realize that rust is removed along the line of sight to the positive clamp. However, you don't need to understand this to observe that it works. Just keep repeating to yourself, "This isn't rocket science." However, bodging requires another skill to be developed--common sense. We have been educated to follow instructions because it moves personal responsibility one level of management up. Yet if you're bodging, all responsibility is yours. You must know what you're doing. Notice that bubbles appear around the negative clamp. This is hydrogen. Hydrogen is explosive, think "Hindenburg disaster," so don't use the water in your rust removal setup to extinguish cigarettes and keep it in a ventilated area. This is common sense. Furthermore, you might think that ordinary kitchen salt might make a great electrolyte. However, the chemical name of kitchen salt is sodium chloride. Since we are bodging we might produce

some unintended consequences. If the ingredients are sodium and chlorine, those consequences are chlorine gas,[51] which was used as a war gas in World War I, and sodium hydroxide (caustic soda).

From a general knowledge of history and chemistry, it should therefore be clear that kitchen salt and sparks (from cigarettes or nearby battery chargers) should be avoided. Also, don't stick your hands into the conducting water. Bodging doesn't require an advanced education, but it does require a real education connecting what you've learned to real-world problems.

It's interesting to note that the more you know, the more likely you are to worry about the risks of bodging. Yet, the more you know, the more you realize that often even experts are simply bodging. You may find this comforting or worrying depending on your personality and how much you know. One problem with bodging is that it's difficult to tell whether someone is winging it or actually knows what they are doing. A good way to tell an expert bodger from a pseudo-expert is to see if the bodger understands *why* he is doing something a particular way. If he mentions "beliefs," "authority," "others," etc., chances are good that he is winging it for personal gain. Be honest about yourself. If you can't bodge, delay the project and work on something easier until you can.

Bodging transitions smoothly into fixing things. Fixing things, or rather parts, eventually transitions into creating parts. First you'll be creating replacement parts, but eventually you'll be creating your own parts. At this point you'll thoroughly understand the technology you're using and be ready to make your own custom-made tools to solve problems.

This way of learning differentiates itself from the educational system because it is real learning--that is, learning by doing rather than learning by taking notes, passing tests, and getting degrees. When I, having gone through the latter process, talked to people about how they learned to fix engines, I was surprised to learn that very often they had never taken a course. The typical story was that at some point they had gotten a broken engine and simply tinkered with it until it worked.

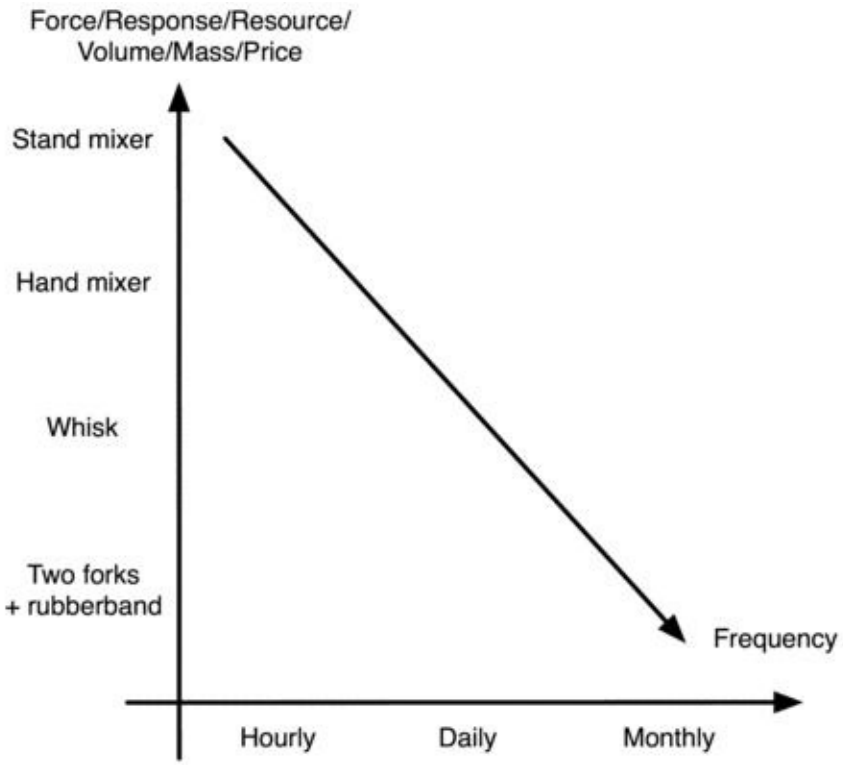
Each new method requires further development of skill, and you may find yourself transitioning through different stages depending on your other skills and personality. At any point in time, one stage may dominate your thinking since few will be able to develop all skills equally fast. Those with strength of character will seek to change, simplify, and downsize, as it goes well with "doing without things." Once a resilient network has been established, bartering, swapping, and wheeling and dealing will become more exciting than simplifying. Technical skills ultimately lead to creative pursuits, building and making things and rarely doing without, despite rarely buying anything. In my

case, I quickly found myself cooking my own meals and giving things away and acquiring others for free, whereas it took me a long time to start a garden and I'm still learning to fix motors and build furniture. Other journeys may be different.

## Appropriate response

Materialism has a fascination with overbuilding, oversizing, and overcompensating. This is bad economics. Consider that for each thing that gets overbuilt, there's something that doesn't get built. For each thing that gets underbuilt, there's something that must be replaced when it breaks. Both problems mean that resources are wasted.

Resources are wasted when the response is not appropriate for the situation. Responses can be divided into labor, capital, and management. Many are short on skill (management) and time (labor), therefore money (capital) is spent to compensate, hence the existence of automatic egg boiler gadgets and other atrocities. What is ignored here is that the opportunity cost in terms of time spent working (or watching TV) and time not spent learning a skill (such as how to boil an egg) is often higher than the cost in time to learn to boil an egg in a pot and actually do it. Indeed, the time savings of gadgets is often overestimated, while the time needed to learn a skill is equally often overestimated. This is particularly true since many capital assets are just sitting around, serving no purpose most of the time (see How to get rid of things).[52] Conversely, if a job is going to be repeated often, it makes sense to buy a labor-saving device. Ignoring skill for the moment, the simple trade-off between capital and labor suggests an arrangement such as that in this figure.




This figure shows total cost as a function of rate of use. For instance, once a month baking warrants a pair of forks tied together, whereas baking daily warrants a hand mixer. Specifically, anything used less than once a month warrants improvisation.

Skill serves to shift the line in the figure down and to the left because skill makes the use of time and capital more efficient. Except at a very high level, maintaining skill has no cost, so if something is learned once, no further effort is required. In this case it's sensible to develop a skill to just before the point that it begins to require maintenance, continued practice--beyond this point, replacing skill and time with capital assets makes more sense.

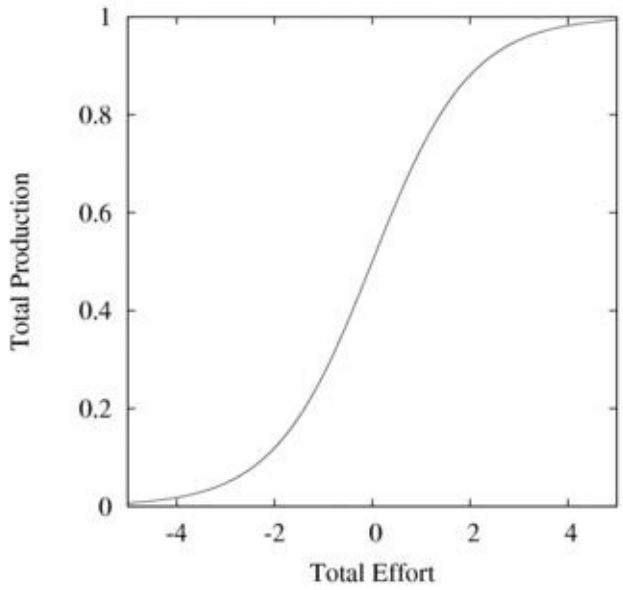
The skill component is something that consumers frequently misunderstand. A skilled response can easily be many times more efficient than an unskilled response. Conversely, the same ratio doesn't hold in terms of capitalization. For example, an expensive car won't be much faster than an inexpensive one. In the example of this figure, a whisk will only be a few minutes slower than a hand mixer, not counting the time one must work to earn the money for a hand mixer.

Consider the difference between an experienced swimmer and a beginning swimmer. The former is fast and the latter is slow. This, however, doesn't mean that the faster swimmer expends much more energy than the slow swimmer. The experienced swimmer is much much efficient and seemingly glides through the water, whereas the beginner is inefficient and struggles just to keep his head

afloat. Money-handling skills are very similar. The experienced money handler knows exactly where and how to spend money to get the maximum out of it. An unskilled money handler spends money everywhere, too much on some things, too little on other things, with much going to waste.

**Sigmoids, logistic curves, and the maximum power principle**

One popular psychological strategy is to set small goals or start slowly. Slow change is comfortable change. However, the cynic may observe that with an eternal series of baby steps, nothing much actually changes. This strategy usually fails from the lack of meaningful progress despite having achieved several small goals.[53] There's a good reason for this. The S-curve or logistic function shown in this figure is a useful model to explain why this strategy rarely brings the intended results.




This figure shows a sigmoid s-curve which can be used as a model to describe "return on effort" in terms of "effort" for many different kinds of "effort." For example, "return on effort" could be happiness and "effort" could be salary. Note that the curve is symmetric around the origin and that its rate of change is fastest at the origin.

Here the vertical axis describes the "return on effort" and the horizontal axis describes the "effort." Here "effort" measures some kind of input and return measures some kind of output. For example, the input could be time and the output could be money. The input could also be work and the output could be happiness, fitness, *etc.*

For the sake of discussion, let's consider a variable *P* and think of it as "Production." One way of thinking about *P* would be in terms of the cumulative number of pages I have written as the book project has progressed. The increase in production is proportional to the current production, because having already written and thought about the subject makes it easier to write more about it. However, the increase in production is also proportional to the potential for further production. In the beginning, this potential is high because there are many things left to write about, but as the book gets closer to the end, there are fewer topics to write about and so it becomes harder to just pick one and write about it. Here is a simple equation which summarizes this paragraph:[54]

*(dP)/(dE)=P(1-P)*

What it says is that with few resources (when *P* on the right-hand side is low corresponding to the lower left side of the figure and *P(1-P)~P*), the ability to change will be proportional to the resources. This works like compound interest and it'll create exponential growth. However, compound interest in itself never made anyone rich. Invest $1 at 8% and wait 30 years to get $10. This is hardly a worthwhile sum for 30 years of waiting. But invest $100,000 at 8% for 30 years and you get $1,000,000. That is real money. To get anywhere, it's thus very important to quickly build a substantial foundation. Setting small goals in a situation which depends on exponential growth is a guaranteed way of not seeing results very fast. Conversely, putting in a large initial effort is a guaranteed way of seeing immediate and growing returns. The middle of the curve shows a proportional relationship between effort and results--work more and get more results; work less and get fewer results. In other words, this is the stage where extra effort is rewarded more than it was in the beginning, because it's leveraged by the now higher production.

With further effort, the production ceiling starts to kick in due to limits on resources, customers, responsibilities, market size, *etc.* You might have found yourself with a job description that could be done in three hours a day even though you nominally have to work for eight hours. If so you know what I mean about reaching the productivity ceiling. In such a situation, it makes little sense to increase work effort by 25% if the return in productivity only increases by five percent. In such a case it is better to start additional projects, look for more responsibility, or learn something else. These projects would then each have their own curve for you to progress along.

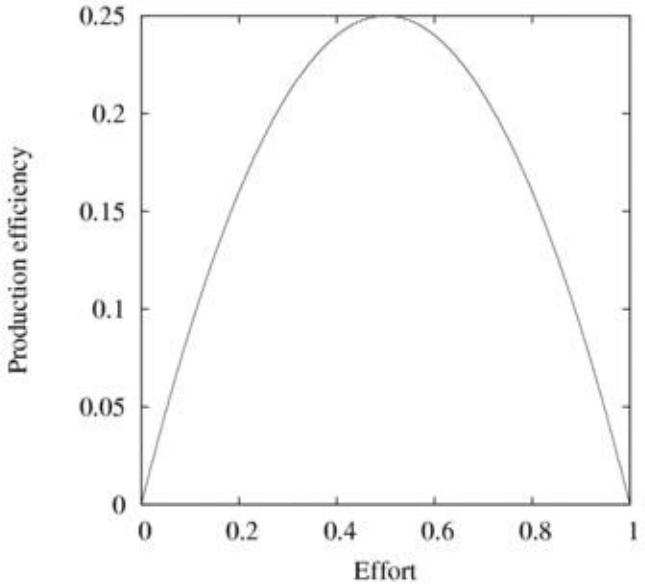
The optimal life strategy is to maximize total "production" for all the things you engage in or whatever the curves are measuring--presumably you'd have a curve for each project and multidimensional returns for each project, where total utility (see Building blocks) is maximized (see Ecological). Pricewise, it would

be impossible to quantify because it would require you to determine the exchange rate between health, money, satisfaction, meaning, etc., some of which can't be quantified. Those values can be subjectively determined, though (see Emotional).

Given a finite effort (you only have so many days left to live) total "production" is optimized by maximizing the "return on effort" for each project. That is a key statement and is related to the maximum power principle of ecology. What this means is that effort must be distributed between projects for maximum return on total effort. Put in the effort where the yield is highest. The yield is highest where the marginal increase of the return relative to the marginal increase of effort is the highest. In mathematical terms, this occurs where the derivative of the equation above is 0, that is,

$$(d)/(dP)(dP)/(dE)=(d)/(dP)[P(1-P)] = 1-2P = 0 => P = (1)/(2)$$

This means that the maximum return happens in the middle of the curve. This becomes obvious if we plot *dP/dE*, which is shown in this figure. This has a lot of bearing on the discussion of decoupling in Decoupling and increasing complexity. In particular, the dynamic region is in the middle of this figure and this figure. The instant response, which requires 100% effort, is to the right and the static (no) response, which requires 0% effort, is to the left.




A curve relating additional reward to additional effort.

To give an example, professionals are often encouraged to hyperspecialize, that is to put in maximum effort so that they'll achieve maximum production (upper right of this figure), to win the competition with other professionals and attract the highest salary. If money is the only utility that matters, this is the optimal strategy. If, however, happiness, low stress, leisure time, or other things

in the work-life balance also matter, it would result in a different strategy, since the last, say 80% of the effort, to gain the last 20% of the results, would be wasted. Once you understand the maximum power principle intuitively, it'll be quite easy to follow. In the simplest terms, it says that you can gain the maximum utility by being relatively competent in large numbers of topics by contributing a nontrivial but fairly small effort. This means that you may gain more utility by being competent (journeyman level) in 10 different topics than by spending the same amount of time to become an expert in a single topic.

# A Renaissance lifestyle

Few consciously think about complex strategies in daily living. On a daily basis, a functional strategy is invisible. Rarely do we step back and re-examine our strategy (lifestyle design). Most of the time we simply adopt the tactics that are handed down through the system without a second thought (see The Lock-on).

Now, it's possible to improve normal consumer budgets by several percent by utilizing tips and hacks to optimize the efficiency of existing tactics. Keep in mind, however, that hacking existing methods isn't going to accomplish the same level of satisfaction as devising new methods that are more suitable to the new strategy. One doesn't win a trench war against machine guns by improving the cavalry. Substantial improvements don't happen incrementally by patching existing methods; they require a complete redesign.

Until now, we have concentrated on the theoretical foundations and guiding principles of the Renaissance life. In this chapter I'll describe the trees of this forest. Just as early humans built fires and shelter and planted seeds to modify their environment, we should modify our environment in ways that are beneficial rather than detrimental to our goals. When the environment can't be changed, we'll adapt ourselves to flow along with the environment instead of struggling against it. It should be realized that it'll rarely be possible to change the environment on a grand scale and build a utopia--that is, unless you and the rest of the world all do what I say. Most tactics will therefore be executed in the current environment. However, they'll often be carried out with an entirely different goal in mind--becoming independently wealthy and financially independent within five years.

The methods for doing so will be simple. I won't present any tips that haven't been seen before and which one can't find described in detail in hundreds of other books. Success won't depend on becoming famous on the Internet or getting a book deal, nor will it depend on a timely participation in a market bubble of junk bonds, internet companies, real estate, gold, or tulips. It also won't depend on successfully starting your own business. You won't need to develop a particular specialized skill such as real estate flipping. In fact, if you have a job, keep it. However, using the methods in a way that aligns your goals and side effects persistently and consistently to achieve financial or job-independence is not easy. You must be willing to change your frame of mind and

conquer old habits. In particular, you must be willing to do things that 95% of the population won't be able to understand and 99% won't be willing to do. This means that you must be exceedingly confident that you're doing the right thing, which is why 90% of this book is dedicated to the development of a coherent philosophy.

Freedom is attained by creating a large gap between production (revenue) and consumption (expenses). This can be done in two ways--earning more or spending less. Nothing new there.

Which of the two you prefer depends on individual circumstances. If you're easily capable of producing more, you'll frame freedom as the opportunity to produce more. If producing more requires significant effort, you'll frame freedom as not having to produce more. In an affluent and wealthy society, the latter is much more easily achieved by most, including myself. There was and is no way I could increase my income by a factor of four, but it was certainly possible to reduce my expenses to a quarter of their former level. I think this holds for the greater part of the bell curve of incomes. Unless you're very poor (income < $4,000 / year) or very rich (income > $400,000 / year), boosting income is very difficult. If done intelligently, a little money will go a long way. Unfortunately, in this age money is rarely spent intelligently. So by practicing intelligent asset management, it's possible to live wealthily without spending nearly as much as the average.

On an absolute scale, spending less also allows for much greater choice in how you earn your money. Currently, the money I spend could be acquired through a part-time job as a burger flipper--just imagine the riches a full-time job could bring. Alternatively, I currently acquire my income as an amateur asset manager or capitalist using a little over five years of personal savings as my capital base (see Financial independence and investing). Since being a capitalist takes very little effort when you don't have to write progress reports or win new customers, I can dedicate most of my time to my primary passion, which is writing. The strategy described in this chapter focuses on living inexpensively in a culture dedicated to extravagance, productivity, and material waste. It follows these guidelines:

- Reduce wants and needs from the marketplace to a minimum to decouple the buy-work connection.
- Decrease the volume and size but increase the sophistication of your activities and possessions.
- Measure prosperity by less activity, not more. Do fewer useless things.
- Work for the purpose of earning money for no more than five years of your

life or five hours a week.
- Avoid generating waste and find ways to use the waste of others.
- Learn to use the system to your advantage, but don't be evil!
- Serve yourself rather than having others serve you. Instead, help them.
- Keep running costs down but pay for value.
- Maintain health to avoid the personal and monetary cost of sickness.
- Build up the capital to live as a capitalist or the skills to always find a new job.
- Focus on productive assets rather than stuff.
- Focus on developing skills rather than on passive entertainment.
- Gain the maximum in satisfaction with the minimum expenditure of money and energy.

Reintegration is an important part of this design. Normal life (see The lock-in) has maximized separation (see Economic degrees of freedom) due to an underlying engineering frame of mind (minimize degrees of freedom) and the economic idea of comparative advantage, with outsourcing being its latest manifestation. This separation occurs not just over the span of decades with schooling, working, and retirement happening in three separate time periods, but also on a daily basis, where people drive dozens of miles away from their home for a set amount of hours in their separate cars and then return late to their separate houses in the early evening to consume stuff acquired elsewhere.

What worked for me was reintegrating much of this behavior, to eliminate the personal inefficiencies this way of life creates. For instance, I lived close to work; most of my work I do at home, because it's mostly telecommuting work. I don't dress up for work, but according to season. I get around not by car, but by foot and bicycle, which provides free exercise. I retired from my career, but I still work, and I still learn. Hence, I no longer get divided and conquered under the guise of comparative advantage.

In the following descriptions I have omitted many details of implementation--consider them left as exercises for the student--whose inclusion would otherwise result in this book being several hundred pages longer. All the technical details can be learned from other books and websites in a matter of months. I trust that the reader, after hearing about a specific method, will be able to fill in the blanks. For instance, if I suggest making your own laundry detergent or a self-watering container, I trust the reader to find the pertinent details on the Internet. This leaves the technicalities to the reader and I can restrict myself to pointing out what to look for and how to devise a strategy.

# Things

Doing anything usually requires a tool and someone using that tool. An experienced tool user will think of the tool as an extension of himself. Hence, it's hard to tell where the tool ends and the tool user begins; after all, what is a tool really, if nobody's using it? This line of thinking extends to all the things we surround ourselves with. If no one is living in it, a house is not a home but is rather a useless arrangement of sticks and bricks (see Building blocks). It's said that a person with skills can do more with less, yet nobody is so skilled to be able to do everything with nothing, and many tools have indeed allowed people to do things better than they otherwise would. On the other hand, many have become unskilled by the easy availability of technological replacements, and so they sometimes end up doing things worse, as well as ending up with a large amount of stuff. There should therefore be a continuous drive toward internalizing skills. After all, you can always lose your tools, but skills stay with you.

From a skill-based-Renaissance perspective, possessions are problematic in the following ways and acquisition should therefore be considered carefully:

- They cost money.
- They take up space.
- They require maintenance.
- They often act as a gateway to additional or more expensive things.
- They can be taken away from you.
- They are hard to get rid of.

The first problem is that they cost money, which is a negative limiting factor (see Effect-mapping). However, these days many consumer goods are very cheap from a historical perspective, so this is the least of the problems. With few exceptions, you can have any one thing you want, but few can have it all, not that most don't try. It's very hard for a person in an affluent society *not* to end up with a lot of stuff, and a lot of effort has to be put into avoiding this. Possessions take up space and the indirect costs of storage[55] can be substantial. It's sometimes jokingly said that a house is merely a roof to cover our possessions. Notice how possessions tend to increase and expand to cover all possible closet and storage space. Sooner or later the house will feel cramped with clutter. This happens when storage becomes inefficient (see Sigmoids, logistic curves, and

the maximum power principle) and more and more effort has to be put into playing Tetris with your stuff and fitting just one more item into an already full closet.[56] At this point consumers start talking about the "need" for more bedrooms. These bedrooms are costly. Not only are bigger houses more expensive, they also come with higher property taxes. It's traditional to heat the entire house to 20C (68F). In other words, money is paid and gas is burned to make one's possessions as comfortable temperature-wise as the inhabitants. Interestingly, storage costs are related to the volume and not the price of what you're storing--transportation (and often environmental) costs are typically related to weight. As a consequence, I consider not only the price, but also volume and mass when I buy something. The costs manifest mainly as real estate costs--that is, paying to put your stuff somewhere--and if you put it in your main residence and subscribe to central heating, the cost of keeping it at a comfortable temperature. Stuff is also hard to transport, so having a large amount of stuff makes it difficult to move and therefore it acts as an anchor on your mobility.

Maintenance includes everything from simple repair--if you can't do it yourself--to fuel costs and insurance. Lifestyle inflation is a well-known and well-exploited phenomenon. Just think about accessories and the next upgrade. Things can be taken away from you. They can be lost in a fire, stolen, or simply confiscated. I don't own anything tangible that would be heartbreaking to lose or which has substantial replacement costs. The sum total of my possessions, including my residence, would cost less than 10% of my net worth. The final problem is a curious aspect of living in a society of material abundance: Things are much harder to get rid of than they are to acquire in the first place. It's very easy for Aunt Martha to acquire the proverbial ugly vase, but it would be very hard for you to get rid of it, other than throwing it in the trash, and throwing useful things in the trash is simply irresponsible.

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A few notes on simple living

Simple living isn't about decluttering and reducing the amount of stuff in your life or putting everything on autopilot. Popular approaches attempt to achieve some arrangement of meaningful things that are left after eliminating superfluous stuff or engagements. This can even turn into a substitute faith or a counterreaction of anti-materialism.

In our approach we are in fact aiming to build as much *internal* complexity into the strategy as possible. This should be clear from Strategy, tactics, and guiding principles.

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All this means that the total cost of stuff is much larger than its initial sticker price. Despite this, and perhaps due to short-sightedness or failure to take the systemic problem into account, owning many things is often confused with a high quality of life.[57] Hence, reducing the amount of stuff is perceived as a major barrier. As a counterreaction, a recent trend towards simplification is to own as few things as possible. Here, the barrier prevents owning more things. The optimal point is somewhere in the middle. In particular, it's important to realize that it's not the things themselves that are the problem; it is their side effects! So with this in mind...

## Which things should I own?

Given these problems, things should:

- have the appropriate quality and a low lifetime cost.
- be durable.
- be easy to dispose of either by selling, giving away, or trashing in a responsible manner.
- be small and preferably lightweight.
- be easy to make.
- be serviceable locally and easy to maintain and repair, preferably by yourself.

As with most lists of optimal qualities, it's rare to be able to satisfy all criteria. Criteria must therefore be prioritized. For the purposes of extreme early retirement or financial independence, the most important criteria is having a low lifetime cost, which usually implies a relatively high level of durability and having the appropriate quality. The most expensive tool in the box is the one you never use, but many times there is also a temptation to get, say, a shop-quality tool, even if the tool isn't used daily like it would be in a shop. For commonly used items, a higher quality tends to pay off in the long run. Surprisingly, disposability is quite important. If you buy things that can be sold again at a price which will recover most of your cost, you haven't paid a lot. Rather than being a consumer of the thing with a plan to eventually throw it away, you're essentially holding an asset with the intent of selling it. If you can enjoy the asset while holding it, so much the better. Small and lightweight is important because it keeps storage and transportation costs down. Reducing the need for storage allows for substantial cost savings, and keeping transportation costs down makes it easier to move. Think twice before getting anything that doesn't fit easily

within a suitcase or which you can't carry.

**Depreciation schedules**

The best way to think about cost is not the sticker price but the depreciation schedule. The depreciation schedule follows this equation:

*Annual cost = (Your cost - Used price)/(Years in service).*

The depreciation principle is widely understood to apply to cars, given the popularity of the used car market. Most people have an idea of the blue book value of their car--that is, how much it can be sold for used. However, everything else has a market price even if it doesn't have an army of salesmen or corresponding blue book. Make it a point to know the market price of all your stuff. Doing so makes it a simple matter to calculate the annual depreciation cost, which is the true cost of ownership. Everything I own is for sale. In my mind, I'm only holding it temporarily. If I need something else for a while, I can always buy it on eBay or find it on Freecycle or Craig's List. In this way, these become like giant libraries of stuff I can "rent" for a while at the cost of depreciation. With sufficient capital, the initial outlay never matters. What matters is the depreciation cost because this determines how much value can be recovered. Even though this is nominally ownership, I prefer not to think of it this way, which allows me to avoid becoming attached to my stuff.

Here are some examples of the right ways and the wrong ways to do it: Consider our dining room set. It was bought used for $75 from a couple who initially bought it for their kids for when they moved out. However, by the time the kids moved out, the kids decided they wanted something else. We had it for 2.5 years, took good care of it, and sold it for $70. The expense of this set was ($75-$70)/2.5 = $2/year, and so from a financial standpoint it was practically free.[58] This was the right way to do it. The wrong way is illustrated by our sofa purchase. We bought it on closeout at $300 (previously $600), sold at $100, and held it 3 years. Cost of $67/year. That was comparably expensive. The person who bought it from us got a good deal, though; be that person.

Measuring use is important. It can be measured in time as in the equation above, but sometimes it's more reasonable to measure the use in "miles driven" or "times used" rather than "years used." For instance, buying a food processor for $75 and selling it for $15 three years later equals a depreciation cost of *($75-$15)/3=$20/year*. However, if it was only used *15* times during the *3* years, a more telling calculation would be *($75-$15)/15=$4/use*. That's one expensive food processor (see Appropriate response)!

An additional cost to factor in is a potential running cost which is there even if the thing isn't used or rarely used. A car requires insurance even if it's rarely driven. Some things are inexpensive but require expensive maintenance parts. Other things are expensive but accept inexpensive maintenance parts. Most stuff has storage costs regardless of whether it's used or not. These factors all add up to the total rate of cost of ownership, which is measured in money/time.

**All the little luxuries**

It's quite interesting to note that by choosing to modify your behavior and give up certain average but comparably incredibly expensive things like $20,000 cars or $50,000 for an extra bedroom, being able to afford, or more accurately, having access to little luxuries becomes a source of pleasure. How about owning one of the best pocket knives in the world, the Sebenza made by Chris Reeves?[59] Regardless of how much someone spends on a pocket knife, it doesn't get much better than this. The VitaMix blender retailing at more than $400 is similarly considered one of the best blenders that money can buy. Kuhn Rikon pressure cookers are in the same league. All of these are in a league that is typically beyond what most people have heard of. Why freeze in "normal" winter clothes when you can wear expedition-quality clothes that are comfortable in a wider range of temperatures and activities?

The typical objection is that these things cost 10 times more than what someone "normally" would pay. However, they also last at least 10 times longer, so the cost isn't that high (see Depreciation schedules). To wit, my boots are 13 years old and my jacket is 14 years old. The cost over time is the same as a cheap unit, but the utility is much higher. The choice is therefore between using a high-quality item and rarely or never replacing it, or a typical, low-quality item and replacing it often. Choose the former even though fashion encourages the latter! The great benefit in doing this is that one can slowly build up an inventory of great items. Buy the coat one year. Next year buy the copper pans. Then buy the tube amplifier. And so on. You can even think of such luxuries as inflation-proof savings in lieu of precious metals.

This means that you won't have a complete inventory right away, yet it's better than buying a complete but cheap inventory or worse, borrowing to do so. For now, use whatever you currently have. When what you currently have breaks down or wears out, replace it with something great. Ideally, one would own one coat, one pot, etc. and hand it down to the next generation rather than replacing it every time fashion changes.

## Mono-use and Multi-use

Things should have multiple uses so they can be combined with other things to solve many different problems. Using skill, a superior thing can be combined with other things in many ways. Here a desktop computer is superior to a laptop computer. The difference is that a desktop computer is made of many smaller and widely compatible components that are user-replaceable, given the requisite skills. While the laptop can do as many things as the desktop, it is, as far as the average user is concerned, one unit, and so it doesn't integrate as well. Of course, one solution is to become skilled in the art of laptop hardware maintenance. Consider whether an item falls under mono-use or multi-use for clothing, tools, rooms, cars, bicycles--everything.

## Being the master of your stuff

I prefer things whose operation can be understood by looking at them. When this is not possible, like with electronics (unless you're an electrical engineer, or have the equivalent knowledge, for example, by becoming competent in amateur radio), I prefer things with replaceable components. If one part fails, it can be replaced to preserve the integrity of the system. Replacing parts corresponds to the technician level. Anyone can replace parts. The mechanic level is knowing which part to replace without trying to replace parts at random until it works. To truly master your stuff, it's worthwhile to try to build some of it yourself. This doesn't mean you should build your own TV, but you could build your own composting system or furniture. Later you can build your own radio. There is a great deal of satisfaction in doing this. Furthermore, disposal becomes easier because knowing how to put things together typically means knowing how to take them apart. It also means that it's easier to select, tweak, and even create designs that are more appropriate for a particular purpose.

In general, I only trust things as far as I can throw them, but that's just me. More importantly, I don't trust things I can't see, like wall conduits. In general, I don't trust things that have been "abstracted" away behind a clever user interface. What this does is merely to insert another layer of experts between the things and the users, allowing the latter to become "lusers."

There are two kinds of people:

1. If something breaks, they call a repair guy or throw it out and buy something new.

2. If something breaks, they are the repair guy and fix it.

If you're the latter type, you're the master of your stuff.

## How to avoid getting things

It is very likely that you already have very many things; I know I did. The most important thing, therefore, is to avoid getting more things and compounding the problem. Realize that the strong desire to acquire new things can be replaced with an equally strong desire to avoid acquiring new things. This transition will take a few months to become habitually ingrained.

The wish list method seems to be widely known. It's trivially easy to use and I have been using it for a long time, first with actual pen and paper, later just mentally. Here's how it works: Instead of buying when I develop a spontaneous desire to purchase something, I put it on my wish list along with the date of the wish. Don't buy anything unless it has been on the wish list for at least 30 days. You will likely find that you have either found an alternative to buying it in the meantime, perhaps by finding an alternative or by learning how to do without it.

Test yourself. Books used to be my favorite consumer item. I read several books a week. During a time when I had no access to libraries and was buying sufficient number of books to make my landlady inquire about the large number of deliveries I was receiving, I decided to go without books. I went from buying close to 100 books a year--about 30 times the average person--to buying three books in total over the course of a year--about the same amount as the average person. That was not fun! However, books aren't very expensive, so I decided that one book a month would be enough to satisfy my cravings, when combined with a newly developed interest in geopolitics which could be satisfied by reading news online.[60] The lesson was that there was an optimal point which is slightly less than the extreme point. Most people will still consider the optimal point extreme, but that's because they've never experienced the extreme. Try it out. Drink water exclusively for a month. Eat mostly or only rice and vegetables for a month. Stop smoking. Stop drinking. Stop eating and fast for a week. Don't spend any money for a week and try to improvise your solutions when needs arise. How long can you go without the consumer lifeline of the marketplace? Proceed intelligently and educate yourself from your responses.

The most helpful thought for avoiding new stuff is to realize that you have lived fine without it for this long, so why get it now? This will eliminate 99% of all electronic gadget lust.

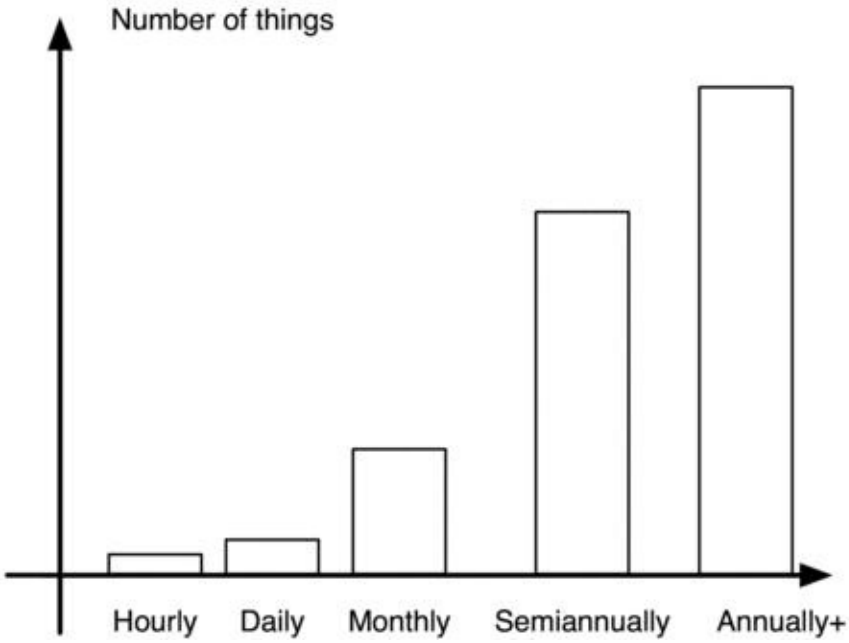
## How to get rid of things

It's hard to determine where everybody got the bright idea to turn their houses into warehouses, but a very simple solution to this problem is to move all unused possessions into a storage unit, which is better suited for the purpose. This problem is relatively easy to solve, but is perhaps best attacked during a relocation. Go through all your possessions. For each possession, each book, each tool, each appliance, each toy, try to recall when you last used it and put it into one of the following categories. It's important to be honest. To avoid ruining the statistics, a box with 500 nails should be counted as one possession, whereas your stack of plates doesn't count as one stack of plates. You'll likely be using only one plate at a time with all other plates being for either guests or to supplement the stack of unwashed dishes in the sink. Be reasonable.

1. I used this today (keep it).
2. I used this within the past week (keep it).
3. I used this within the past month (keep it).
4. I used this within the past six months (get rid of it).
5. I used this within the past year (get rid of it).
6. It has been more than a year since I used this (get rid of it!).
7. I did not even know I owned this?! (get rid of it!!)

If you draw a histogram it might look something like this figure. Don't be surprised if you use fewer than three percent of your possessions daily and 90%+ of all possessions *less than annually*. This is a normal consumer pattern, but a waste of space and money.

The goal is to bunch the histogram up on the left-hand side, so that most possessions are used daily, with fewer possessions used weekly, only a few used monthly, and only a couple of keepsakes that rarely see any use. Usually one's possessions will then fit into one or two suitcases (see Which things should I own?).




This graph shows a histogram that illustrates the number of possessions versus their usage. The *x*-axis shows the *time since last use intervals* and the *y*-axis shows the number of possessions in this category.

To make the transition, anything that falls outside of this pattern should go into storage. In the US people have so much stuff that one can rent commercial storage units. In other parts of the world one has to come to some sort of arrangement with people who will rent out attic or shed space or store things for free.

This process is most easily accomplished when relocating and things have to come out of the closet, perhaps seeing daylight for the first time in a long time. Plan on relocating to a smaller home. While packing, sort things into moving boxes according to the list above. Put categories 1-3 into a few suitcases--if you need more than that, you're probably cheating--and put the rest in boxes headed to storage.

Speaking of relocating to a smaller home, make sure to plan for things that are important to you. For instance, if you like to read, get a home close to the library. This way you can use the public library as your library rather than duplicating the books in your home. In fact, one of the strategies I've used is to check whether a book I own is available through the library. If it is, I sell it, swap it, or give it away.

If going through this process while staying in the same home, one will find a lot of space liberated. This will make cleaning and maintenance easier. It might also make you question why you live in such a big house (it looks so empty!). Please resist the temptation to fill the house with new stuff.

A more lengthy process is to get rid of things slowly rather than putting them into storage. I don't think this is an optimal solution; see Sigmoids, logistic curves, and the maximum power principle for why. Most likely, the process will be too slow and will subsequently stall out of bitterness over the fact that things don't appear to change despite all efforts. The cost of moving slowly towards a goal is that one needs a long time to get anywhere. This requires more discipline and dedication. In other words, there is a tradeoff between making sudden, large changes and being dedicated to incremental change. Only you will know which one fits you better.

However, a slower process allows more maneuvering space. Rather than just putting things into storage, things can be thrown out, given away, exchanged, swapped, or sold. With the Internet, this is much easier to facilitate. In my experience, the question of whether to give, trade, or sell depends on the value of the item. If the item has no use value whatsoever, it should probably be thrown out or recycled for parts. Fortunately, consumer society has a very good service level when it comes to throwing things out. In principle, you could throw everything in a dumpster. In fact, some people do this--other people live off this bounty through dumpster diving.

**Giving away**

If things have some use value but a price close to zero, such as old clothes, garden hoses, or a rusty but working bicycle, they can be given away. There are several systems for this, depending on where you live. One can donate the things to thrift stores, charities, or religious institutions, which may be tax-deductible. One can put them out on the sidewalk with a sign saying "FREE." The method I like best, though, is freecycling. Freecycling is organized through an Internet mailing list. People post things they have and things they want, and others respond. Once a connection has been made, the owner/donor simply puts the thing outside the front door and tells the recipient where to pick it up.

When giving things away, consider city-city or even state-state arbitrage of goods between areas with high and low costs of living. It may be helpful to transport it to a cheaper place, which may be the next, smaller city. Here the recipients may gratefully accept your $125 used chair, whereas in the "expensive" city they may be dealing in $250 chairs and scoff at your $125 chair.

**Selling**

If the value is higher, things can be sold. Everything I own is for sale, always. Ask me and I will give you a quote. Not only does this constantly remind me of the value of my possessions, but it prevents me from developing an attachment to the thing in question. A more enlightened state would be to always be willing to give away everything I own. Unfortunately, I'm not sufficiently skillful, nor do I as yet own so little to easily be able to reacquire and recreate everything I own, but that would be something to strive for.

To sell things, I use online services exclusively. Online services like Craig's List are useful for common and generic items like furniture, garden tools, bicycles, toys, *etc*. Listing is free and the transaction is cash-based and hassle-free.

For odd things that can be mailed, online auctions and marketplaces offer a wider audience. Many will offer a number of free listings each month, so take advantage of that. I usually pick a price point near the bottom to ensure a quick sale. Check back frequently to see if anyone is underpricing you.

**Serial ownership**

Many things--books in particular come to mind--are sufficiently well-built to last longer than you as their owner maintain an interest in them. Instead of storing them, which increases the demand for housing and new goods, I feel almost obligated to reduce this pressure by passing them along when I'm no longer interested, so that other people may enjoy them. For similar reasons, I also always attempt to buy things used. Not only does this keep the pressure off of people's homes, it also keeps the pressure off landfills, since normal people don't think twice about throwing perfectly functional items in the trash when their space becomes too crowded by stuff. In fact, any depreciating asset should always be bought used if you must own it at all. Serial ownership is one of the biggest contributions you can make towards counteracting environmental problems (climate change, resource depletion, and population pressure), as the resources required to build and transport stuff is generally higher than those used to repair and maintain stuff, and even the resources used to heat and light your home.

**Bartering and swapping**

Bartering and swapping work best with what could be considered "differentiated commodities" such as CDs, books, board games, computer

games, *etc*. These things are all different in degree but very similar in kind (a CD is a CD), and joining a network is a great way to get new media. Once you develop some skill in networking and bartering, you'll begin to pay attention to the needs of other people and whether you can fulfill them with items you have. At this point you may want to barter your excess items for food or services, to reduce your stuff.

### Using up and wearing out

Those who take care of their stuff will likely be able to use their current inventory for several years before using it up. For instance, in my experience one towel will last four years if it's the only one in use. Consequently, a set of four towels in rotation will last a good 16 years. Similarly, if t-shirts can be washed 100 times,[61] are only worn once between washings, one is worn every day, and you have 15 of them--which shouldn't be a problem if you participate in a few events that give you a free t-shirt each year--you have enough t-shirts to last four years.

Unlike cars and computers, which start failing "all over" once the first failures start to appear,[62] clothes have known weak spots--for example, armpit, shoulder, and crotch seams or heels and toes in socks. Learn to mend these.

You can make a sport out of extending the wear. For instance, bed sheets generally wear out in the middle (the middle part covers the body). When it finally rips (this takes 3-4 years if you only have one set, and why own more?), you can cut it in half along the middle and sew the sides together to become the new middle. This is how people used to do it, but I must admit that today fabric is so cheap that I'd just get a new set and turn the old sheets into rags for cleaning. The benefit of this exercise is perhaps not so much in extending the wear of things, but in learning what to look for when acquiring new things. For instance, having noticed that the no-stick treatment for pots and pans only lasts a couple of years and that it can't, as far as I know, be replaced, get stainless steel, iron, or copper the next time. For shoes, get Norwegian welts, which allow a complete replacement of the sole. And try to avoid plastic; it is hard to fashion plastic replacement parts on your own.

## How to get things

Things used to be built to last. It was expected that a piece of furniture or even a good jacket could be handed down to the next generation. With growing

product quality, there was a limit to the size of the market. As soon as everybody had everything they needed, there was no one left to sell to and businesses would have begun to shut down, leaving people with less work (gasp!). This happened around the 1920s. The solution was and still is to change the focus to the service aspect.[63] One contemporary example is when a $500 cell phone is sold for $1, but with a mandatory $1,000 contract. Leasing is another example. However, a more nefarious strategy has been to build products of an increasingly inferior quality and, in doing so, make them cheaper. This creates a continuous and dependable demand as things break and are thrown out and replaced. It has therefore become somewhat of a challenge to "find the good stuff." Finding the good stuff can be done by exploiting survivor bias. As someone informed me, the good stuff is whatever costs more than $100 in a pawn shop or an antique store.

**Free things**

In general, people who live a life of abundance, like "primitive" tribesmen (see Human capital and necessary personal assets) or Californians, will be happy to give things away, the latter primarily to create more space in their garages, and the former presumably because they can easily build replacements. Dumpster diving is one method of acquiring free things, but with the Internet, the dumpster part is skipped. Post wanted or offered ads on mailing lists, newsgroups, or in classifieds, and people respond and come to pick it up. This saves the trouble of putting stuff in a dumpster and people from having to dive in to get it; it also saves stuff from the landfill. The range of stuff changing hands can be surprising: from leaves for composting to projector TVs. Supply and demand also fluctuates. What may be impossible to give away one month may be in high demand the next month. What may be impossible to give away in one place--entertainment centers in California--may be picked up in another within the hour; possibly to be used as firewood. Speaking of firewood, people are happy to give away rounds in the summer when they're clearing away old trees to increase the size of their lawns. Get a splitting maul and dry them for firewood in the winter. All it requires is a little planning and your heating is free.

For lower-cost items which are not worth driving for, get rid of them by establishing a "table." Put things on the table and mark them "FREE." Lo and behold, people will quickly pick up on the idea, take your items away, and put other items down. This works for magazines, garden harvest, cookies, etc. and is nicely established near the coffee machine, laundry facility, stairway, or other

points where people gather or pass.

**Swapping and bartering**

Another way of getting use-value without paying money is by swapping. There are several options for online swapping, which gives one access to a much larger market. Some swapping works on a credit-based system--rather than being paid money, giving away a book gets you a credit. Credits work like gift certificates as they can be used to order books from other people. This avoids the friction of having to find a specific trading counterpart. Usually these services are offered for free, which also avoids the friction caused by commissions.

Another solution is to trade directly. This comes with most of the problems of trade before the invention of money. Here one has to find another person and do the swap directly. One solution is three-way swaps: A gives to B, B gives to C, and C gives to A. Bartering and swapping can also be used to get rid of unwanted things (see How to get rid of things). Using these methods, I have not paid for a CD or a DVD in years.

**Renting**

Generally, renting is an overused method when it doesn't benefit the consumer, and an underused method when it would benefit the consumer. Consequently, if you're used to buying something, you should look into how and where to rent. Conversely, if you're used to renting, calculate whether it's worthwhile. When renting long-term, consider the cap rate (see Rent or own?), which holds for small items as well as houses. When renting, you're usually not responsible for breakdowns. This is a winning proposition if you don't have the skills to fix it yourself and a losing one if you do have the skills or could cultivate them. Also important is how often you use a thing. Maybe a 24 foot ladder is only used once a year, in which case it could be rented from a home improvement store. If you do a lot of printing, it makes sense to own your own printer, but it actually takes a lot of $0.50 printouts at the local copy center before the price of a new printer is reached. Also, consider that instead of renting very expensive and rarely used special tools, you could simply hire a professional and his tools to do that part of the job.

**Borrowing**

Borrowing is another method. The cardinal rule of borrowing is *always* to return the borrowed item in the same or better condition. There should be no exceptions to this rule. Returning something slightly damaged or dirty is almost guaranteed to cut you out of the loop the next time you want to borrow something. Lending your things out can also be a way of having access to them without having to store them. Now, you may think that giving your books to the library will allow you to borrow them back and not have to store them constantly; however, libraries will most likely sell your books instead to cover their operating costs.

**Sharing ownership**

Many offices have a coffee club where money is contributed to buying a shared coffee machine and coffee suppliess. This saves everybody the expense of each buying their own individual coffee machine. It takes initiative to establish such clubs, so don't wait for someone else to do it. If you have an idea, propose it; people just might say yes. Here are some examples of things that can be purchased and shared: tools, sports equipment, A/V equipment, computer equipment, vehicles, boats, appliances, *etc.* It seems to be a fact of life that very few people will take the initiative to establish something new, but many will gladly go along once someone proposes it. Here are some examples of people to start a club with: friends, family, co-workers, team members, *etc.* Such clubs can also be established with things everybody already owns. I have heard of households rotating kitchen appliances using the theory that ice cream makers, waffle irons, grills, and similar rarely used appliances might not see daily use. That way everybody gets a chance to try them out. I find that these arrangements work best when everybody trusts one another.

**Living behind the cutting edge**

In computing, actually high-tech in general, there are a number of consumers who effectively "pay" to be beta testers of companies' products in exchange for having the latest and greatest. Leave it to other consumers to work out the technological kinks and take the depreciation hit for "driving it off the lot." If you really enjoy being at the cutting edge, be a reviewer, a tester, or even a developer.

Similarly, there are a great number of people who must watch movies as soon as they come out or pay full price for CDs. Instead, lag the edge and watch

movies at the dollar theater or wait for them be released on DVD--even better, wait until they appear in the library or on TV. You'll see "new" movies at the latter sources as well[64]--that is, they'll be new to you, and the only difference will be in lagging the movie theaters by one to two years; but you'll no longer be paying attention to that.Most curious is the phenomenon of the hyper-consumer, who effectively pays to continuously own new stuff, to avoid being seen sitting on last year's furniture, and the culture that goes along with that. The hyper-consumer has to get rid of last year's stuff somehow, which can be had at ex-depreciation costs for much less. This also goes for store inventory that did not sell in time: Last year's model has to be discounted even though it's effectively the same as the current one, because who would want to buy last year's model at the same price? If I have to get something new, like rollerskates, I just get last year's model. Last year's inventory is typically cleared at certain times of the year, so keep an eye out and be ready to pick it up; it goes fast!

### The "limit order" price book

Oftentimes decisions are based on emotions, but until or unless you develop a sense of pleasure from not spending too much money or a sense of dread from parting with excessive money or getting anything worse than the best price, emotions are not the best decision instrument.

For grocery shopping and other regular purchases, use a maximum price ceiling which is the lowest price you have ever seen. Only buy at that point. If memory doesn't serve well, use a notebook. It's easier to memorize a limited number of items commonly purchased. This method is very powerful, and if followed, will always result in buying things only on sale. I use it to guide what's for dinner--whatever's on sale. If you feel really motivated, plot prices on a weekly or monthly basis. This should prove quite revealing. Many things, from vegetables to clothing, vary consistently in price on an annual cycle.[65] Follow this cycle.

## How to make things

When I ask people who fix their own cars or motorcycles how they learned where all the bits and parts go, I never get the answer I expect. Apparently, they didn't take an evening class or community college course. They were not even taught by their dad. Rather they got an engine that didn't work, then just tinkered intelligently with it until it did. In fact, it seems that a majority of people taking

classes are just looking to get credentials for skills they already possess.

Thus, the biggest barrier to overcome is the perception that you need to be an expert or take classes in order to be able to make things. This is particularly problematic for white-collar workers with white-collar hobbies, like computing, or no-collar hobbies, like watching TV. However, if you can tie a bowtie, you can easily learn to knit--I learned knitting from a web page. If you can print your name, you can learn how to solder--I learned it when I was eight years old--and make electronic gadgets or repair electric gadgets. Repairing broken electronics is much more difficult, which is a good reason to avoid electronic controls on most electromechanical devices. If you can draw a straight line and follow instructions, you can build your own furniture. If you can put the cap back on a bottle, you can fix engines and mechanical items, as those are generally composed of fasteners and parts.

In fact, most things can be created or repaired with a combination of the right tools and parts.[66] The challenge thus becomes one of sourcing tools and parts. Ease of sourcing is important. You don't want to own anything with proprietary parts! Fortunately, there are plenty of good websites and books--sometimes you have to ask for the shop manuals--which will tell you exactly which tools and which parts you need to accomplish a given task, down to the catalog number. Find these books by reading book reviews online.

I suggest starting with either simple repairs or simple construction projects and build a tool base as needs develop. It may behoove you to keep a list of receipts and expenses to deduct should you later decide to turn it into a business. Buying a set of, say, screwdrivers to "save" money is rarely worthwhile. You will end up breaking the ones you use constantly and with a collection of ones you never use. Never buy the set. Also avoid buying a fully equipped shop-set for the same reasons.

I recommend getting quality tools (see The fixer-upper or "holding") but doing cheap projects using cheap materials in the beginning. Quality has at least two components. First, tools are mostly an extension of the tool user. It wouldn't make sense to spend more money to get functions that the user can't fully utilize. Second, the inherent quality of the tool, as categorized into three tiers: basic/economic, standard, and shop/professional. These labels are typically *not* indicative of their place of use. Consider, for example, pedal wrenches, which are used to removed a pedal from the crank arm of a bicycle. A basic wrench is a short, stamped piece of hardened metal which is sold for "occasional" use. However, unless the pedal is new or the threads are covered with anti-seize, it will bind and the metal wrench will cut into your hand and most likely you won't be able to remove the pedal. It would be more accurate to say that the basic

wrench is for light-duty use. Conversely, the shop wrench is longer, angled for leverage, easy on the hands, and accepts an extension bar (a piece of pipe used for leverage). The shop wrench will take off anything, even if you rarely use it. There is nothing more frustrating than an inadequate tool. Unfortunately, it's hard to know in advance which strength of tool is required. Never buy the biggest tool just to be sure. Specifically, if you already have a light-duty tool which has proven sufficient so far, don't upgrade it for the sake of upgrading.

Making things is a synthetic/creative process which is based on first mastering the technical skills, second on mastering the design principles (see Gauging mastery). There are two paths to "enlightenment." On the first path one first learns all the technical skills before moving on to the design phase. This can be done by starting out in service and repair before moving on to rebuilds and, finally, builds. On the second path one starts out with a building project which usually comes with parts and a plan, and learns the skills on an as-needed basis. The former seems tailored to an educational/work/small business structure; the latter seems more tailored to the hobbyist. The money flow from the former could quickly turn positive. The money flow from the latter will stay negative for longer, as the aim and required level of mastery for profit in creative design is higher than in service and repair.

Skills that are likely worthwhile include woodworking, electric work (wiring, soldering, etching print boards), engine work, vehicle maintenance, cooking, preserving, clothes repair (mending, hand and machine sewing), and house maintenance/handyman work.

**Reusing**

Build things out of your environment! Find out what kind of utility something provides (see Building blocks). Everybody is familiar with the college student bookshelf made out of a few boards and concrete blocks. You can build a bed frame out of wood pallets, or you can build a table out of a large phone cable drum. You can get food containers from store-bought products: Lunch meat is sometimes sold in reusable plastic containers. Mustard is sold in drinking cups--use a permanent marker to draw lines and it becomes a measuring cup. Olives are sold in what could be spice containers. A fork is a whisk. A plate is a cutting board with the right knife (serrated tomato/utility knife). You can make clothes hangers out of cardboard boxes. You can store clothes on hangers or in suitcases or trunks. A nice trunk is a table. Laundry goes in big plastic bags. A towel, or clothes in a pillow case (or t-shirt) becomes a pillow. A zipped

sleeping bag is a hay box for your pressure cooker. An unzipped sleeping bag becomes a duvet. The liner becomes a blanket. The best way to think up new inventive ideas is to imagine being on a desert island with no other option than to create a solution out of the materials at hand. This requires conquering the tendency to go out and buy the known commercial solution, but with time it can be overcome.

**The fixer-upper or "holding"**

Most consumables and many capital assets suffer depreciation and lose resale value year after year. High-quality items, particularly if they involve old technology that has become canonical--that is, it can't be improved--don't lose value and may even gain value, effectively functioning as an inflation hedge. Some examples include revolvers (but not pistols), woodworking and machining tools, mechanical watches, tube amplifiers, wool coats, knives, fishing reels, *etc.*

For example, a new high-quality tenon saw may cost $145. Since there is little difference functionally between a new high-quality saw and an old high-quality saw, the used price may be $130. All things being equal, the price after several years will still be $130. If you managed to fix it up--for instance, by refurbishing the handle or sharpening the blade--it may fetch more. If you got some rust spots on it, it may lose value. Subtracting the purchasing price from the sales price should come to a small amount. It's interesting to note that this amount is comparable to or smaller than the price of a cheap new $20 saw, which will only fetch $1 if you sell it. This is also more environmentally and financially sustainable: Sustainability comes from lifetime ownership--not necessarily by the same person--of one quality item instead of 10 disposable items.

Doing some research and plotting prices as a function of product age creates a depreciation scatter plot. For each year there will be a range of prices reflecting the different conditions. If the curve is trending downwards, the fixer-upper strategy is to buy something in poor condition, fix it up and sell it later. This will make the holding cost zero. This way you can own expensive items, like boats or cars, for almost no cost.

In terms of financial considerations, the money which is now sitting in an asset that is unproductive has opportunity costs. If your rate of return is 6%, a $50,000 boat would cost you $3,000 annually, which you could have made had the money been invested. On the other hand, perhaps you were holding cash at 0.5%. In this case, your cost is only $250. If you offer the boat for chartering,

you may even make money.

# Shelter

Many houses increasingly serve not only as living quarters but also as storage areas for toy collections, personal libraries, galleries of art and other assorted knick-knacks, small supermarkets (massive refrigerators), home cinemas, and restaurant-sized kitchens which seem proportional in size to the time the owners spend away from them, eating out. Outsource the storage and live in something smaller.

Additionally, there's a preference for suburban housing that leaves people far away from their jobs, unable to get anywhere without owning a car. Getting a driver's license and a car at 16 is a rite of passage into the "freedom" of adulthood. Without access to public transportation, which makes little sense when everything is spread out, it's difficult to get around without a car. Consequently, people growing up in these places often don't know how to ride a bike. Many can't even walk greater distances than a driveway, lacking the stamina, the proper clothing, and perhaps even the faith that they can engage in the vigorous labor of walking three miles without consulting a physician first.

Houses are surrounded by asphalt, unproductive vegetation, and artificial "lakes" which cover valuable agricultural soil. The unproductive vegetation is specifically selected to be unproductive to avoid having to pick up fruit from the ground. Why get free fruit from the garden when you can pay for it at the supermarket 5-10 miles away? In addition, the vegetation is often nonnative, which requires significant amounts of intervention.[67] Consider, for example, how lawns are first fertilized and watered, then once they grow accordingly, they are cut down.

The houses are poorly built, but made to look expensive with fake brick walls and concrete columns. The optimal design for an efficient house is almost always rectangular with as few corners as possible, as corners are structurally weak and admit cold. Speaking of cold, housing is typically poorly insulated, if at all. This is a viable strategy in a world of cheap energy--a world that may not last much longer--with its central heating and cooling. With cold (warm) walls, the air temperature has to be raised above (lowered below) normal to compensate for the radiative heat loss (gain) from the walls. As a consequence, as money spent on insulation has gone down, room temperature in the winter (summer) has gone up (down), and the cost of living has gone up.

The problem is that there's a cultural perception of what constitutes a "good house," and despite or perhaps due to all the failures mentioned above, the

suburban house with a lawn, a picket fence, and a car or three (one for each person over legal driving age) parked in the driveway is the pinnacle to attain. Like a peacock's tail, and in general for status symbols, the more nonproductive and inefficient they are, the better status symbols they make. After all, if someone can afford to use a lot of resources in non-or even counterproductive ways, he must be rich, powerful, strong, *etc*. As the suburban house is able to absorb tremendous amounts of money, it makes an excellent status symbol.

Considering that the median home is priced above $150,000, a mortgage rate of 5% will cost the homeowner $9,663 each year, which is more than the entire budget of the lifestyle described in this chapter. Now add on insurance (nobody is going to lend money on an uninsured house), taxes, possible home association fees, and general maintenance, that's another 50% on top of the mortgage payments. This comprises a huge opportunity cost in foregone investment returns, which will be nonexistent. Any retirement accounts will be cordoned off, and therefore, having no assets to speak of and no investment cash flow, the homeowner will be forced to pay for his house with wage income over the duration of the mortgage. Renting such a home is obviously not much wiser. Except during extreme bubbles (see Rent or own?), renting costs approximately the same as owning, since the owner passes along the costs.

Either buying or renting a home that is priced at several times your annual income is a huge financial mistake. No business, not any that lives long, would obtain long-term debt that exceeds 50% of their equity and spend it all on nonproductive overhead, yet homeowners consider debts exceeding their nonproductive equity by 400%, conservative.

Hence, a trophy house, or a trophy anything for that matter, is not very compatible with financial independence. Giving up the trophy house in exchange for financial independence can result in alienation from those who are heavily socialized to middle-class status symbols. However, there are significant subcultures in which you can easily find friends and partners who put less importance on curb appeal and one-hour commutes.

Therefore, there is a deliberate choice to make between financial independence and the standard house engineered to give the appearance of enhanced "socioeconomic status." You can have one or the other, but not both. In other words, living in something significantly more economically efficient, smaller and more conveniently located than what your peers are living in is key to financial independence.

For most people a home is basically only a place to sleep, eat, shower, and keep stuff (see Things). Realize that you could choose between having an extra bedroom and having an extra $200 per month.[68] It's quite possible that the

marginal utility (see Building blocks and Sigmoids, logistic curves, and the maximum power principle) of $200 is higher elsewhere in the budget.

To become financially independent of a $200/month expense requires investments between $60,000 and $80,000 (see Financial independence and investing). This is the so-called latté effect on a large scale, except that instead of a daily superfluous cup of luxury coffee, we are talking about a superfluous bed or bathroom that is rarely used. How many years will it take you to save this much more money?

I think that a good guideline per person for living arrangements is $200-350/month/person or about 10-15% of your net salary. If anyone tries to convince you to spend more, they're trying to sell you into a lifetime of wage work (see this figure). In some places this buys more than in other places. As far as I'm concerned, the percentage is absolute. If I want to live in a "nicer place" it simply translates into a smaller place. For instance, in New York or San Francisco, this just about gets you a room in an apartment shared with 4 others. In other parts of the country, this figure will buy you an entire house.

When I started out in grad school, I was paying about $275/month for a small room with a sink. I shared the kitchen, toilets, and showers with 18 other people. This was close to the downtown area of one of the most expensive cities in the world. When I relocated for work, I moved into my very own apartment for $400/month. Then I moved into a house together with my future wife for $330/person/month. We then made the mistake of moving into a house at $700/person/month. That lasted a year with stagnating savings as a result. We currently spend $237/person/month.

The idea is therefore to seriously consider whether your current living arrangements are optimally aligned with your liberty and pursuit of happiness. Is your money best spent on an extra bedroom or five years of freedom? If not aligned, doing so should be of primary importance. Unless you revel in interior decorating--and if so, why not decorate other people's homes and get paid for it?--home maintenance and repair or cleaning, most activities don't require a large home. Resources like money and time spent earning money may therefore be better spent on activities you enjoy, rather than things you possess. Even if you like "entertaining", you could simply rent a restaurant the few times a month or year that you do. If you do it more often, open a bed and breakfast, or consider expanding the realm of entertainment beyond eating.

## Sleeping and other living arrangements

The taxman defines a home as a place to sleep and a place to cook, with

bathroom facilities. This leaves wide room for interpretation,[69] but what's important is not the "rooms" but the utility (see Building blocks) that must be acquired. Instead of thinking in nouns like bedroom, kitchen, and bathroom, think in verbs: sleeping, eating, washing, *etc*.

Make a list of activities (verbs) that you *need* to do--sleeping, eating, washing up--and what you *want* to do--writing, hiking, cycling, entertaining, working, skating, talking, cooking, playing, exercising, *etc*. Now consider whether you do some of these activities often enough to have "in-home" facilities or whether you're better off outsourcing them. Consider this list and extend it to your general facilities--for example, how long since you last used the guest room, the bar room, the home cinema room, *etc*. Consider that some rooms could have multiple uses (see Monouse and Multiuse). In particular, are the facilities available nearby already? In this case, there's really no reason to duplicate them at home. For instance, if you're a gym rat and spend six days a week at the gym, maybe you can shower there and thus don't need elaborate bathroom facilities at home. If you eat in cafeterias most of the time, maybe you don't need anything fancier than a microwave and a minirefrigerator for your in-home kitchen facilities. Hence, if you currently have rooms and facilities that mostly go unused or could go unused with a change of habit or hobby to something that requires less stuff on location, yet provides as much enjoyment, don't include them in your next home.

**Living**

A place to sleep can be provided by couch surfing, a ship berth, a tube-hotel, a military cot, a tent, airports (for the perma-travelers), a houseboat, a yacht, a yurt, a car, a van, a motorhome, a truck, a room, *etc*. Some jobs, like long-haul trucking, serving in the military, caretaking, housesitting, and commercial fishing, include some form of shelter.Note that some of these choices lend themselves more to renting than others. For instance, it's hard to buy a room in a house, yet it's usually possible to rent one. Conversely, it's easier to buy a yacht than to rent one as a liveaboard. You should choose your living arrangements to be somewhat compatible with your interests. If you like other people, go for the shared living, dorms, or communes. Do you like the sea? Go for the boats. How about the road? Do you like to feel you're getting away with something? Check out stealth/van/city-camping--some chain stores will allow overnight parking; some national parks allow longer stays, all for free. Are you handy? Consider owning something older or building your own. Are you responsible? Consider

caretaking. Do you want minimum hassle? How about renting a furnished room from a landlord? Do you want maximum hassle? Buy an apartment complex, live in one of the units, and rent out the additional units. Searching the Internet for any of the terms above should lead to people interested in one or another way of living. They do exist. Don't think that the only way to live is in a house in suburbia or an apartment in the city.

**Eating**

The need for a kitchen and its particular configuration is determined by diet. Even the need for particular kitchen appliances is determined by diet. Eating a mostly or exclusively raw diet eliminates the range oven and replaces it with a blender and a juicer. The need for a refrigerator is determined by your location. If you live close to a supermarket, you can simply store your food at the market rather than in your refrigerator. On the other hand, the more inconvenient your location is, the larger the refrigerator you need. In other words, if you were a serious health nut, you could completely replace your kitchen with a blender. If you desire some variation, simply eat somewhere else once in a while. If you desire some warm food for a change, bring out the camping stove. There's no need to own a range unless you use it every day. You may even be lucky enough that your company offers a lunch buffet. Make lunch your main meal and have a sandwich for dinner; no kitchen needed.

**Hygiene**

With a little planning and consideration, all families will do just fine with one bathroom. Multiple bathrooms only make sense if you're housing an entire football team for some reason. Unless you fancy playing with composting toilets, humanure, and building your own thunder box, toilets all work the same. Showering may very well be accomplished off-site, for example, in a gym. A blog reader informed me that he used an off-site toilet for half a year, walking 1.5 miles each way. Showers can range from a bucket over a solar shower to more elaborate arrangements. Also, there's no rule that says that showering must happen in the morning right after getting out of bed.

**Living with other people**

Minimal use of certain facilities calls for their sharing with other people. The

easiest way to share is to live with others, or at least next to them. Recently the trend has been the exact opposite, with more and more people living by themselves and building rooms that provide utility just for them, like home theaters, rec rooms, bars, *etc.* Sharing things as in dorms, communes, or families represents enormous savings. If you're a student it's tempting to move from home, as I did, but there are many savings to be had by staying at home, both for you and your parents. You will also reduce the work associated with cooking, laundry, *etc.* Consider that resources are being wasted whenever an asset is lying dormant. Spending 8-10 hours out of the home, eight hours sleeping, and a few hours doing "other" leaves very few hours for using the "home." As such spending a lot of money on one's home makes little sense since one's "effective place of being" is actually one's job or office. The fewer the users of a given room, the more resources are wasted. Some rooms in many homes are used very rarely, such as the bathroom and the kitchen, both rooms on which it has become popular to spend a lot of money, ironically. Other rooms, like the dining room or sitting room, are practically never used. This leaves the bedroom. When sharing, one has to avoid queuing problems. If you live in a place where everybody needs to leave at seven in the morning and wants to get up at the same time, you have a queuing problem. This is typically solved by having multiple bathrooms. This ridiculous waste can be solved by a slight change of habit (someone gets up half an hour earlier) or simply by living with people who have different habits.

When I was a grad student, I lived in a dorm. More accurately, as I spent most of my waking hours in my office, I realized that I effectively lived in my office. The dorm room I had was just a place where I slept. I'd sleep about 7-9 hours a day, which effectively meant my bed had a duty cycle of 33%, which is probably what most bedrooms see; except a berth on a small ship, which may see 66% or even 100% use as one person can sleep while the other is on watch. I cooked once every six days--I did all my own cooking--and ate in my room. Cooking took 30 minutes a week. Therefore, if I had had my own kitchen, my duty cycle would have been $0.5 / (6 \times 24) = 0.347\%$, which is a waste of resources. It therefore made sense to share the kitchen with others--18 others. I avoided the crowds due to my work schedule. I'm at my most creative during evenings and nights, when there are few distractions. Hence I would cook and do laundry at two in the morning. Showers and toilets were also shared (and professionally cleaned daily). This also makes sense. After all, how much time do you spend in the bathroom? For my schedule and priorities, my living arrangements, 10 minutes away from my office, were fully optimized, with very little waste.

Many consider living with other people a horrible idea. I suspect this is due to atrophied social skills from living apart in houses, and lately, in rooms.

Perhaps a criteria for moving in with anyone, for instance your spouse or a friend, should be sufficient social skills to be able to tolerate being together in small quarters. Learn to be easy to get along with. Be considerate. I'm sure this is a learned skill. Historically, extended families have lived together just fine, and perhaps living under the same roof as Uncle Bob or sharing a house with another family will become the norm once again.

Living together with others provides significant economies of scale, with the largest effect realized by adding the first person (see this figure and Sigmoids, logistic curves, and the maximum power principle). The fewer people there are in a household and the more aligned their interests are, the fewer the compromises that have to be made. Therefore, depending on alignment, there's an optimal number of people in a household. If you can't share rooms with others and/or living in solitude is very important to you, you need to reduce your expenses in other ways, by finding something smaller or relocating to another town.

**Rent or own?**

There is much money to be made in building and in transaction costs from buying and selling houses.[70] There are significant pressures, political and economic, to get people involved in this game, including the strange idea of including the value of one's home in one's net worth or having taxpayers pay part of your interest while you pay the other part to the bank.[71]

This begets the crazy idea of a starter home and the even crazier idea of buying something bigger as income increases. This in turn has led to speculating in one's domicile, using arguments like, "Real estate always goes up; better buy before the market runs away." After the recent crash, I don't think I need to refute that anymore. If you're using a mortgage because houses always appreciate in value, you're simply speculating in leveraged real estate, something which is surprisingly unregulated compared to speculating in stocks on the margin, which uses the same principle. In the long run, real estate goes up at the same rate as inflation, which is to be expected for a practically risk-free, nonproductive asset. It's not a good idea to consider the house you live in as an "investment" unless you know more about real estate than the average person, and in particular, enough to speculate on its direction.

Including home value in one's net worth is an academic exercise, as this part of net worth is irrelevant to financial independence. What matters is cash flow (see Financial cash flow cycles) and it's well-known that any cash flow from

your home is negative. The only question then is whether it's more negative than renting something similar. You can calculate whether this is the case by considering the *net asset value* (NAV)

*NAV = (annual rental income ×(1-upkeep))/(risk-free rate + risk premium).*

Here the *upkeep ratio* is typically 30-40% of the rental income. The *risk free rate* is the going rate of 30-year bonds. The *risk premium* is typically 1-2%. Calculate the *capitalization rate* (cap rate) given by

*cap rate = (annual rental income ×(1-upkeep))/(price).*

The cap rate should be a few percent over the risk-free rate to adjust for the possibility of the house burning down. As you can see, it's essentially the same calculation. You should understand these calculations and be able to modify them to your situation.

In terms of rent, landlords attempt to pass on mortgage, maintenance, and insurance costs to the renter. However, they can't charge more than what the rental market will bear. If you're renting and equivalent housing is selling at its NAV, the landlord is successfully passing all maintenance, insurance, and mortgage costs on to you. In this case, you'll probably be better off owning since you should be able to maintain your home for less than what you're paying your landlord to pay for caretakers. If it's selling above NAV, you'll be better off renting. If it's selling below NAV, you'll be better off buying--unless you know you're going to move within the next few years.

## How to find shelter

The three most important things that matter for shelter are

1. Location relative to your work.
2. Location relative to your grocery outlet.
3. Cost.

If you work from home, it's the location relative to your customers that matters. If you don't need to go to your customers physically, this doesn't matter at all. If you can grow most of your own food, location relative to your food supply doesn't matter either. You may want to consider getting food shipped. Run the calculation. And of course, if you're loaded, you don't need to worry about cost--but then why are you reading this chapter? For now, let's assume that all three are important, as they would be for most people.

For renting, the method I use is to go to Craig's List and click on "housing." Then I put in my limits: $200 minimum (because that removes a lot of useless

search results) and $350 maximum. If you're two people with an income, you could put $400-$700. It's likely that for certain areas, houses or apartments are simply out of range. In this case, consider cohousing, roommates, *etc.* In particular, consider radical alternatives. We currently live in a motorhome, for example. In addition, some of the cheaper places may not be heavily advertised. We lived in the same place for two years before discovering an option that was $400/month instead of $660/month. Ask around! If you're priced out of the market, you should consider other areas. I wouldn't be too tied to a particular city. Indeed, a frequent excuse is that, "I need to live here." Actually, unless you can document some critical need--for example, a medical reason for a particular climate--you only *want* to live in a particular place. This want, then, comes down to paying extra versus your other goals.

The search should result in several potential addresses. Next, find routes to work and groceries respectively. Get a map and some tacks. Mark your work address and the potential housing addresses and trace out connecting routes, then calculate the distances. There are online tools that make this easy.

I highly recommend not owning a car (but see Driving for a possible exception!), since transportation will most likely be your second largest expense. Therefore, check to see if those streets are walkable or bikeable--no disappearing sidewalks, killer intersections, or killer people. Online, you can use satellite views of the map at maximum resolution to scan for sidewalks. Unfortunately, this requirement sometimes results in detours that can turn a three mile route into a four mile one. Also get a map of bus stops or other public transportation. Buses will extend your range. If you live one mile from a bus stop and your work is one mile from another bus stop, your effective distance is two miles. Also check options for car pooling.

If you live in a region with heavy winters, you may want to walk rather than ride a bike.[72] In that case, limit your maximum distance to three miles (this will take about an hour to walk). If you have a bike option, I would say seven miles, tops. However, perhaps you're tougher than I am--some bike commuters ride more than 15 miles each way, every day. Walking a six mile round trip daily is certainly doable. I did it daily for half a year once, but I wouldn't want to walk much farther than that; it simply takes too much time.

Some may be presently bound by mortgages that are underwater (don't fall for the sunk cost fallacy) or by not having sufficient ready funds to make a deposit, in which case they may resort to just reconsidering or postponing the move. Even if you're not going to move, try going through the exercise anyway just to realize that it's possible. Don't worry, there are other ways to self-actualize and gain (self-)respect than living in expensive housing. Furthermore, in most

vocations you'll rarely be keeping up appearances with anyone other than your neighbors.[73] Your employer and clients will most likely not even know where you live, and your real friends won't care (see People).

## Telecommuting and work

Moving your work to your home eliminates transportation to work and removes the constraint of living close to work. It's likely that it also removes other constraints, such as corporate hours and dress code, as well as inconvenient constraints such as not being able to drop work at a moment's notice if something else comes up. I prefer supplying products or services that can be sold locally, by mail or online, as this makes it easier to find customers.

Furthermore, if you work in a field with a high return on assets, that is, your income is large relative to your investments in fixed assets, your fixed assets will be easy to move (or you make so much money that moving expenses are of no concern to you). Computer jobs only require a computer, which is easily portable. Also consider watch repair, micromechanics, microelectronics, accounting, tax assistance, and other jobs that don't require heavy machinery.

Instead of moving the work home to your shelter, also consider moving your shelter to where the work is. Contractors live in travel trailers that they pull around the country, living at low rents close to wherever the work is, and they use their work trucks to pull the trailer.

## Domestic food supply

There are three ways to supply your food domestically without having to leave home. The first method is to order in, either having ready-made food delivered to your door (expensive) or groceries delivered (also expensive, but maybe not as expensive as a car).

The second method is to buy in bulk. Shop for groceries once a month. This will be similar to provisioning for a cruising boat, and books on cruising will offer detailed instructions for how to do this, even without the need for refrigeration. Alternatively, survival literature will provide plans for even longer food storage. The benefit of this method is that should something happen, you'll likely have food for a few or even several weeks, depending on your buffer. If you want this kind of coverage, don't forget to store water. Mark everything with the buy date, eat the oldest first, and keep the store in rotation.

The third method is growing a majority of your own food. Being completely

self-sufficient is economically inefficient. It would make economic sense to focus on crops that are expensive (tomatoes) and buy crops that are cheap (potatoes). Combining plants with animals that will eat whatever humans don't eat and provide fertilizer that humans don't provide either will cap the waste. Unfortunately, zoning laws prohibit such farming in most urban settings. However, there's a growing trend of urban farmers that push these laws to the limit under a "don't ask, don't tell" policy. For instance, you could keep (meat) rabbits in your basement, and no, they won't smell if you clean the pens. If you can keep animals above ground, have your chicken eat some of the red wiggler worms you use for speedy composting of your green waste. If you can't have chicken, at least get a fishing license and use your surplus worms or share them with others. There are always people who are into vermicomposting. All it takes to build a vermicomposter are two buckets and a drill.

If you can't get access to land, and indoor hydroponics is too far-fetched, you could join a CSA (community-supported agriculture). Buying into a CSA seems rather expensive, though, and it may be cheaper to arrange your own "community" by asking friends if you can use some of their unused land to plant something. Many will be happy to let you pluck their oranges or apples to keep their lawn free of obstacles. Some engage in guerrilla gardening.

You can find many books describing how to grow your own food, whether it's on a farm, a small homestead or even your balcony. In my opinion, at present price levels, growing your own food isn't going to save you much if any money. At future price levels, it most likely will. Furthermore, having insourced some of your own food supply, you'll be more resilient. Besides, gardening can be a very satisfying pastime as you literally get to eat the fruits of your labor, something which is rarely the case in a "real" job.

## Lights and electric

First, quit the wasteful habit of leaving the lights on everywhere. Leaving a room for more than one minute means turning the lights off. In particular it means turning off minor appliances like TVs, radios, and computers. If no one is around to hear it, does it make a sound? Yes, it does!

Next, reconsider whether the amount of lighting is appropriate. I've seen close to 800W being used to light a living room, which is clearly unnecessary. Replace the 100W light bulbs in big chandeliers with smaller light bulbs. Some well-designed lamps are much better at diffusing the light and directing it downwards. In general, move the light source close to where it is needed. These measures will help more than switching the house to CFLs and keeping your bad

habits.

Extreme measures involve making sure that your devices are truly switched off. Many modern off switches just put the device in standby mode. If you're handy with a soldering iron and understand electronics, you can install your own off switch at the DC side of the power supply. Or you can simply pull the plug out.

I wouldn't recommend going out and buying energy-efficient appliances without doing a detailed analysis of current cost of electricity versus future cost of electricity + cost of appliance. It's quite likely that it won't be worthwhile. If appliances are to be replaced, the absolute power consumption is more important than the relative consumption. By changing your eating habits from refrigerated and frozen food to a diet of fresh food and staples, you'll be able to get away with a much smaller refrigerator. I can keep my leftovers in a dorm-sized refrigerator. When I have lived in places with larger refrigerators, they have always been mostly empty. Save a few bucks by filling them with water containers instead. Large refrigerators are mainly filled with "condiments and compost"--that is, a large assortment of ketchup, mayonnaise, hot sauce, and stuff you're not going to eat anyway. Keep in mind that people have been conditioned to store everything in refrigerators, even things that don't really need cooling. Reading sailing and cruising manuals can be very helpful if you plan to store food for weeks on end. I find it easier just to live close to a supermarket and drop in when I'm out.

With that in mind, you may decide to go refrigerator-less. You wouldn't be the first. You'll likely be amazed at how silent your home will be without the droning compressor. While a refrigerator is a suboptimal strategy, a large chest freezer may be a worthwhile investment. The reason is that you can stock up on sales. Again, though, if you let your meals be dictated by sales, you can forgo the freezer.

In terms of appliances, consider whether electric is appropriate (see Appropriate response). Unless you use the gadget more than one hour per week, it most likely is not. With a little research, it's often possible to find a "manual" version. Hand drills, grinders, mortar and pestle, wheat grinders, etc.--in short, most household tools--come in some pre-electric version. This "primitive" version is often better built and will last a lifetime--that is, your lifetime, not the lifetime of the product--a warranty that never made any sense to me. Be prepared for sticker shock, though. This kind of quality has a large upfront cost.

A synergistic side effect of the manual version is that it requires human power, which burns calories (see Moving), generates heat (see Heating and cooling), and provides a closer connection to the work. Indeed, kneading dough

can be done with the hands; it doesn't require a stand mixer, unless you're baking twice a day.

## Heating and cooling

The central heating which everybody in the Western world takes for granted is a strange concept to other cultures. Central heating has conditioned us to fairly tight tolerance ranges. However, it's possible to change your body to feeling quite comfortable while sitting in a t-shirt at 15C (59F) or, alternatively, deal with 30C (86F) (see A modular design).

How warm or cold you feel depends on metabolism, circulation, diet, activity, clothing, and environment.[74] If you've ever relocated from a cold climate to a warm climate, you've probably been surprised at how quickly you adapt. What used to be a balmy 10C (50F) outside is now freezing cold. Feeling warm or cold has a lot to do with adaptation. Unfortunately, it's now normal to live in heated and air-conditioned bubbles which allow for no adaptation at all, except perhaps to the price of those services. Here's how to do it.

To adapt to heat, you need to increase the efficacy of your sweat glands. This is best done by exercising or being physically active at high temperature, like outside without air conditioning. With increased heat, you won't need to eat to stay warm like you would in a colder environment, and thus you'll eat less. Eat lighter foods: more vegetables. This will save money and you'll also be eating in season. Change your schedule to do more physical work early in the morning and take a siesta during the warmest hours of the day. Sleep outside, or at least with open windows. These changes are possible once you achieve control over your work schedule.

To adapt to cold, try switching to cold showers. Instead of standing under the showerhead, move it around the body, starting with the head and extremities. This will save on water and heat, and it will increase cold tolerance and circulation. It takes about two weeks to adapt. Any kind of "cheating" can be treated as a setback. One step forward, two steps back.

Another way to feel warmer (but actually be cooler) is to lose subcutaneous fat under the skin. This brings the surface of the skin closer to the heat-generating sources (muscles and organs) within the body. As a consequence, your skin will feel warmer to the touch. Since heat loss increases with surface to volume area (the rounder and larger the body, the less loss--children and long and slender adults will lose more)--this will require more heat to be generated and consequently you'll need to be more physically active and eat more.

Food increases metabolism. Warm food with a high heat capacity (large water content) such as soup comes with thermal energy (heat) as well. The body will naturally want to eat more when the environment is cold because the metabolism is naturally increased, and vice versa when it's warm. As a corollary, if you're on reduced calories, relative to the ambient temperature you'll feel colder. Not adjusting one's eating to the season (see Eating like a farmer) will lead to difficulties when trying to cope with warm weather without air conditioning or cold weather without heating.

An intensive exercise regime--that is, heavy weightlifting (see High intensity interval training) or similar--substantially increases the metabolism up to 24 hours afterwards. Low-intensity exercising, like running, cycling, dancing, yoga, etc. doesn't have a similar effect. Here, the body reverts to normal within an hour. One solution is to keep moving (also useful when outdoors, in which case if you're cold, move faster). Perform basic activities that require some human muscle power instead of sitting/standing still and pushing buttons. For example, use manual appliances. Take up hobbies and crafts with a manual component. If you spend your evenings doing carpentry or baking (real baking, not powder mixing) it's unlikely that you'll be cold even if the central heating is off.

With all this talk of generating heat, it may be interesting to know that a seated person emits around 100W (a sleeping person around 80W). This number is higher for someone who has exercised intensely within the past 24 hours. 100W is not much, but it's interesting to consider that if you fill a room with people, they'll heat it up. High-intensity workouts generate more than 1000W (see High intensity interval training), which is comparable to a small space heater. For room-heating purposes you can substitute the company of 10 friends with one intensely exercising person.

External heat sources offer a less convenient solution, since they must be lugged around. They're like the difference between knowing the multiplication table by heart and having to use a calculator. The modern solution is the electric blanket. For half a monthly heating bill, you can buy a heating blanket that will reduce your central heating bills forever. An older, less expensive, and therefore harder to find, solution is the hot water bottle. As an alternative, you can use a rice bag. Take an old pillow case and sew in a few cups of uncooked rice. Heat this in the microwave. The heat capacity isn't as good as the hot water bottle. These heat sources should be covered by an insulating layer or you'll lose more than half the heat. With the hot water bottle, you can simply stuff it under your sweater. Preventing heat loss is as important as generating it in the first place. This is where adding layers of clothes outside the body comes in handy. It's important to add layers preemptively. If layers aren't added, the body will

withdraw blood from the limbs to save heat. Once this happens and you've got cold feet, the blood will not return and reheat the feet even after you put on extra socks. In this case, heat must be generated in the feet by stamping, walking, jumping, or on the feet, by rubbing them. An alternative is to use biofeedback. This requires some practice. Concentrate on your feet and imagine they're in warm water or you're standing on hot coals. It may take a few minutes to get it to work and it may take several months of practice to learn to control it.

Air doesn't conduct heat well and layers trap air. Thus, trapping air prevents heat transfer to or from the environment. If you stick your hand into a 100C (212F) oven, you won't get burned immediately. If you touch 100C water, you'll get burned immediately. Water conducts heat very well. This is also why damp clothes feel colder and why staying dry is important for staying warm. Conversely, if you want to cool down, sweat or add water exogenously. Causing water to evaporate will cool you even faster. Evaporation can be encouraged by convecting away the air with a high relative humidity around your skin. This is the basis of the swamp cooler, (a swamp cooler is a simple system, so you can build your own; it only works where the relative humidity is low) which is useful if you can't sweat enough on your own. If you can, a fan will do. These days most fans are electric, but you can get a hand fan. You should also wear loose clothing to aid in convection when you move. Conversely, in cool temperatures, wear constricting clothes, like neck ties and cuffs, to seal off air movements.

Given standard-sized rooms, focus on heating and cooling the body rather than the room. Heating unused rooms isn't harmonious with financial independence as money is being wasted; nor are large rooms.

If you have the choice, go with smaller rooms. Small (100sqft/person), well-insulated rooms can be heated and cooled at almost no cost; consider this along with future projections of the cost of heating oil. It may be useful to know that should the central heating be switched off for whatever reason, you can approximate a small room by pitching a tent in your living room and sleeping in that.

Without the benefit of small rooms, heating and cooling means changing habits to be more in tune with the seasons--that is, letting the room temperature follow the outside temperature more closely. The barrier here is that modern people live in bubbles, only spending trivial amounts of time outside their offices, houses, cars, and shopping centers. Modern sedentary habits have almost eliminated physiological advantages and adaptation. How to dress and behave for seasons and weather have been forgotten, and so people own improper clothing which is uncomfortable outside the range of "modern room temperature." By wearing the right clothes (see Clothes) and changing a few

habits, it takes about two weeks to adapt physiologically.

# Clothes

In a business setting, men wear suits suitable for unheated or poorly heated rooms in a cold temperate climate, namely England, where the business suit originated. Because of tradition, businessmen and office workers wear woolen two-or three-piece suits regardless of the climate they live in, and office buildings are air-conditioned to an English climate so that workers may comfortably over-dress even if the weather outside calls for t-shirts. Dress more compatibly with the weather and save money on trying to change the temperature (see Heating and cooling); this is possible if you're not subject to dress code restrictions, either by working from home (see Telecommuting and work) or working in an occupation where your attire must not conform to customer expectations or affect shareholder profits. Like with heating and cooling (see Heating and cooling), clothing should follow the seasons. I wear wool suits during the winter; they're very comfortable and last a long time.

## Fixing up a wardrobe

Wardrobes often show a history of fashion, sales, sudden inspirations (good and bad), and changing weight. It's apparently not unusual to budget for clothes as a recurrent expense just to keep up with fashion and maintain a sufficient selection of outfits. As a result, clothes are bought cheap (sometimes extra is paid for branding) and considered disposable. However, clothes should be considered durable goods (see Depreciation schedules) and tools to serve a purpose. This means that an item must be carefully considered (if in doubt, always postpone). It must look good, fit the body, fit the temperature, not be sticky nor restrictive. If it doesn't allow a comfortable five mile walk or standing around outside and inside for one hour while wearing it, it fails.

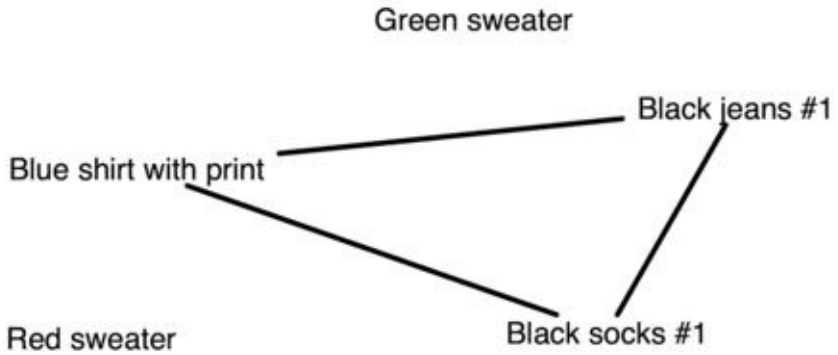
The process of dressing for form and function is well-known: layers. The outer layer determines the form and contributes to the function. The rest of the layers are pure function. Layers allow for flexibility in activity level and inclement weather and they trap more air in cold climates--anyone feeling cold and wearing anything less than three layers, if not four, isn't trying hard enough.[75] The inner layer should be sweat-transporting (quick drying). This typically means technical fibers like polypropylene or similar. If you don't plan on sweating much or if evaporative cooling is actually desired, cotton is good. The midlayer should be sweat-absorbing and warming. The best material for this

is wool; down if it is really cold and you can keep it dry; wool works fine wet. If you can't afford wool, you can also use fleece. Cotton will also do in a pinch. The outer layer should be water-and wind-proof. This combination provides the most comfortable combination. Waxed cotton is probably the most durable if you plan to keep your jacket for more than a decade, since it's easier to refurbish than using water-repellent chemicals on your technical jackets. Also consider that zippers do wear out and they are harder to replace than buttons, which anyone can replace. In sunny conditions, the clothes should be UV resistant (darker and tightly woven); in warm conditions, the clothes should be loose and allow air to pass and cool--don't ruin heat adaptation by switching on air conditioning; in cold conditions, the clothes should be tight, particularly at the sleeves and collar, much like the business suit mentioned earlier. Also consider that the radiative heating component is strong for dark colors and weak for light colors. Hence, darker winter jackets provide more heat but also greater volatility.

Instead of a growing collection of clothing, much of which is obsolete or not generally useful, what is needed is a strategy to increase the number of outfits while minimizing the number of individual items.

**How to build a wardrobe**

To (re)build a wardrobe, take a piece of paper and list all your items of clothing, spreading the items out over the paper as in this figure: "Blue shirt with print," "Black jeans #1," "Black socks #1," "Red sweater," "Green sweater," *etc.* Now create one outfit by drawing lines, for example, "black jeans #1" to "black socks" to "blue shirt" forms a closed geometric shape (a triangle) and constitutes one outfit.




How to build a wardrobe (see text for details).

It will be easier to match colors, at least for a guy like me, if you just stick to black, navy, and grey. These colors go well with each other and almost everything else. Continue this exercise, but only connect things you'd be willing

to wear or are in fact wearing regularly as per this list. At the end, you'll notice that some items connect to many other items. Those are the central pieces of your wardrobe. Other items, like that hideous sweater from Aunt Martha, are fairly unconnected. Yet other items have duplicates which serve the same function. The most efficient wardrobe is the one with the largest ratio of outfits to items of clothing.[76] Add or remove items of clothing accordingly. You can use the methods in How to get rid of things to get rid of clothes.

Now determine how many outfits you need; in our society six is typically sufficient--one for each day of the work week and one for the weekend, although if you can convince your colleagues that you still wash your clothes, you can go with fewer. If following fashion is important to you, consider that the average piece of clothing lasts about 100 wash cycles. Better clothes may last 200 cycles. If washing is the primary source of failure, the amount of clothes should be balanced to wear out by the time it becomes unfashionable. This amount is determined by Lanchester's Square Law. For example, 10 average shirts that get washed after wearing them for a day give 1,000 washes total. They would last a little under 3 years given equal amount of wear. If shirt fashion changes faster than this, 10 shirts is too many. As clothes can take up a lot of space, you may want to reduce the size of your wardrobe to keep other things in your closet, or to simply require less closet space in the first place.

### Making your own clothing

Clothing is now so inexpensive, at least in terms of getting dressed, that making your own isn't worthwhile other than for the satisfaction it brings. Mending and darning are still valuable skills, as is resizing.

## Laundry

You may want to put in an external constraint that all dirty clothes should comprise a full laundry load to minimize laundry machine use (wear, money, water, electricity). If you use machines, figure full loads. This will likely be two loads, a colder one and a warmer one. If you're two people doing laundry together, the loads will be done twice as often, which makes it possible to get away with only owning half as many clothes. Three people means one-third and so on. If you handwash, you can get away with one to three sets of clothes, depending on your drying times. Many synthetic fabrics, such as "no-wrinkle," require little maintenance and dry quickly. In this case, it's possible to make do

with only one set of clothing which dries overnight while one sleeps-- this is the holy grail of wardrobe minimalism.

To wash a full load of clothes "by hand," put it in a sealed bucket with some water and detergent and drive it down a bumpy road. Don't forget the rinse cycle. This is done by transferring the clothes to a clean bucket on the way back. If you don't have a bumpy road available, you can use a plastic container (10gal.) and a plunger. If you don't have a plunger, attach a shovel handle to a wooden stool and twist it around. Alternatively, you can buy electric contraptions that will agitate the clothes for you. These are called washing machines and cost a few hundred bucks. They usually need to be repaired every few years.

Commercial detergent is an interesting concoction of sodium carbonate, borax, and inactive ingredients (color agents), all of which are very inexpensive, plus advertising campaigns, management salaries, distribution systems, etc., which comprise most of the cost. To make your own, you only need sodium carbonate, which is sold as either washing soda (check out the art supply section) or pH booster (next to the pool supplies), borax (laundry detergent section), and grated bar soap (grate your own). Mix these in a 1:1:1 ratio. A load requires about a tablespoon of this mixture. If you want liquid detergent, simply mix with water and heat up the concoction. Notice that the liquid version may form clumps. This is not a functional problem--just shake the container prior to use.

To dry the clothes, use a clothesline. A clothesline is either a piece of string tied between two points or an expensive contraption available at "green living" outlets. If you stick with the piece of string, the clothesline will be working for you, rather than the other way around. Some consider hanging clothes up to be arduous, backbreaking labor involving about 50 deep knee bends from the hamper to the line. Avoid this (and the hamper) by putting the clothes directly on your shoulder (big items like pants and shirts) or in your hand (small items like socks and underwear). Then walk over to the line and transfer them either from the hand or the shoulder as you walk along the line. There's no reason to bother with pegs unless the wind is blowing strongly.

# Health

Think of health as wealth--the wealth that matters most--and being wealth, its usefulness lies in its ability to serve as an asset in our lives. The healthier the life, the better the life. What is health?

Consider the way a child feels about his body. He can't stay still and wants to jump around--almost can't help himself. How many adults do that? Indeed, not many. Many adults act as if moving is not particularly enjoyable. Given the choice, they'd rather not move around. To them, moving is uncomfortable, exhausting, and even painful.

Consider the curiosity of a child, always asking questions about this and that to learn about the world. Children express themselves creatively when given the chance. Here too, only a few adults are creative, imaginative, lifelong learners. Those who are can't help themselves: They are mentally healthy and never bored. Learning comes easy to them. Conversely, many have little imagination left and would prefer not to think, especially if they have to change their mind or break a few conventions to be able to think about something.

Consider that most parents love their children unconditionally and thus children enjoy unlimited social support. As the child grows up, the "innocence" soon wears off, though. Indeed, the current psychiatric and sociological paradigm defines social health as being adjusted to the prevailing norms and culture. After all, we're all cogs in the machine, and if a cog doesn't work, the prevailing dogma is that it must be sick and broken. Why then is there so much depression and so many prescription drugs designed to make people stop caring so they can be neutrally "happy?"[77] Instead, it makes sense to define social wealth as parallel to mental and physical health. As such, it should be measured by the strength of one's relationships to the people one chooses to associate with--one's tribe, so to speak.

Health is thus a condition of well-being and an ability to appreciate life. It's not necessarily optimizing or conforming to a set of measurable quantities like life expectancy or blood pressure, nor is it removing all symptoms using drugs. Health is the presence of something positive, rather than the absence of something negative.[78]

## Moving

It's generally realized that fitness involves some combination of diet and

exercise. The diet quantity determines how big the body will be and the diet quality determines how healthy it'll be. The exercise quantity and quality determines its function, form, and health.

To understand how this works, think of the human body as being analogous to a car, with the exception that the human body over time is able to adapt its size and shape to external demands of diet and exercise (see Ergodicity and destiny). It becomes what it does. It is what it has done. In other words, by looking at someone it is possible to see how much and what they eat and what kind of exercise they do. Form follows function.

**The couch potato**

Since there are many different human behaviors, human bodies come in many different shapes and sizes. A popular model now dominating two-thirds of the American market is the CouchPotato500, adapted to a sedentary life and capable of processing large amounts of Twinkies[79] while sitting and staring at a monitor for up to 16 hours a day. The problem with the CouchPotato500 model is that it eventually requires prescription drugs to compensate for various system imbalances obtained from eating a diet of meat, starch, and corn syrup, drugs which require some kind of insurance scheme to keep personal costs down. It's typically in pain, being overloaded with weight, meaning more drugs and typically less activity, thus exacerbating the problem further. It then requires auxiliary motorized assistance to move farther than a few city blocks, something which is almost exclusively possible with personal car ownership.[80]

**The runner**

Many then realize the importance of keeping "in shape," which suggests a specific body shape with a lack of fat in the wrong places like thighs, hips, stomach, and upper arms, and muscle in the right places. For some strange reason I have yet to uncover, this often means putting on running shoes and going for a jog.[81] For the overweight, restricting calories will effectively reduce body size. Yet many runners and other people who do several hours of aerobic exercise each week often suffer from "fat aerobics instructor syndrome," with deposits of stubborn fat in annoying places that just won't go away and even increase. The problem is that running or aerobic exercise in itself does very little for fat loss. Low-intensity exercise (see the list of intensity levels in this table) doesn't burn many calories--a pound of fat, that is 4,200kcal, will supply enough

energy for a 50mile run--and it doesn't burn any energy after the run. In fact, it may even be detrimental. Conversely, adding a pound of muscle mass increases the daily metabolic rate by 75-100kcal just to keep the muscle alive. It's thus clear that decreasing muscle mass is self-defeating as a strategy to fat loss. Indeed, looking at experienced runners with their relatively spindly arms and legs with thighs no thicker than their necks, and soft and scrawny upper body, it's clear that the adaptation to long distance--anything over a couple of miles--running doesn't get them "in shape."[82] Furthermore, no activities in real life require jogging or rhythmically jumping around. Being pursued by a dog, you sprint. If you're moving far under your own power, you either ride a bicycle or you walk. Most activities require some combination of agility, strength, and work capacity. Yet aerobics, running, or jogging enhance none of these qualities.

**The bodybuilder**

Even though things are changing, much modern strength training has been influenced by bodybuilding. Bodybuilding is primarily concerned with developing a certain look based on bulk, symmetry, and definition. This may explain why most women stay away from any dumbbell that is not ultralight--usually they are color-coded pink--although lifting heavier weights could do wonders for preventing bone loss--a solution currently sold in pill form--and increasing everyday capabilities. Since "manly" bulk is currently fashionable,[83] guys have no such concerns, and therefore a lot of work goes toward increasing muscle tissue primarily on the biceps, chest, and quadriceps to manipulate the body into a certain look. However, much of this work is directed towards the illusion of real strength,[84] and not as much real world strength as the look suggests.[85] This is similar to how driving a luxury car these days mostly means being able to put one's mark on a lease or a car loan, whereas it used to indicate a measure of wealth since only the really wealthy would be able to pay cash for a luxury vehicle.

**Functional fitness**

Functional fitness is a recent drive to reintegrate the isolation exercises of regular strength training and instead focus on whole-body movements. It doesn't seek to build the body for appearance, but for function. It's perhaps the first step towards moving exercise out of the gym and reintegrating body movement with

everyday life. For now, it still resides in gyms, most likely because it has become difficult to find enough exercise outside in the real world, where everything that previously required physical work has been replaced with internal combustion engines, electric tools and appliances, and paper-pushing jobs to buy them.

The gym, however, is a good place to start before venturing out in the real world and doing real things. It's a place of physiological preparation, where real world strength is built up using movements which are similar in form, strength, intensity, and work capacity to real world movements. For instance, the clean and jerk corresponds to picking up an unconscious person, the vertical row corresponds to pulling a rope, the squat corresponds to picking up a child, and the power clean corresponds to stacking sacks of corn. With a solid foundation in functional fitness, activities like cycling, walking, running, double digging a garden, or doing laundry with a plunger will be quite easy in comparison. It'll be the equivalent of driving a powerful SUV, tow-package, hybrid, and all that.

Being in the right shape means an enhanced ability to tolerate cold, since it depends on muscularity (static) and work capacity (dynamic). A high work capacity is the ability to perform physical work as fast as possible. Similarly, the ability to tolerate heat depends on a low body fat percentage. If you never experience heat, you can carry more body fat. However, it's easier not to carry it and simply add a layer of clothes. The proper physical conditioning is thus aligned with the problem of heating and cooling (see Heating and cooling).

It's possible never to be out of breath walking up stairs or otherwise engaging in normal activities, like cycling 10 miles to work or carrying a heavy package. It's possible never to be sore after an activity. It's possible to have fun engaging in strenuous physical activities into your 60s or beyond. The reason that people get weak is not age; it's a history of disuse, a process many start right out of college. I think that maintaining this functionally into old age will make life enjoyable for a long time. I notice that my 80-year-old grandmother, who grew up on a farm, until recently was stronger than my mother, who was a stay-at-home mom and is yet still stronger than my wife, who writes reports most of the day. This is despite the ~25-year age differences between them, but it parallels the progression of my grandmother using her hands and a balloon whip, my mother using her hands and an electric mixer, while we use a breadmaking machine. This trend is best reversed.

### High-intensity interval training

There is an absolute standard of fitness. To be fit is to be able to drag or carry

an unconscious adult out of a burning house on one, maybe two gulps of air. Alternatively, it's to outsprint a dog, given a head start, and climb over a 7ft wall. To be fit is to be able to fight and defeat anyone who can outrun you and outrun anyone you can't defeat.

The most effective way to reach that particular kind of fitness is high-intensity interval training, and the best way I can think of that won't cost an arm and a leg in equipment or gym fees is the "clean and pushpress." It is a full-body movement, which strengthens practically the entire body from the neck to the knees.

The clean and push press works practically all the muscles in your body and it's a great power movement. If your desire is to be strong (but with less endurance), the ultimate exercise is the deadlift.

If done with dumbbells or kettlebells, these are relatively simple movements. If done with a barbell, you may want to get someone to show you. I prefer kettlebells. Do-it-yourselfers may realize the same benefits by filling a sturdy duffel bag with sandbags made out of duct taped Zip-loc bags.[86]

A high work capacity is physically equivalent to sustaining a high power output (keeping a light bulb lit on a rowing machine), which means being able to do a lot of work in a short time (stacking sacks of corn). Since this is very exhausting, training is done in intervals.

The optimal interval for strength and endurance is the Tabata interval, which means 20 seconds of all-out exercise followed by 10 seconds of rest and repeating this sequence throughout the entire workout; that is, working roughly *2/3* of the time. Increasing the weight and rest-to-work ratio prioritizes strength. Decreasing the weight and rest-to-work ratio prioritizes endurance. Pure endurance aims for working 100% of the time.

To increase work capacity, a good progression is first to increase strength, then to increase volume, and then finally to increase power by shortening the rest intervals. It works like this:

1. Increase strength sufficiently to do a few reps. This is efficiently done by using this entire program at a lower strength requirement at first.
2. Build up the volume. Suppose the entire volume is 100 repetitions. In this case do 100 reps with enough rest in between to finish. You may take all day if you like--for example, doing 5 reps every hour all day until you reach 100. Once you can do this every other day without overtraining, move to the next step.
3. Unless you picked a completely unrealistic strength level, most people will start at this point. Now, 100 reps can be divided into *100 reps×1 set*, *50×2*,

*33×3, 25×4, 20×5, 18×6, 14×7, 13×8, 11×9, 10×10, etc.* Doing 1 set should take exactly 1 minute, rest included (use a watch!). Hence, *33×3* will take 33 minutes to complete. The program adjusts with power capacity--for example, once *18×6* can be completed in good form, move on to *14×7*. Once you reach *7×14*, say, rest periods will be very short and you will be close to being able to do the exercise continuously, for example, as a power-endurance exercise. At this point move to a higher strength level and start over.

This is a very generalized way of laying out a program and it can be used for any kind of exercise such as push-ups, squats, power cleans, rowing, sprinting, *etc.* The good thing about it is that it adjusts. You will probably find yourself making great strides in the first month, particularly if you're untrained, as neuromuscular connections adapt. After that, progression will be much slower. Also note that at the more advanced stages the entire workout will take less than 10 minutes, yet the volume will be as high as what regular people spend an hour in the gym completing.

**Intensity levels**

The following is a useful gauge for subjective exercise intensity. Intense exercise happens beyond level 7. I've been to level 10 twice in my life. On second thought, maybe it was only level 9. While the levels seem unscientific, they actually correlate rather well with the amount of surplus oxygen you can use to talk with.

1. You can hold a continuous tone.
2. You can tell your life story.
3. You can speak in paragraphs.
4. You can carry on a conversation.
5. You can talk in sentences.
6. You can speak a few words at a time.
7. You can pronounce a syllable or two at a time.
8. You can't possibly breathe any faster than this.
9. You think you will die.
10. You wish you were dead.

The best exercise intensity, in terms of calories burned and increase of cardiovascular capacity, is right around the lactic acid threshold--that is, where

the body starts running out of oxygen, somewhere between level 7 and 8. Conversely, most aerobic workouts happen at level 4 because it burns the most fat[87] relative to blood sugar, and especially because this lower level doesn't scare off the beginners, who are very important to the fitness industry.

**Measuring progress**

To gauge progress, I use the "overhead pound." This is a weight lifted or cleaned from the ground or near the ground to the shoulder, "half overhead," and then getting it "overhead" with the arms straight. Moving a weight from shoulder to waist height in a squat is a "quarter overhead." The distance covered for a deadlift is also considered a "quarter overhead." A push-up is roughly the distance of half an overhead, but since the feet are supporting half the bodyweight, each push-up is only half of that. If you weigh 200 pounds, one push up is thus 50 overhead pounds. You will find that, thus scaled, most compound movement work capacity tests lead to roughly the same numbers. The intensity of an "overhead" depends on the individual. Lifting a weight overhead requires more work for someone who is 6'2" than for someone who is 5'6."

Compared to human potential,[88] a good measure of work capacity for a 6-foot 175-pound male is being able to execute 5,000 overhead pounds within 10 minutes[89] (this will make you quite competitive for local sports events); 10,000+ overhead pounds is a professional performance, and 2,500 is rather weak.

Work capacity scales by bodyweight, so weighing 50% more means increasing expected capacity by 50%. Since male athletes are about 25% stronger than females athletes pound for pound, females can subtract 25%. Unfortunately the current female body ideal in our culture is somewhat emaciated, and consequently women find themselves doing cardio to rid themselves of fat and muscle and working out with five-pound dumbbells to "tone" what's left of the muscles.[90] This is strictly a cosmetic preference. Functionally, if a 175-pound male is working out with 50 pound weights, a 125 pound female should be working out with $0.75 \times 125/175 \times 50 = 26$ pound weights to be at the same level of fitness.

At this level, participating in physical activities won't be limited by general physical preparedness. Any limit will be sports-specific. For instance, your tendons and knees won't appreciate it if you decide to run a marathon tomorrow, but your heart, legs, and lungs will be up for the task. Similarly, if you should decide to take up a sport like tennis, martial arts, or swimming, it will only be a lack of sports-specific technique that will hold you back. You should pass any

fitness test by the military, police, fire department, etc. with flying colors.

## Eating

Why do we eat the way we do? Some eat for fuel, some eat for comfort, but I bet most adopted the eating habits of their parents rather than making a deliberate choice. Before I discuss why I think food should be eaten for fuel with good taste as a side effect rather than the other way around, let me start by discussing eating for comfort and tradition.

### A comfortable addiction

Food is eaten for comfort when it's associated with good memories or even tradition, like the morning coffee, the Christmas turkey, or soup the way mom used to make it--even if it's now made in a factory. This kind of comfort food doesn't even need to taste particularly good to people outside one's particular culture, much like religious tenets often make little sense to people who follow a different faith.

However, food can also be directly addictive. For example, the amino acid tryptophan, which is found in abundance in chocolate, oats, and milk and meat products, is a precursor for the neurotransmitter serotonin, which improves mood. Normally tryptophan competes with other complex amino acids for entry into the brain, but an increase in blood sugar, which can be accomplished with sugar, white flour, and other "fast" carbohydrates, decreases the blood level of all amino acids *except* tryptophan, leaving it without competition for entry at the blood-brain barrier. This is an excellent recipe for addiction. Chocolate chip oatmeal cookies anyone?

Here's another example. Milk protein is primarily composed of casein. Casein breaks down to casomorphin, which is an opioid, so named because of its similarity to opium. Casomorphin originates in the cow's liver, gets transferred to its bloodstream, and ends up in its milk. Casomorphin is particularly concentrated in cheese, which is a milk product from which water, whey, and lactose have been removed. This explains why cheese is very addictive. It's perhaps not surprising that the food industry spends a lot of money hawking their products. Something to keep in mind is that if a product needs advertising to tell you it is good for you, it probably isn't. I'll leave sugar addiction and various other food addictions as a research project for the reader (see Physiological), but this does explain why changing one's diet can be very hard.

## Eating like a farmer

Most animals don't have breakfast, lunch, and dinner. Why do we? The standard three meals a day model is very useful for anyone engaging in heavy manual labor like farmwork or early industrial work. Obviously, work can't be stopped all the time for a snack break, but it's impossible to eat enough in the morning to last for an entire day of hard work. Three meals are thus a good compromise. Breakfast would fuel four hours of work, lunch would fuel another four hours of work and dinner would fuel eight hours of nonwork and eight hours of sleep, nominally. For people engaged in light manual labor, this diet is a problem, particularly if highly glycemic foods are eaten at lunch resulting in an insulin spike that drops blood sugar levels precipitously. Not only can this make a person hungry,[91] but the high level of insulin also makes one very tired. A quick way to fix this is to quickly engage in intensive workout--for example, spend 20 minutes doing all-out HIIT (see High intensity interval training). Another option is to store the excess energy around the midsection and grab a cup of coffee or one of the heavily marketed energy drinks.

## Eating like an athlete

Recently, a diet of six meals a day has gained popularity. This diet is inspired by full-time athletes, especially bodybuilders, who, in contrast to full-time workers, do have the option of taking a snack break. Using blood sugar directly from the intestines and having them refueled every other hour by a meal is easier that relying on blood sugar from the liver, which gets depleted (also known as "hitting the wall" or "tanking") after a couple hours of hard work. As a consequence, the body will start producing insulin on a sustained basis. Insulin is required to bring the sugar into the cells, where it is used. Of course, there's the problem of missing a meal. In this case, insulin levels will remain high in anticipation of sugar, and if the sugar doesn't arrive on schedule, the relatively elevated levels of insulin will drive blood sugar down and make the person very hungry. This is made worse if compounded by a workout, in which case hitting the wall comes much sooner than it otherwise would. It's very important if on this diet to eat constantly. It's a good thing too, because digesting food actually requires a substantial amount of energy, also known as the thermic effect. Generally less refined foods like vegetables and meats require up to one-third of their caloric value just to digest them. Refined foods like white flour, sugars, and fat require almost nothing. This is great news for the athlete but bad news for

regular folks, who don't work out 4-6 hours a day in pursuit of muscle mass. In this case, one must eat very small meals and stay clear of cookies and other highly processed foods. In my opinion, this offers few benefits for a normal person, who do just fine on liver glycogen without the need to "turbocharge" the blood sugar by continuous fueling. Eating six meals a day also makes for a lot of hassle, such as keeping track of calories, planning meals, the problem of missing a meal and the resulting hunger pangs.

**Eating like a warrior**

Culturally speaking, we have been programmed to believe that an empty feeling in the stomach is undesirable and a full belly is good. However, throughout and before history, warriors and pre-farmers--that is, hunter-gatherers--have followed a diet of eating almost nothing during the day followed by a large meal at night after the fight, or hunt, as it may be. This is called *The Warrior Diet* as developed by Ori Hofmekler and it prevents insulin levels from spiking more than once a day, and even better, instead of trying to plan and fit in three or six meals a day, it only requires the planning of a single meal. There is no tracking of calories as one develops a natural feel for being full without being bloated, and if prioritizing foods with a strong thermic effect by eating those first, it is hard to eat enough to gain weight with a single meal.

In terms of exertion, modern workers, like managers, assistants, and desk jockeys, and modern warriors like soldiers, policemen, and firefighters, have more in common with the historical warrior or hunter-gatherer than the farmer or the athlete. It would thus make sense to eat similarly. Imagine being called out to a fire just before one of the six small meals on the bodybuilder diet or just after one the three bigger meals on the farmer diet--exerting yourself on full stomach is not a pleasant experience!

Like switching to cold showers, changing the timing of one's meals takes a couple of weeks for the body to adapt to; especially if it's used to increasing insulin levels in anticipation of food at certain times of the day. If food is not forthcoming, the presence of insulin will drop the blood sugar below a comfortable level and cause the sensation of hunger. Being hungry is nothing particularly worrisome unless it becomes a permanent condition; unfortunately, well-fed people are unused to this feeling, and it's therefore a serious barrier to overcome. After a couple weeks of getting used to not eating at a particular time, the feeling will go away. If dinner is eaten at a regular time, one will still feel hungry if that meal is missed or delayed.

## Eating every other day, even?

Freeing oneself from the timing of even the evening meal is very liberating. All meals can now be eaten at home. Even missing one meal, that is, not eating for 48 hours, becomes possible. In fact, studies show that eating every other day, even when eating several meals that day, may increase longevity in the same way that constant caloric restriction does, at least in lab mice.[92] Caloric restriction has been shown to extend longevity in two senses: not only does it mean more years of life, it means more healthy years, as the body shows increased resistance to cancer and other degenerative diseases. It's a subject worth studying.

## Eating out

Americans spend close to half of their food budget having professionals cook for them. This is the equivalent of a third of my entire budget--not just for food; for everything. The solution is to dial down restaurant visits to the point where they again become special and exciting rather than expected. For those who eat out for social reasons, instead of meeting at a restaurant, take turns meeting at each other's homes. Either take turns cooking for each other or make every gathering a potluck. If you're really enterprising, start a "club" with your neighbors, each taking a turn cooking. With seven families, you only have to cook once a week.

## Cooking

For fuel you need a certain combination of amino acids, carbohydrates and essential fats (see Building blocks).[93] These can be acquired in a multitude of ways and from different ingredients. The ingredients can be combined in various ways--recipes. It's noted that recipes also follow general principles and that it's worthwhile to learn these principles. For example, baking involves a grain product (typically flour), liquid (typically water or milk), butter, yeast or baking soda, combined with a sour product, butter, and a sweetener (sugar, honey, molasses, etc.). Practically any baked product can be made out of these ingredients and they each serve a very specific purpose in that certain types of bread, muffin, or cake will always have some of them but not others. A little experimenting will reveal this. Just remember that flour and liquids are always needed; anything else is optional. Similarly, combining ingredients usually

requires some form of utensil or appliance--for example, a knife, a bowl, a spoon, an oven, a burner, *etc.*

This means that the entire process of following specific recipes and using specific utensils and appliances to combine specific ingredients into specific meals which supply *all* the required nutrients builds a complex system (see Building blocks), which provides flexibility and room for optimization (see Construction methods).

**Optimizing ingredients**

There are plenty of different diets out there. By diet I simply mean a particular way of eating; not necessarily with the goal of losing weight or even maintaining any kind of consistency. Diet seems to be a personal choice based on physiology and habit. I'm not going to recommend anything in particular, other than not eating too much or building towards downstream health problems from a junk diet. Given a diet, ingredients can be chosen in the following ways:

- Spontaneous (no recipe)
- Shopping list (recipes before ingredients)
- Staples and opportunism (ingredients before recipes)

"Spontaneous" food shopping happens without any particular strategy. The mission is to get something to eat. Often this leads to ready-to-eat meals or ordering a pizza. This is an inefficient way to spend resources, and because it's inefficient, it's expensive.

Shopping with a list is perhaps the most popular way of shopping. A meal plan is selected and a shopping list is created, based upon which ingredients are needed. Economically, this is better than spontaneous shopping because it tends to avoid the TV dinners, but it's still not optimal because it doesn't take sales into account. Missing ingredients are bought regardless of their cost.

The most optimal method is to shop for ingredients, and then, based on the ingredients one has available, determine a recipe. This allows one to buy food on sale, typically loss-leaders. The supermarket's sales strategy thus drives what's for dinner. To make this work, it's necessary to have some staples on hand (say pasta and beans) which the loss-leaders (say tomatoes, zucchini, and minced meat) can be combined with. If you pay attention, you'll notice that loss-leaders are typically on rotation; something on sale now will be on sale again in the future. Wait for it and eat whatever else is on sale in the meantime.

Creating a pantry of staples works on exactly the same principles as creating

a wardrobe (see How to build a wardrobe). Here the ingredients are to the recipes what clothes in the wardrobe are to outfits. Of course, it's possible to write out the solution, but it's likely to require more paper than the wardrobe. Another way is to use websites like `supercook.com` to do it. The traditional best way is to learn several recipes and notice which ingredients they have in common. If one recipe includes an ingredient that is used in only that recipe, avoid the recipe. The more it's optimized, the easier it is to manage the system, but obviously there are diminishing returns to obsessing over which recipes have the most synergy.

Another way to sort through your existing ingredients (a method that also work for utensils, incidentally) is to set aside a table in your kitchen for a month and put any ingredient on the table once you're done using it rather than putting it back. After a month, anything still left in the cupboards are ingredients you practically never use (see How to get rid of things).

As mentioned above (see A comfortable addiction), if a brand needs advertising, it is probably because it is either difficult to tell the difference between it and another brand or because you would not otherwise want to buy the product in the first place. None of the ingredients I use seem to come with coupons, and so I don't clip coupons. I do admit that coupons offer spectacular savings, but these savings are almost exclusively concentrated in preprocessed foods. For our purposes, we only really need to shop in the grain, meat, and produce sections. Not clipping coupons saves time organizing them as well as running around to different shops to use them.

A search will generally reveal one, or at most two stores nearby (see Transportation) that can supply all your needs. A systematic search may be in order: Travel all the streets of your city and visit all the stores, making a note of their prices and selection. Relying on junkmail or chain stores usually isn't the best solution. Put in some footwork! It's good exercise.

Set a strict food budget item: You'll notice that your total caloric intake will fall. You'll eat less processed food; likely none at all. As a result, your general health will improve and your long-term health expenses will decline, maybe to a point where you don't need to stay employed to be able to afford your required medical care.

Budget $80/person/month for food and only shop once a week, keeping track of food costs with a notebook or by paying in cash. As novices (see Gauging mastery) may find it challenging to spread the budget equitably over the entire month, dividing it into a weekly budget may be helpful.Building up a store of food, thus decoupling shopping from cooking, allows one to wait for sales and thus to spend money almost exclusively on sales. This only works with storable

food groups. Here, a freezer is much better than a refrigerator, and if I could choose only one, I'd choose to have a freezer over a refrigerator, but I'd rather have neither. This may be surprising, especially considering that we tend to believe that everything needs to be refrigerated. However, see the next section for suggestions of what can be stored without the noise and electricity usage of a refrigerator or freezer. Storing also avoids having to engage in the proverbial scramble for milk, eggs, and bread whenever the weather forecast is unfavorable.

**Optimizing utensils**

In general, simple meals are easier to cook. This means less need for unusual ingredients or utensils, less time spent preparing, and less time cleaning up. The simplest meal is the one-pot meal. You will find many ideas for one-pot meals in cookbooks focusing on slow cookers. These can be eaten directly out of the pot. Many cultures do this. A better choice than the slow cooker is the traditional slow cooking setup: the hay box.[94] Instead of an actual hay box, put the pot under the blankets of the bed. This also heats up the bed. Alternatively, use an old sleeping bag, or a cardboard box inside a bigger cardboard box with newspaper shreddings in between. The ideal pot for this is a pressure cooker because it naturally seals, but take the rubber gasket off or use an old one when in slow-cooking mode to keep it from wearing out. Pressure cooking also radically cuts down on time and fuel use as well as making some dishes much easier. For instance, I have never burned any of my rice in a pressure cooker because the heat comes from the steam pressure rather than from the bottom, which it does in a conventional boil.

Specific diets also influence the choice of utensils. For example, someone choosing to eat raw food only, a diet which can fulfill all dietary requirements, wouldn't need a stove but would need a dehydrator (it's easy to build your own), a blender (somewhat trickier), and probably a juicer instead. Such a person's kitchen would look quite different from the norm. Similarly, someone living close to the supermarket (see How to find shelter) and not storing more than a day's worth of perishables could eliminate the need for a refrigerator. After all, the refrigerator is a recent invention. The refrigerator could also be eliminated by changing ingredients. Shopping outside the refrigerated section also means avoiding meat and dairy products. Many fruits, vegetables, and tubers store without refrigeration for weeks or even months: Potatoes, sweet potatoes, cabbage, onions, garlic, carrots, winter squash, turnips, apples, oranges, limes and lemons. Others store for days: Bananas, lettuce, tomatoes, green beans, and

melons. Books on boat provisioning are a good source of this information, as are old cookbooks. This doesn't require a complete elimination of meat or ice cream, etc.; it just means only buying what will be eaten that day. All things being equal, not having a refrigerator will likely make one's diet healthier. Of course, not having a refrigerator doesn't mean not having a freezer. When selecting utensils, keep Appropriate response and Which things should I own? in mind. The modern kitchen is full of specialized junk that only serves a single function. Avoid this! For example, instead of putting your spoon or ladle on a spoon rest, put in on a (try to follow this) plate (see Building blocks). Instead of cooking rice and eggs in dedicated rice and egg cookers, use a pot. Instead of toasting bread in a toaster, use a cast iron pan with a cast iron lid.[95] Yes it works. Commit to a single knife. For most people, this is a short chef's knife, although if you're a vegetarian, a serrated utility/tomato knife is perhaps better. I've had the same $5 tomato knife for over 14 years now--best knife ever.

**Detergents, cleaners, and other household stuff**

I prefer to clean appliances and utensils immediately after using them. This means that after I'm done using a cutting board or ladle, I clean it immediately. Since the food isn't dry yet, this makes it very easy to clean and saves time. I try to do the same with general maintenance. Dirt and mess tends to invite more dirt and mess, so it's best kept from establishing a foothold in the first place. Another popular method is waiting for guests to come over and then engaging in a frantic overhaul of the entire home.

Most household cleaners comprise simple staple ingredients which you can mix yourself, but which are sold in fancy bottles with expensive advertising campaigns to an ignorant public for 10 times the cost. Since their basic ingredients are the same, their effectiveness is too.

The staples are ammonia, baking soda, borax, chlorine, soap, and clear vinegar. Just remember to *never* combine chlorine and ammonia. Otherwise, learn how to put the rest together, instead of relying on companies to supply them to you with additives at a higher cost. This only requires searching the web for "homemade X" or "DIY X" every time you need X. My last search was for oven cleaner; no problem.

# Transportation

Travel is the process of getting from A to B and transportation is the means of travel. Solving the transportation problem starts by strategically minimizing the distance between A and B, as described in How to find shelter. Successfully minimizing this distance permits walking and cycling. Not having a car saves a lot of money (see Driving) and moving around by muscle power increases fitness--countries show an inverse correlation between obesity and miles traveled under human power. This in turn can substitute for an entire cardio program by either running or doing interval cycling (pick a mile marker and go all out until you hit level 8) on the way home. If you planned the location of your residence relative to your work properly, it's not very far.

One strategy, is to think of cars as recreational vehicles, like I believe they were originally intended to be. As such, use them for tours on weekends and use your feet or your bike on weekdays, rather than the other way around. This requires a lot of discipline, so it may be better to get rid of the car outright and rent one on weekends.

### Comparing modes of transportation

Consider these times to reach a destination about three miles away:

- Walking: 45 minutes[96]
- Running: 25 minutes
- Cycling: 15 minutes
- Driving: 10 minutes

One reason that the faster methods are so similar is that a surprisingly large amount of time is spent waiting for traffic lights to change--even for running, it's probably 3-4 minutes. In particular, cycling and driving include time "preparing" the vehicle and parking it again.

I think one has to offer a fairly convincing argument to use a car rather than a bicycle just to save five minutes. Hauling is no argument, because one can easily fit a heavy-duty cargo trailer to a low-geared bicycle, which due to its open nature can haul as much as a truck, if not more. I'm not exaggerating: You could transport a big refrigetor with a bicycle trailer. Time-wise, I can even make the argument for running and walking rather than using a bicycle, especially if it's

raining, since proper maintenance requires spending 15 minutes wiping down the bike at the destination. The list above doesn't consider the time spent paying for and maintaining the cars, bikes, and shoes, respectively.

Suppose we make 10 such trips weekly, 50 weeks a year; that's 500 trips a year. This will take

- Walking: 22,500 minutes
- Running: 12,500 minutes
- Cycling: 7,500 minutes
- Driving: 5,000 minutes

According to government statistics, the average person spends 20% of his income on vehicles. The average person also works 2,000 hours or 120,000 minutes a year. 20% of that is 24,000 minutes. A bike can be had for $50 and up, so that's about 300 minutes of work to buy it, but let's say 1,000 minutes a year -- I think that's quite conservative considering how long a bicycle lasts. With daily rides you'll have a flat every third month or so and those will take 15 minutes to fix, so that's an hour a year. That makes it 1,060 minutes. Shoe soles are about $40 a year if walking and twice that for running, which costs maybe 250 or 500 minutes to pay for. Adding that we get the following numbers:

- Walking: 22,750 minutes
- Running: 13,000 minutes
- Cycling: 8,560 minutes
- Driving: 29,000 minutes

For a distance of three miles, the most optimal in money-time mode of transportation is cycling. It's interesting to note that driving a car is almost as economically efficient (time is money) as just putting your shoes on and starting to walk--it's likely that a big reason for this is that the car and oil industries are heavily subsidized. Keep in mind that this presumes you're always capable of making more money. If you're salaried, paid overtime is typically not possible. You can do a similar calculation based on the time you spend getting to your destination and the cost of your shoes, bicycle, and car, respectively.

## Driving

The thing that most Americans live for and which permeates the entire culture, the car, is an incredibly expensive piece of machinery, with barriers to

nonownership that must be dealt with emotionally and physically. It's likely that universal car ownership was one of the larger mistakes of American society. When few people have cars, cars means freedom. When everybody has cars, cars mean sitting in endless lines, emitting pollution, and not having a car means freedom. Many people are in such poor shape that they can't get anywhere under their own power. This is a physical barrier to nonownership. However, anyone can walk efficiently with practice. I still remember getting passed by several 60+-year-olds during a two day double-marathon walk--I had no training; they had plenty--happily marching along, commenting on the pretty flowers while I was dragging my 18-year-old sedentary feet along, only concentrating on the next painful step. Many believe that not having a car is unsafe, despite the fact that more people die in automobile accidents than are killed by guns every year. This is a mental barrier to car nonownership.

Next to housing cost, transportation costs are American's second biggest source of expenses. Car ownership has some or all of the following costs:

1. Depreciation, leasing, or debt servicing costs. Leasing or debt servicing costs are relevant if you don't own your car outright. If you own your car outright and you intend to replace it, depreciation costs become relevant. For instance, $12,000 for a car that lasts 10 years costs $100 a month. That requires $40,100 in extra savings (see this equation in Investing and reasonable return rates).
2. Gasoline and insurance. These are unavoidable if you want to drive your car anywhere, except perhaps downhill on backroads.
3. Opportunity and health costs from sitting behind the wheel when you could be exercising.

The average American spends 20% of his income on transportation. That is $0.20 \times 12 = 2.4$ months a year of work. That is a lot of time that could be used for something better. Assuming he also spends an hour daily in his car commuting, then that is 250 hours a year, assuming 250 working days. That is $1/8$ of the working day on top of the working day or $1/8$ of the working month on top of the working month. Hence, that is $12/8 = 1.5$ working months in addition, meaning we end up working four months a year driving and earning transportation funds.

Hence if it would otherwise take you six years of work to retire, if you own a car you will only be able to save $(12-4)/12$ as much, so your time until retirement would extend to $12/(12-4) \times 6 = 9$ years, or three additional years simply due to driving. If you calculate 12 years until retirement, then you're really looking at

18, or six more years.

Giving up the car makes sense. First you'll save money on exercise. Driving your car over to a gym to run on a treadmill, then driving back again is inefficient at best. If walked or biked to and from work, not only would you save the money otherwise spent on a car, you'd also save the money normally spent on a gym membership. Many people past college age completely ignore physical fitness. It seems like a degree and a career also serve as a subscription to physical decline. If you're going to retire early, it will be sad to sit on the couch all day, being shut out of physical activities due to a belief that weakness comes from age.

I'd consider it normal to--without preparation or prior training other than a daily commute--be able to run five miles, walk 25 miles, or bike 50 miles. Perhaps these numbers sound insane. This suggests a large chasm between the frame of mind of someone who gets around using gasoline, and a walker, runner, or rider who gets around under his own power.

Walkers easily travel three miles by foot. Drivers get in their cars to get from one side of the parking lot to the other. Neither quite understand why the other is so crazy, when it's so easy to do things their way.

Not having access to an automobile means rediscovering the art of planning. Do your shopping in fewer trips, or alternatively plan to live closer to the market. I used to shop every other day on the way home from work, which meant I could buy food with fewer preservatives and chemical additives. Interestingly enough, it seems that as long as you know someone who is going the same way, they are usually happy to offer you a ride. Don't forget to extend favors in the other direction, like offering to pay for gas.

"But what about the children? Surely they need to be ferried around." They need to live close enough to their school that they can ride a bike or walk or take the bus (consider this in How to find shelter). Good habits are best started early. Consider a trailer bike. Consider walking them to school, or at least to the bus. When I was a kid I lived two miles from my school, and my mom walked me back and forth for the first year. When you're free from your job, you'll have time for this--it's a meaningful thing to do. It's, in my opinion, better than working for more years so you can drive your kids back and forth in a van.

**Affordable driving**

An enviable alternative is fixing up classic cars or motorcycles, which can make costs close to zero. This is done by buying a fixer-upper at the lower end

of the price range of the depreciation curve for a given year, fixing it up, and selling it at the upper end a few years later, making the holding cost close to zero, or perhaps even positive. This way you can achieve transportation as well as income, whereas cycling and walking achieve transportation and health. Of course, you could do the smart thing and fix up bicycles. It doesn't pay as well as auto repair, but you get transportation, money, *and* health (see A web of goals).

## Walking

To a large extent, weather is all about attitude and the right clothes and shoes. I grew up in a place where it probably rains 200 days a year, and consequently I have more than a handful of different words for different types of rain. Conversely, a few raindrops in a dry area send people scrambling for cover. Similarly, one inch of snow in a place where it never snows sends cars careening all over the place. Getting caught in the rain is really like a bear attack. Don't run! The reason is that due to aberration, running will cause the rain to come in from the front, thus exposing a much larger area of the body. If you walk, it'll mostly come from above, and only the shoulders and the head will get wet. If it's not windy, use an umbrella. It might be unhandy or uncool, but not even the best `tex-materials can beat an umbrella for breathability in this situation. Don't get one of those fashionably huge umbrellas. For handiness, the smaller the better. For instance, I can fit my telescopic $5 umbrella in my chest pocket. Even without an umbrella, it's possible to walk for about an hour and only get the top part of the jacket and maybe the shins of the pants wet.

If it's rainy and windy, the problem becomes more difficult. The umbrella is now useless: if deployed, it'll blow out shortly. `Tex shell jackets are great. I prefer the three-layer type which comprise a liner, a `tex barrier, and the outer shell, which is typically treated with water repellent. The two-layer jackets are slightly lighter, slightly more expensive, and, I suspect, slightly less durable. They use a special treatment on the `tex layer so that it doesn't need to be protected by a liner. I got my jacket about 14 years ago for around $400 or $500 and it was completely worth it, being presently amortized to about $40/year. Having an absolutely windproof and breathable jacket feels much better than an insulated nylon jacket. If the outer shell is waterproofed, it's sufficiently water resistant to take a shower with. If it's not, water in the soaked shell will slowly diffuse "around the corner" at the sleeves and creep up on the inside. Also, the `tex will no longer be breathing, although it's still practically waterproof. I picked an all-black jacket, because it works better for business casual than signal colors--if that is not of concern to you, I would advise offshore foul weather gear

because of its superior hood and collar. Two things to consider: First, a big hood--check to see if it holds a bike helmet; a jacket designed for military use likely will--and preferably one that folds into the collar to retain the business casual feel. Most hoods on cheaper jackets are so small that buckling up means having the hood directly on your skin. A good hood should have the appearance of a small astronaut helmet. Large pockets are great. I can carry one umbrella, two bananas, a large pair of gloves, or a handheld 2-meter transceiver in my inside pocket. It's huge. It also has a drawstring to adjust the waist and the bottom. When it rains, the bottom should be wide. If it's snug, water will just run onto the pants. The waist doesn't matter in terms of rain. Generally, if it's cold, the waist should be loose. If it's warm, it doesn't matter. Most shells will have the option for a zip-in fleece. Get a liner that fits the zipper. Often it doesn't have to be the same brand, as long as it fits. Pants are much less important than one might think. Unless we're talking heavy rain under windy conditions, jeans are perfectly alright. Remember, when walking, rain comes mainly from above. Therefore, cheap rain pants will do. The problem here is that moisture from the inside will get your pants wet anyway. Therefore I often prefer to wear a loose set of pants on top of my regular pants. Jogging pants work fine for this. They do get wet, but since they are loose, the water doesn't transfer to the layer below. One important point is not to tuck the pants legs into the boots or socks. The bottom of the pants will get wet and transfer to whatever they touch.

Depending on the level of flooding, hiking boots are recommended. If you're walking regularly, I'd get a pair anyway. Personally, the quality I demand doesn't cost less than $200. The cheaper ones only last a couple thousand miles before the seams start breaking. My current pair of boots are almost as old as my jacket and I've walked many thousands of miles in them. This means an annual depreciation cost of about $20, if maintenance is expensed separately. They are full grain leather. I don't like nubuck because it doesn't last as long and it doesn't survive long against rock, in the case of serious hiking. It goes without saying that I'd never get anything with nylon in it. My boots have a stitched Norwegian welt. Stitched welts are getting hard to find these days since $100 glued sole boots sell better, but some companies still make them. If you get a chance to buy a pair, jump on it--maybe buy two or three pairs so you're covered for life! Having used a lot of leather fat and polish, I've made mine quite water-resistant and wouldn't think twice about walking through a two inch deep water puddle. Find a good cobbler who will put in good replacement soles, preferably the same as the original soles or better, rather than a cheap sole that has to be replaced again in a year.

This outfit should work for most situations. If you walk a lot or commute by

foot, it works very well in cold/wet temperate climates. So if such a climate is in your future, start substituting into them the next time a garment or some footwear breaks down.

### Running as transportation

When I first came to the US in 2004, someone asked me if I rode bicycles. I replied in the affirmative, and then I was asked whether I liked to ride for fun. "For fun?" You see, in the US people mainly ride bikes recreationally, whereas in Europe people mainly ride bikes as a form of transportation. This partially goes to show how deeply ingrained the association of certain modes of transportation are with certain activities. Further, in the US walking is something you do inside the mall, and in Europe walking is something you do to get to the bus stop. However, when it comes to running, both Europe and the US are similar in that running is a recreational activity. However, for the fit person who wouldn't break a sweat from jogging a couple of miles, running could easily be a way to get from A to B which is as simple as walking--you only need a pair of shoes--but 2-3 times faster. For short distances up to three miles, it's almost as fast as slow cycling because it takes a few minutes on each end to get the bike out and ready. It's possible to run with small loads using a backpack. If the backpack is loaded with more than a dozen pounds, however, normal running becomes destructive to the knees. Instead, run in a gliding fashion, keeping the knees close together and always one foot on the ground.

It would thus be possible to literally *run* small errands, like picking up small items from the supermarket, and anyone who does this on a regular basis is bound to end up with sustained low-intensity endurance and a resting pulse lower than *50* beats per minute.

If you managed to arrange your residence to be less than three miles from anything, you wouldn't even need a bicycle. In that case, I would walk to work, which would take 60 minutes that could be used for meditation, brainstorming or calculating your passive income from your savings in as many ways as you can think of, and then run home, which would take about 20 minutes. When shopping, I'd run with an empty backpack and then walk a full backpack home. It is a more minimalist approach than the bicycle option.

## Cycling

Statistically, cycling is about as dangerous as driving a standard-sized car--

SUVs are a little bit more dangerous because of rollovers and the increased difficulty of swerving out of the way in a bigger vehicle.[97] However, many bike riders are killed because they ride in the wrong direction or on the sidewalk. A particularly lethal combination is riding the wrong way on the sidewalk; a turning car will never suspect you're coming. Avoiding these bad habits, most likely learned while riding around on trikes in suburbia as a child, will make you safer riding a bike than driving a car.

On top of that, you must ride defensively; just presume that the other drivers are out to kill you because they don't know any better. A five foot tall teenager in her dad's supertruck literally might not know any better because she can't see you over the side window. Try to get eye contact with other drivers. They will mainly be looking for other cars; if you have not established eye contact, you can "safely" presume that they have not seen you and that they will go right out in front of you. Be courteous to other drivers, and in turn they will be courteous to you.

In terms of taking lanes, remember the following two rules:[98] 1) Ride with the cars (be in the correct turn lane). 2) The faster you go relative to the speed limit, the more of the lane you should take. If you go 15mph and the speed limit is 15mph, you should be close to the middle of the lane. If you go 15mph and the speed limit is 55mph, you should be close to the edge of the lane; once you go downhill and start pushing 40mph, you can start taking more lane. This automatically avoids you getting squeezed and it puts you in the right position during turns at light crossings. Speaking of light crossings, a regular rider on a well-geared commuting or road bike (not a cruiser or a mountain bike) will easily be able to out-accelerate any car starting from a standstill when the green light changes--trucks in particular won't be able to catch up until at least after 100yards or so. A sedentary rider generally won't be able to do this. Doing so represents both a physiological challenge, a perceptive barrier, and to some extent a safety problem for beginners--get off the bike and use the crosswalk if in doubt. Never ride across the crosswalk; it's illegal, dangerous, and annoying. Riding an underpowered bike, or more accurately, riding a bike underpowered will decrease one's confidence as much as driving a significantly underpowered motorized vehicle.

If it's cold, move faster, or add a layer. Experienced people tend to start out underdressed, knowing exactly what their moving "comfort level" is. Comfort can be achieved by moving faster or slower.

If it's warm, the problem becomes more difficult. It's very common to be "air-conditioned" to low heat tolerances. What happens is that air-conditioning

makes sweat glands ineffective as they're never called into use. This means that when moving outside in the hot air, more blood has to be directed away from the core and the muscles to cool the body. If the skin becomes flushed when exposed to warm temperatures, that is a sign of air-conditioned sweat glands that have been rendered ineffective. This leaves less blood for the muscles. In effect, living with air conditioning is like exercising after eating a big meal, in which case the blood would be around your stomach area. This effect can be dramatic. For instance, people who are used to training hard, but indoors in air conditioned buildings, run out of energy and oxygen very quickly if they have to repeat the feat outdoors in 30C (86F) or higher temperatures because their circulatory system simply isn't used to the extra load.

The best type of bicycle for commuting is probably a touring bike, as it goes fast, far, and carries a load. The ideal frame is steel. Steel is durable, and unlike carbon, it doesn't fail catastrophically. If you're going to commute by bicycle, don't be afraid of spending a couple thousand or more on a bicycle. If you maintain it well, it *will* last you the rest of your life. After all, most people spend more on their cars, which generally only last about a decade.

# Services

In a service economy, people pay other people to raise and teach their children, grow and cook their food, build and maintain their homes, make their clothes (you still get to pick your own unless you hire a personal stylist), etc., mostly things that we could do ourselves.[99] In return, we get to spend our time working at a job, doing the same thing most of the day. This arrangement follows from the economic law of comparative advantage, which is supposed to make everybody better off economically. There are, however, parts of life that are difficult to measure economically because there's no market for them. There is, for instance, no market that can price in the cost of happiness, yours and theirs, in not raising your own children. Worse, this arrangement fixes an identical price for everybody. This is great for the accountant who gets paid $100 per hour, allowing him to purchase lots of services with only one hour's pay, and bad for the hairdresser who gets paid $10 per hour. It would make financial sense for the hairdresser to serve himself for any kind of service that has a higher hourly wage than what he is paid.

## TV, cell phones, and other money sinks

As mentioned earlier (see How to get things), many products have been turned into service arrangements, where a company will provide the "hardware" for free or at a loss-leading price in return for a contract buy-in. Such services--TV, phone connections, etc.--are mutually substitutable goods and it doesn't cost the company anything to keep you on the plan; they just rake in the money. If the cables are already in place and all that travels on them is information, more information isn't going to cost much energy. Companies therefore spend large amounts of money trying to tell you how their service is different (see A comfortable addiction), because it actually is not. This means that once a customer has been hooked, the companies will try hard to keep him on, since the advertising costs are sunk. Thus, if you ever want to deal with a service company, simply ask to speak with their retention department to negotiate a better deal.

### Cell phones

Opinions are strongly divided--I have my opinion, everybody else seems to

have a different one--when it comes to cell phones. No less than a decade ago people did just fine without them, yet cell phones have already turned into a "need." Aside from providing an opportunity to share the most mundane details of one's life at all times, cell phones have created the opportunity to engage in activities without any prior planning whatsoever. Cell phones have provided a false sense of security and the ability to disregard precautions, like bringing a map. If you're having trouble letting go, talk to an older person (over 25) about how they used to get around without them.

If you must have a cell phone, I suggest a pay-as-you-go plan. This should not cost more than $15/month. Don't get suckered into contracts. The primary reason for having a cell phone isn't to call your friends and tell them you're on your way; it's to call 911 in case of an emergency. Cell phones have this capability without a contract! If you need to make a real phone call, say, to your bank, use a VoIP phone service. Don't rely on VoIP for emergencies; it's not sufficiently reliable.

### Internet

I have many good things to say about the Internet. To the Renaissance man, the Internet is like a super-advanced library/meeting place where it's easy to find like-minded people[100] as well as instructions for doing and making most things yourself. It's also a great way to waste a lot of time. These days, many websites--my own included--are full of advertising to pay for operating costs. However, it's also quite easy to avoid having to suffer the barrage of ads by using any one of the many adblocker plug-ins. In many cases, this will substantially speed up the load times of a site, which means that one can go with slower connections than otherwise believed. In fact, switching off all images tends to work really well on text-dominated sites like newspapers and blogs. Go ahead, I won't mind.

### TV

I have nothing good to say about TV. While I can't prove its universal disutility, I think not having a TV, or at least not watching it, is a big factor when it comes to choosing unconventional paths. Naturally, there's this popular idea that TV feeds the masses with certain values, but I believe this is exaggerated.[101] Most programming offers fairly reticent opinions and is quite free of actual content. The great beauty of TV is therefore not so much that it acts as a form of active propaganda filling people with new ideas, but that it keeps people from

having new ideas in the first place.

When TV was invented, it was thought to be a great opportunity, a great teaching tool for quickly reaching the masses. However, ironically, it turned out that TV was much better at keeping people from learning. This fits perfectly with the focus on specialization. During the day, professionals attend to their jobs. During the evenings, they vegetate in front of their TVs, thereby prevented from learning anything, and this effectively keeps them in their jobs. Actually, the closer you get to middle-class values and neighborhoods, the greater the preponderance of silent streets; all you see in the evening are empty streets and a faint blue hue emanating from behind the curtains of every house.

In my experience, by going cold turkey, it takes about a week to get rid of a TV addiction. There's no pain, save an empty spot in the room and perhaps the loss of hundreds of imaginary friends (mostly detectives, doctors, lawyers, and spaceship captains) you have vicariously lived through yet learned nothing about. If you still need your fix, you can swap, borrow, or rent DVDs and watch those instead.

## Money, credit, and insurance

I'm not a big fan of automatizing personal finances. In my opinion, the only thing worse than automatic control is no control. The former is, however, a large improvement over the latter. The most important reason for this is that automatic procedures eventually fail. A missed automatic transfer due to some institution changing their procedures might result in cascading failure of everything linked to that account. When this happens, companies love to slap you with exorbitant fees.

The systemic problem is forced complexity and tight coupling. You can't get rid of the forced complexity without giving up automatization. However, you can decouple by keeping a buffer amount in each account comparable to the maximum amount you have/will ever withdraw from the account. Keeping all these buffers has opportunity costs, but think of them as a cash reserve that could be used elsewhere, if you cancel all the automatic systems.

### Credit cards

Credit cards are mostly a nonissue in the Renaissance lifestyle. The rich may use credit, but the wealthy don't. Leave rewards, cash back, and frequent flyer miles to consumers and high spenders. If you never carry a balance, as nobody

should, negotiating interest rates is irrelevant. If you spend less than $4,000 a year using the credit card, selecting the "best card" is a waste of time as far as I'm concerned. The only reason I have a credit card is to pay for things online with a modicum of protection against identity theft.

Cash back is slightly worthwhile and comparable to the free float of the balance you run up. Suppose you spend $300 a month; then 1% cash back will result in $36 a year. The $300 float can be invested at, say 10%/year, which yields $30. Obviously, the $3,600 which is spent during this process is gone. Spending money to get rewards is never profitable.

People in the US have to deal with a secret formula, the so-called credit score, which attempts to evaluate their credit risk based on previous behavior with debt. I see no reason to engage in credit behavior based on superstitious beliefs about a formula which is secret. Credit scores are irrelevant because obtaining a loan is irrelevant. It's perfectly possible to save up enough money to buy a small home and buy it in cash, 100% down. To determine whether it is worthwhile, just compare your portfolio's return on investment to the cap rate of the real estate you're buying. The only case where credit scores may be important is in obtaining insurance or a job. If this concerns you, get a single card and pay the balance off in full every month. That is what I do. It doesn't result in the top scores like those who have enough credit to go $50,000 in debt overnight, based on a decade of regular payments on massive balances. On the other hand, it is not subprime either.

**Insurance**

The way insurance works is that a company takes premiums from a pool of people and pays it out to those who have accidents and make claims. Actuaries are generally very good as estimating how accident-prone groups of people are, and the difference between take-in and pay-out is generally low (this is also known as the combined ratio). Insurance companies thus make their money by holding your money, called the float, and investing it for their own profit.

Since the insurance company is willing to take the bet in return for the proceeds from investing the float, it means that you should not take the bet unless your financial loss would be catastrophic--or you know better than the actuaries. Furthermore, you also have the opportunity to proactively reduce the risks. If you think about the potential consequences of everything you do--that is, careful--you can substantially reduce your risk. On the other hand, if you know your behavior is risky, paying for insurance might be worthwhile, unless the

insurance company also knows this, in which case they will simply charge you more.

Many insurance plans are better thought of as financing than insurance. This holds for insurance plans that pay for regular maintenance such as health and dental. Here the cost of the maintenance gets added to the premium along with a profit for the insurance company, similar to how a credit company collects interest. They would not offer these fully loaded plans unless it was unprofitable for you.

Preventing catastrophic, that is, irrecoverable losses is the only reason to carry insurance. Effectively, this means carrying as high a deductible as possible while at the same time having enough funds, which you can invest, to cover losses up to that deductible. Oftentimes, people carry too much insurance simply because they don't have the money on hand to cover the deductible. This shouldn't be a problem for you though, and so you'll profit. Another common argument is that the monthly premium is low. This is like saying that a stock is cheap because it trades for $3. This argument is common for renter's insurance. However, this is a case where it should be easy to have the funds to replace anything that was lost which can be bought. Especially when considering the methods in How to get things. Furthermore, it saves the hassle of battling the insurance companies, which have a habit of routinely denying the first claim.

Some insurances are not necessary. Once you're financially independent, you don't need unemployment insurance. You don't need life insurance, as your estate's assets can simply support another dependent. You don't need disability insurance since you don't need to work to live. If you don't have a car, you don't need car insurance either. If you own your home outright, you don't need "home mortgage holder's" insurance. If your home comprises a substantial part of your assets (not a good idea), you would want to carry some form of insurance, as a loss would be catastrophic insofar as you would not be able or willing to save up the money to buy a new one in a few years.

Whether or not to insure should be a rational decision based on one's risk of loss and ability to survive the loss. Most of us don't insure our clothes or tools. For a financially independent person, this will extend much further since almost everything can be replaced many times over.

# People

Voluntarily stepping out of the consumer cycle and saving enough to replace one's job with investment income instead of working isn't "normal." The great majority of people do neither, and those who do one almost never do the other. Anyone not consuming as much as possible tends to do so out of external necessity and thus doesn't have savings to invest. Anyone investing for income tends to have plenty of money and thus consumes at an average if not above average level. There are few doing both; most do neither.

To do both requires navigating four types of people (see this figure). As before, the types may overlap each other and should be thought of as archetypes. The popular consumer culture represents the dominant type. Being surrounded by this culture around the clock makes adopting its values almost unavoidable. Indeed, you may have to deal with your "inner consumer" from time to time questioning you. This culture measures success in terms of status symbols like things owned or number of visits to exotic places, awards, job titles, *etc.* One's value is measured by salary--a marketing executive is more valuable than a schoolteacher--or what something costs. Often, new things are valued more than used things--shrinkwrap in particular significantly increases perceived value. But popular opinion is only rational from its own internal perspective; consuming for the sake of consumption.

By choosing not to strive for these things, those who do will feel judged or be led to question their choices. This is largely their problem to deal with, but it will also turn into your problem, insofar as you have to deal with concerned inquiries about your material comfort level or their trying to rationalize their choices. As noted above, you may ask yourself questions like, "Can I really be comfortable with only one bathroom? Don't I deserve two?" or, "If I can't identify with a job title, like assistant sales manager, who am I really?" On the other hand, it is possible to find other people pursuing frugality or voluntary simplicity as well as people interested in investing. If you prefer to avoid confrontation, keep a low profile when it comes to this area of your life.[102] Don't mention that you also happen to manage a six-figure portfolio to your "voluntary simplicity" friends and don't mention that you only have one bedroom to your investment friends unless you're prepared for the resulting discussion.

## Spouses and significant others

When writing and talking about this lifestyle, the most common lament I hear is that, "This would be a lot easier if I was single." Technically, this is not true: Due to economy of scale, two or more people working together towards homeotelic goals will always be better off than two people working separately (see Contingency goal-setting).

Today, society has reached a level of wealth that has made the economic benefit of living in a community or a tribe, and, to some extent, even a family, unnecessary. This is partly why there's a growing number of singles; the economic inefficiency of, for example, two people having twice as many refrigerators than a couple, has become affordable. The main problem is therefore social. In fact, some people have told me outright that they could never live in a space as small as we do (currently two people in 289sqft) because they can't stand being in the same room as the person they married for extended periods of time, or they can't deal with the idea of their children playing in the same room they're in. I'm not making this up. Material wealth has made it easy to avoid having to develop any social skills or flexibility.

I think it's rare to find two people who agree on everything, and who stay that way; at least that is what divorce statistics suggest. Fortunately, it's possible to reach a degree of compromise that allows one person to live this lifestyle and the other person to live a regular consumer lifestyle.To live together, a couple has to agree on certain things, like not signing up for debt, and how much to spend on common items like housing. A compromise must be reached. For other things, whereas it would be nice to agree on them, like where to squeeze a tube of toothpaste, whether to have a TV or a car, it's not a crucial issue.

Unless you possess superior persuasive skills, it's no use arguing. Most people (and especially children) will follow your example rather than your suggestions, if they follow at all. Children will follow practically any example (and believe anything you tell them, so be careful there), but adults are calcified already and usually want to follow their own example rather than yours, unless it becomes clear that your way is better. This means you have to demonstrate that there is a viable, credible alternative. Once your spouse, or any other person you're trying to convince, is ready, he/she will generally come around very quickly. For instance, you may build up a savings account or what people with bills, job-dependence and other liabilities call an emergency fund. It is very rare for someone not to see the sense in that. If your spouse is already familiar with the concept, start talking about how your "emergency fund" will support you for five years, say, and that you're thinking about switching careers or taking a long hiatus. A five year fund is in another category altogether. It is qualitatively different, because it gives you many more opportunities in comparison to the

mere breathing room a traditional emergency fund provides. A normal six month fund is only designed to pay your bills while you go and look for another job because you just got fired, or carry you over while on an extended sick-leave. Those who focus solely on these problems will have a hard time wrapping their heads around the larger timeframe and additional possibilities. However, if your spouse's emergency fund is only the standard six months, but she is beginning to think that her current life path sucks, she'll most likely start saving more so that she'll have the same options. If your accounts are joint, say you would prefer to save the money whenever she proposes an additional expense. Suggest that you split some money into his and hers, and if he wants to buy something, fine, but you reserve the same amount of money for savings. After a while, you can start talking about the interest you're earning. One thing that tends to get people going is when I talk about how the money my savings generates on average corresponds to a full-time minimum wage job, and how that essentially means that the person is working for me. That seems to get people thinking--yes?

If you want your spouse to adopt some change, another thing to try is to find something they are familiar with. For instance, my wife couldn't see herself living in a tiny house less than 150sqft (my original plan), so I started talking about boats. Then a reader of my blog suggested living in a motorhome. Unlike me, my wife had actually been in an motorhome and lived in a mobile home park at some point, so she was familiar with those and was much less resistant to this idea. Had she not been, I guess one way would have been to start camping and make the trips longer and longer, after which I'd combine this with the suggestion that if we started camping full-time, we could cut our budget in half. Often, it is merely a question of exploring all alternatives. You just never know.

Try acquiring a majority of your stuff through swapping or freecycling. This might make your spouse reconsider the idea of paying for things, especially when he/she sees the envelopes arriving by mail or when you come home with a leather jacket, proudly announcing that you didn't pay for it or that someone else is now using those rollerskates that took up space in the closet. Get furniture used and make this your norm. Mention that this month your expenses were completely covered by income from your investment accounts. Volunteer for housework. The golden rule of volunteering is that the volunteer gets to do it his way. If you want to eat better for less, volunteer to cook. If you want to save money on cleaning supplies, start making them yourself. This takes leadership abilities, but if not you, then who?

None of this guarantees success, but maybe, just maybe someday your spouse will have a problem that is best solved using one of your solutions, and you'll be right there.

## Children

Sometimes the question of children and how they factor into extreme early retirement comes up. We don't have children, so what follows are my purely theoretical thoughts on raising a child and how it would impact early retirement, and the child.

Most importantly, it should be realized that children don't spend a lot of money; rather, their parents do! This means that raising a child costs as much as you can afford. It is certainly possible to clothe and feed a child for $100/month just like it is possible to clothe and feed an adult for that amount. Beyond this, all they need is love, learning, activity, and responsibilities. You can either pay for someone else to provide this or you can provide it yourself. Most arguments will originate in the belief that it is normal, needed, or even desirable to pay someone else to provide these services.

I believe that having a stay-at-home parent is a very good idea, and I don't think I'd want it otherwise. I had a stay-at-home parent myself. My mom stayed home full-time for the first six years of my life and after we started going to school she took a part-time job, so we never came home to an empty house. This naturally goes very well with the idea of early retirement. Not only does financial independence and early retirement automatically allow for someone who stays at home; it doesn't delay the working spouse from early retirement in the sense that they don't have to provide for two people, since the retired adult is already providing investment income. This is also a good argument for achieving financial independence *before* having children--it only takes five years!

I wouldn't send my children off to cello lessons, travel soccer, or preschool where they could pretend to be intellectually stimulated at a rate of $1,500/month by learning a few words of Mandarin. I suspect children cost exactly as much as you're capable of spending. You can buy their clothes at thrift stores, just like you buy your own, or you can buy designer outfits for them just as you buy designer outfits for yourself. Their entertainment can match your own. I don't believe in the necessity of everybody having their own room. Again, this comes down to social skills. Sharing used to be normal; ask your parents or grandparents. There are certainly happy families on cruising boats where nobody has their own room. It can be done.

Essentially, love and caring would be demonstrated through spending time together rather than spending money. I would make sure they did their homework. I would encourage inexpensive and creative hobbies. There would be chores in the form of housework since everybody would contribute in their own

way. I would certainly not try to fill their schedule with leadership activities and other brouhaha for their application to Brand Name University. I would make sure they did their homework, but I would let them make their own mistakes.

I don't think I would pay an allowance, but I would hire them to do work not associated with the household. Whenever they got a money gift (birthday, Xmas) or any income whatsoever, I would make them put 50% into savings and let them spend the other 50% as they wished. I would let them spend the interest of their savings account, hoping that they got the point. Once they understood the point of this exercise, the decision would be up to them. In the end, I would not be able to make the decision of whether they should be salary men, working men, businessmen, or Renaissance men. That would be up to them.

Naturally I'd also educate them on life skills that they don't get from school. They would know how to read a balance sheet, double dig a garden, put up a shelf, and fix a flat before turning 18. Again, the decision whether to spend money on this later on would be theirs.

Speaking of school, I would concentrate on the early years (primary) rather than the late years (trade school / college). Generalized skills, such as work discipline and the multiplication table, learned early are far more important than a course in Ancient Egyptian Algebra, in my opinion. I would strongly encourage that they learn a trade (machinist, engineer, accountant, nurse, etc.) before going for their education (English literature, history, political science, mathematics, etc.). This would make it possible to work their way through college and always have something to fall back on. I would probably not pay for a college education, but they would be free to stay at home until they finish. I'd recommend a state university and make them fully aware of the consequences of being in debt up to their eyeballs should they insist on a brand name college.

In conclusion, I don't believe that adding members to our household would materially change the possibility, form, and implementation of financial independence.

# Foundations of economics and finance

An ecosystem has four components, which form a cycle: Abiotic (resources), producers, consumers, and decomposers. Modern economics only considers two of these relevant: producers and consumers. It ignores the finite[103] abiotic resources and presumes that their only limit is the producers' ability to turn them into commodities. Similarly, consumers and producers ignore decomposition. Once our waste and detritus is dumped into landfills, lakes, rivers, and the atmosphere, and is out of sight, it is, for all intents and purposes, out of mind. Meanwhile, the finite planet is running out of its finite resources (duh!) and pollution keeps increasing and is starting to bite back. Typically, the economists solve this problem by waving their hands and mumbling something about substitution and human ingenuity. However, it's obvious that our cultural paradigm is incomplete and that resources and decomposition capacity can no longer be considered infinite.

Naturally, the economy can't keep growing without killing itself if the cycle isn't completed. If the cycle is not completed, we're either going to run out of resources or drown in pollution. If a decision is made to solve this problem, the size of the economy would be determined by how efficient the cycle is. Given the enormous size of the human population in relation to the renewable resource base of Earth, completing this cycle and preventing leaks will be to the 21st century what the Cold War was to the 20th century. In this book we're not focused on the necessary policy decisions, but rather what the individual decisions should be. An economic system has trophic levels like an ecosystem with groups or socioeconomic strata feeding off each other. In a growth economy, there are workers, organizers of workers, owners of assets, and owners of land. In a complete ecology, there are abiotics, producers, consumers, and decomposers.

Humans are sufficiently adaptable to execute any of these roles in either system. Economic decision-making must be expanded to include all these factors. Until such an understanding is codified into human behavior via law, religion, and values, something that those who profit from the current setup are not apt to do anytime soon, individuals need to act as if such a code already existed, since economic decision-making eventually does catch up to reality. The

economy has many unrecognized inefficiencies--it is, for example, possible for more people to play the role of decomposers (recycling, upcycling) and producers as well as becoming less dependent on abiotic resources. The challenge is to do this within the existing framework. Net savings--lifetime income minus lifetime expenses--equals a person's contribution to society. It illustrates how much the person has given versus how much the person has taken on an economic basis, as measured in money. Using the saved money, it's possible to acquire productive factors by trading. In a less specialized society, imagine having spent the time building and accumulating tools and other productive factors that make work more productive. The same society also allows for a conversion of tools back into money for spending. It's a more abstract way of arranging matters than building a shoe-making machine which is capable of outputting a lifetime of shoes, rather than having it output a pair of shoes every decade after the previous pair have worn out. "Investing" is simply the process of putting this idea into practice. An "investor" is thus a person who lives from his assets. A capitalist is an "investor." A hunter-gatherer, who has a way of life that has survived for tens of thousands of years, is to a large extent also an "investor." "Investing" typically requires a great deal of knowledge and familiarity with one's assets. Conversely, "working" requires a great deal of energy and vigor. This is why hunter-gatherers protect their old and why farmers historically have focused on having many children. From the worker's perspective, an industrial society is closer to the farming community. In this case, the crops are people, specifically the products made by people. From the investor's perspective, it's the capital market that is of primary focus. Here experience and wisdom are more important.

For an investor, the start of financial independence includes a strong vision of one day creating a metaphorical forest and living harmoniously with the forest. It starts by planting seeds. These seeds grow into saplings and the mind starts connecting the vision to the upcoming reality of a mature forest. When you live for the future, your present will very much be determined by the actions of your past. Hence, you'll only live in a forest if your past self at some point decided to plant the seeds.

Contrast this with living for the present, in which case your future will be uncertain. A person living in the present would very much like to cut down that forest as soon as possible and turn it into paper. A future-oriented person would carefully try to preserve his principal asset, the forest, and only cut when necessary, living off the trimmings. He would think of his wealth as the amount of wood he can get by trimming, not the amount of wood he could get if he cut the forest down. Unfortunately, so many people see it differently. That is why

they keep working to both cut down existing trees, as well as planting seeds and cutting down the saplings as soon as they get the chance. They don't see the freedom that the mature forest offers. The entire focus is on maximum wood production in the present rather than minimum effort in the future.

This frame of mind is pervasive. Retirement is seen as spending hoarded savings, and survivalists tend to focus on stocking up on tools and supplies. Rather than forming an environment which can sustain them, they accumulate assets to survive in an environment that isn't conducive to their living. Conversely, a hunter-gatherer lives in an environment conducive to living. The traditional hunter-gatherer works 15 hours a week to gather resources from his environment. With our level of technology and understanding, we can gather resources from our environment more effectively and only work a few hours a week, or part of the year, or develop enough assets to no longer work at all, letting others do the work.[104]

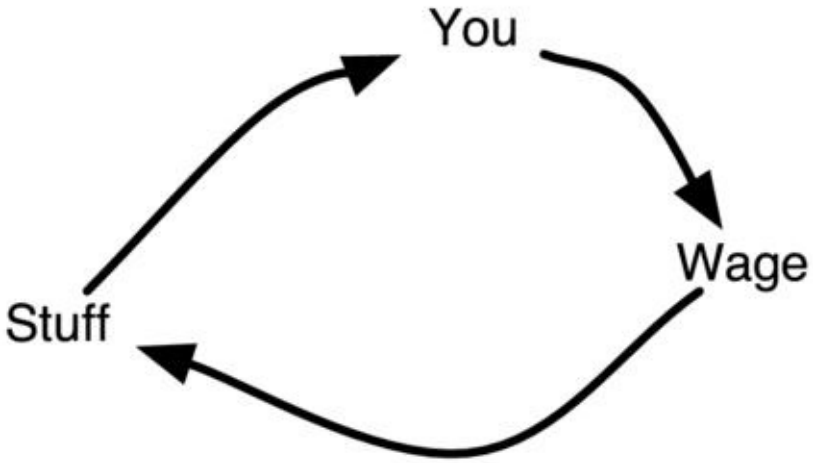
**Personal economics**

Personal economics is the study of the principles of how individuals can most efficiently acquire resources, create and derive utility, and decompose or dispose of the resulting waste in a way that turns it back into resources. Ideally, society would be set up in a sustainable fashion, so that the material cycle runs in a stable, nongrowing fashion with no losses. In such a system, waste wouldn't be a problem, since it would serve as resources for the next cycle. For example, leftover food would be composted and turned into fertilizer for the next harvest rather than ending up in landfills. Bags, houses, and even computers could be disposed of in a similar fashion, serving as raw materials for the next evolution.

Currently, this is far from the case. Modern living mostly involves producing products, consuming them, and throwing them out, with money driving the cycle. Now, it's possible to completely avoid dealing with this part of the economy and never set foot in a shopping center or pay for anything with money. However, although interesting, such self-imposed constraints aren't optimally efficient. As bad as the normal consumer economy is, it has its good points, so some interaction is desired or even necessary. The more interaction with the local economy by systems thinking people--and the reader should be one by this point--the better the likelihood of societal change. This interaction requires money, and so it requires some means of acquiring money. This can be done in two ways: "You working for money" or "Money working for you." In a money economy, the flow of money is a bit more complicated than this.

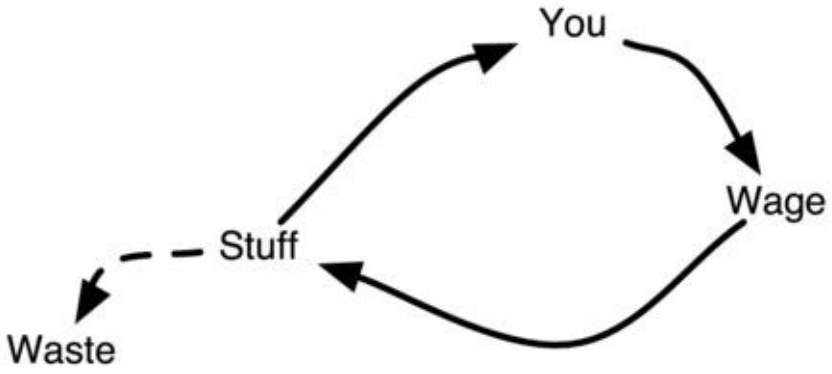
# Financial cash flow cycles

This section describes the different ways money flows for different people operating within a free market economy. This figure shows the simplest possible financial cycle for a salaried person. Here *you* work which results in a *wage* which you spend on *stuff* which *you* consume. Here *stuff* represents actual stuff, as well as services like dental work, car insurance, and so on. This is the work-spend-consume cycle described in The lock-in and The salary man. The work-spend-consume method is a very simple way of managing finances. There's only one source of income and it's impossible to spend money that hasn't been earned. All you need is a job and a bank account. If the employer pays in cash, you don't even need a bank account.



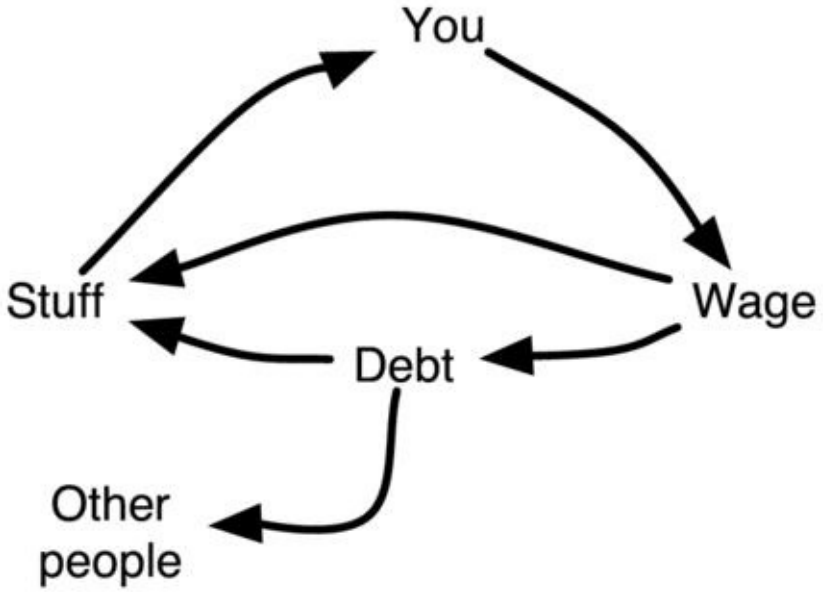

The cash flow of someone who works for a living.

Running the cycle produces *waste* as shown by the dashed arrow in this figure. While some think that more waste means more "living," it's clear that the more *waste* which leaves the *stuff* area without being consumed by *you*--for example, superfluous bedrooms, time spent commuting, clothes never worn, things collecting dust on the shelves--the faster the cycle must run and the harder or more *you* must work.



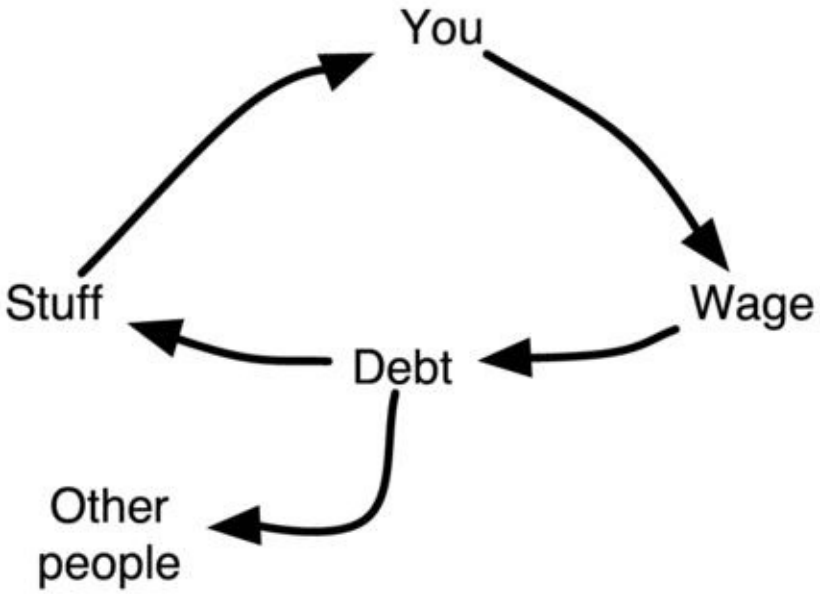

The cash flow of someone who works for a living and continuously replaces his stuff.

People, who are credit-worthy, which until recently meant practically anybody, as people didn't even need to be alive to be "pre-approved," can then use credit to increase their spending on *stuff* (see The salary man). This is shown in this figure. First there's an arrow going from *debt* to *stuff*, which is called financing. This can be car-financing, furniture-financing, or house-financing (mortgage). There's also an arrow going from *wage* into *debt*. This represents the *monthly payments* which naturally are no longer going into *stuff*. There's also an arrow going from *debt* to *other people*, which represents the *interest* and finance charges and other ways lenders are getting paid for fronting the money *you* spend on *stuff*.



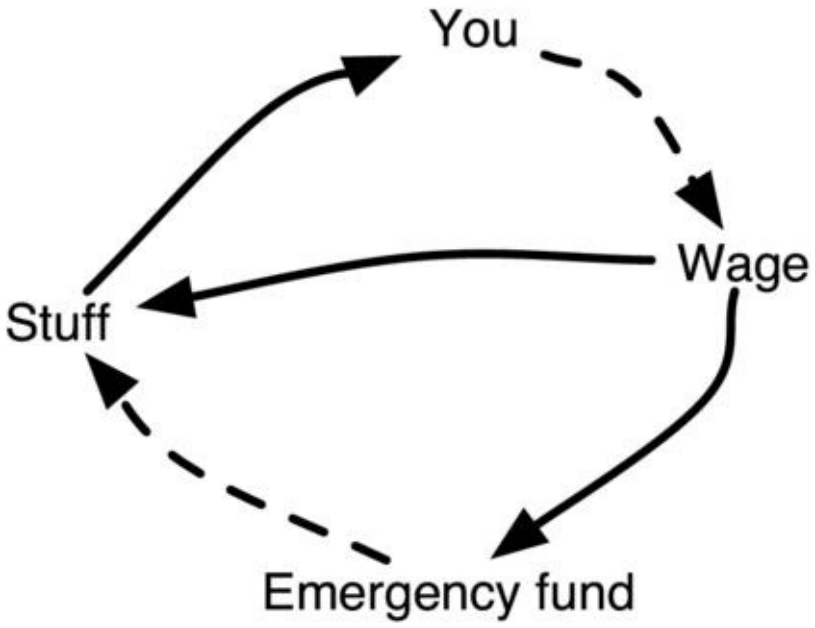

The cash flow when going into debt. Some of the wages are now diverted into paying off debt and paying interest to other people. However, it's possible to buy more stuff than is otherwise affordable from the increased flow by using credit.

What sometimes happens is that this cycle spirals out of control. This can happen if there's no negative feedback, which is the case if credit limits are increased to no end or if minimum payments are held down to make the payback period extremely long. This is profitable to the lender as long as the borrower doesn't default. The result is shown in this figure. At this point all wages are going toward paying off debt. Stuff can only be bought through continued use of credit. This stage is right at the limit of defaulting, because payments can barely be made. A job loss will push this person into default. The only option then would be to negotiate a lower interest rate that will lower the payment, and then spend the extra money paying off *debt* rather than spending it on more *stuff*.



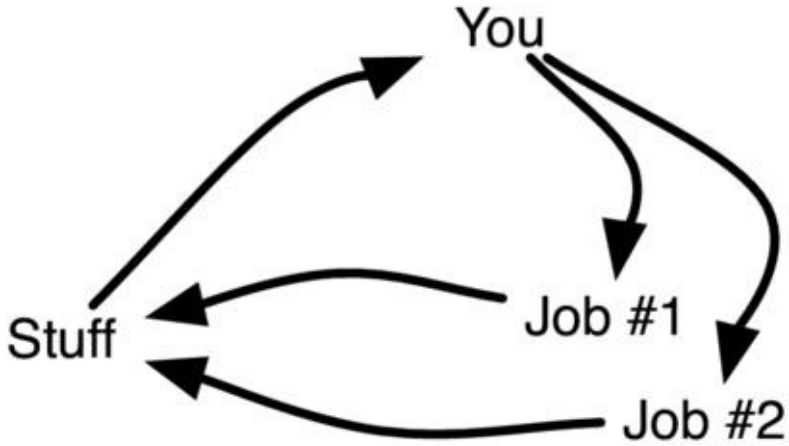

The cash flow when fully in debt. All payments are going towards bills and credit service. Credit is used for all purchases.

Even when not liable for debt payments, the dependence on having to spend to get *stuff*, which can be thought of as another liability, means that losing the *wage* will cause serious hardship. To prevent this, wise people establish a so-called *emergency fund*. The emergency fund is an attempt to hedge against all the liabilities in your life with a cash reserve. To establish the fund, spending must be reduced to divert money to savings as in this figure. Its size depends on a fair estimate of the current liabilities--that is, money that needs to be spent until the lost wage can be replaced. Naturally, this depends on duration, the likely reduced amount of spending, and the loss of the wage relative to other sources of income.




This shows how an emergency fund works. If wages are no longer forthcoming, the emergency fund can provide a temporary cash flow to continue spending.

The emergency fund is no different from normal savings used for presents, large purchases, *etc.* Savings are essentially delayed consumption. The same goes for retirement savings, which are essentially a very big fund intended to last from retirement until death.

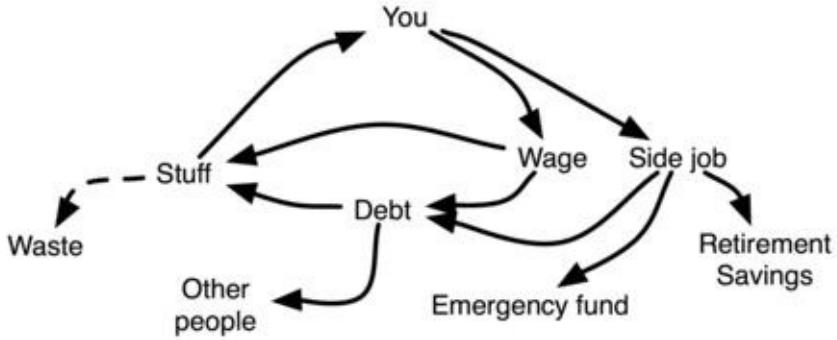



The cash flow when working more than one job. If each job can cover expenses, the diversification provides security. This may also be thought of as working one job and having multiple clients.

A person, particularly a nonsalaried working man, may have several sources of income, either in the form of multiple clients or serial contracts in which case the cash flow looks like this figure. Due to the unsteady nature of his income, the working man will likely rely on savings in between jobs. Since periods without

work are a way of life, "emergency fund" is hardly the right term, but the principle is the same. Having more than one income stream provides more security due to diversification. Of course, a working man can go into debt as well, and a salary man can take on side jobs. The complete picture for many people will thus look more like this figure. This system is generally tightly coupled and complicated, but typically not complex. There are many books dedicated to decoupling by introducing buffers and simplifying the system, mostly by consolidating whatever serves the same function. For example, two bank accounts become one. Some subscribe to automating everything with automatic payments, *etc*. Others prefer to make each payment manually. I suppose this is like the difference between driving a manual and an automatic transmission. It really doesn't matter, and it's merely a question of personal preference, as long as you choose whatever you're comfortable with. Personally, I prefer the manual option since it allows for more control, which makes it easier to fix things when (not if) they go wrong.

More important, though, is the primary reason that so many complain that they're not "getting ahead," which is apparent from the figure. It's the loss of *wage* to *waste* and *other people*. This constitutes a lot of hard work for nothing, and it's the reason why so many, after decades of work, have so little to show for it.

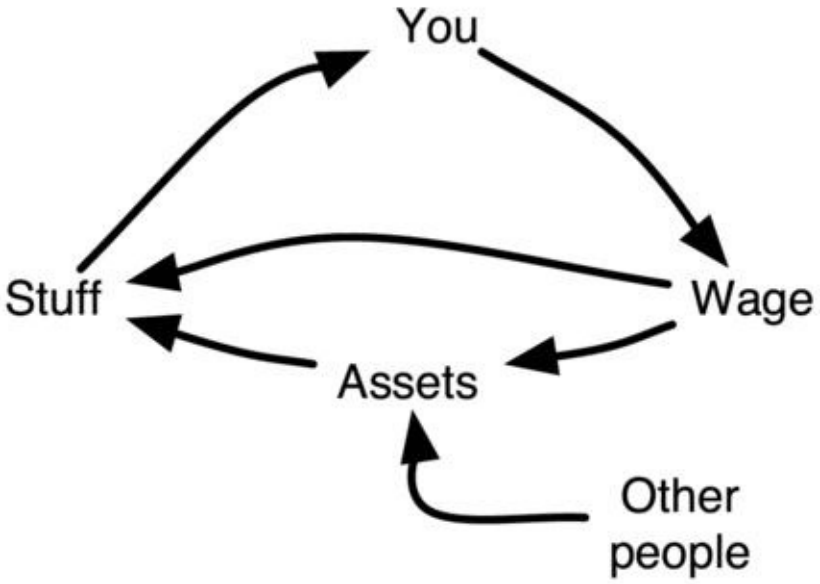



A fairly common cash flow, albeit a bit simplified, since most people have multiple, different kinds of debts and savings, and ways of transferring the money between the accounts.

The previous chapters have mostly dealt with strategies for reducing this loss. It's perfectly possible to live well using those methods, and the strategies and tactics can either be used to simply prioritize resources--for example, spending on things that mean something to you, like vacations to the south pole, antique furniture, brand name educations, etc.--or only working seasonally and living the rest of the year on savings--alternatively, only working a few hours a week (see Intermittent work); or, as will be covered below, the money can be spent on assets which will provide enough cash flow to completely eliminate

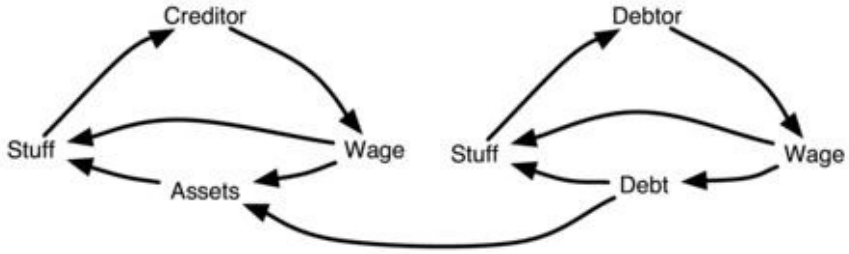
having to work for money (see Financial independence and investing).

A worker acquires assets by consuming less than his income and then saving and investing the rest. This figure shows the cash flow for a worker who is investing and accumulating assets. Notice that there's an additional flow of cash from *assets* to *stuff*. This cash comes from other people who pay for the usage of the investor's assets. The cash flow from *wage* to *stuff* is thus reduced.




A worker in the asset-building phase. Money is being spent on investments in assets instead of stuff while assets begin to produce a cash flow which can be spent on stuff.

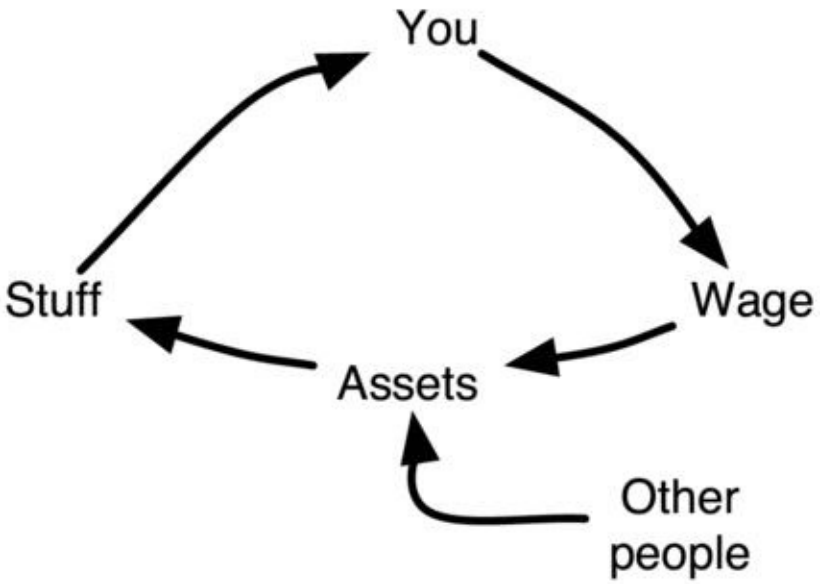
Owning stocks means that the investor gets the profit (but not the wage, see The salary man) when other workers produce goods and services. Owning rental units means that the investor gets paid for use of his home. Owning bonds means that the investor gets paid for use of his money. In fact, combining this figure and this figure, we get this figure, which shows how creditors and debtors fit into the economic system.




This figure shows the cash flows in a world with only two people. I labeled them creditor and debtor. In reality, there are many creditors and debtors (see text for details).

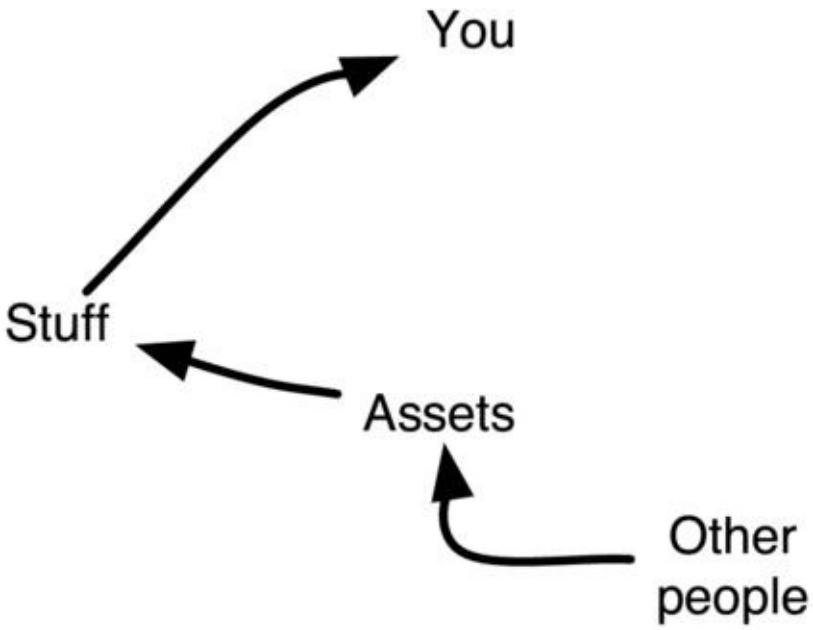
It also explains why the "rich get richer" and why those who are in debt and work for a living never seem to "get ahead." While the figure only shows the

cash flow between two people, in reality the assets are diversified via the financial system so that each asset owner gets paid a little amount from many different people and each debt owner uses the assets of many different people as well. However, figuratively speaking it is quite possible to match up the relative sizes of the cash flows between two people. For example, I spend about as much on my total living expenses as an upper-middle-class family spends on their mortgage interest alone. Effectively speaking, I've lent them my money so they can have a house with five bedrooms, three bathrooms, a vaulted foyer, and a two-car garage. In return, they pay all my expenses. Hopefully, we both consider this a good deal; I know I do.




Financially independent and working. Since these savings flow into a nonretirement account, money immediately flows out.

In a free country, roles are chosen, not assigned. Most people choose to become debtors and borrow money so they can increase their spending, possibly due to a lack of knowledge or maybe simply due to the barrage of advertising that says spending money will result in happiness. However, it's possible to choose the creditor side and save money, eventually buying *financial independence*. Such financial independence comes from investing in income-generating assets until the cash flow from the *assets* completely cover all spending on *stuff*. When this happens, the cash flow looks like this figure. Here all wages go to increasing assets and work can stop at any time. When the person is no longer working for money, the cash flow situation looks like this figure.




Financially independent and no longer working for money.

# Working for money

Work has been defined in many different ways, the most appropriate being, "I know it when I see it," and very often includes activities that one does not want to do.

The best way to think of work is as a package which includes several different goals (see Contingency goal-setting), such as cash flow (see Financial cash flow cycles), contributing to society, personal edification, socializing, having something to do all day, etc. (see the discussion of side effects in Contingency goal-setting). In many cases, cash flow isn't considered the primary reason to work. Many state meaning or passion as the main reason for working. However, even if that is the case, the cash flow to pay for *stuff*, which can't be otherwise acquired due to lack of skills or connections (see The lock-in and A Renaissance lifestyle), is a *crucial* part of work.

When cash flow comes from work, it's called *earned income*. Earned income is made either by working for an employer or working at a business you own, and it always requires spending time and effort. Earning income is therefore a process of exchanging your time for money. For example, suppose the actuarial tables say you have 60 years left to live, and you work 1 year in exchange for $30,000 net. You now have 59 years left, but you also have $30,000 which you would not have gotten otherwise. Similarly, you can exchange more years for more money. Many exchange most of their time for money. If we subtract the time spent on work plus associated tasks and sleep in a 24 hour day, there's very little time left, perhaps less than 25%.

However, money can be spent to avoid spending time directly--for example, earning $10 to buy a cast iron pan takes less time than building your own pan from scratch. Money can also be invested to get more money to spend, thus avoiding having to exchange time. Different arrangements define the restrictions on your time and money stream. I divide them into salaried work, which covers the typical arrangement of a salaryman (see The salary man), and nonsalaried work, which covers the typical arrangements of a working man (see The working man) or businessman (see The businessman).

Within the context of the Renaissance lifestyle (see A Renaissance lifestyle) there are three financial strategies to pursue: Intermittent work (see Intermittent work), financial independence (early retirement), or semi-retirement supported by a form of part-time work (see Financial independence and investing). The beauty of combining the Renaissance lifestyle with working for money is that as

long as you can get and hold a job for a handful of years, the strategy is robust and practical in the sense that success relies more on internal qualities like focus, discipline, persistence, and spending behavior, which are under your control, than on external circumstances like career or businesses success, or a lucky run in the real estate or stock market, which are not directly under your control. Salaried and nonsalaried work feel different from each other due to the different ways time is exchanged and remunerated. Very likely you already work, so instead of starting something new, it's most convenient to keep doing whatever it is you currently do to make money, while beginning to work on ways to make yourself more economically independent and financially resilient (see A modular design).[105]

## Salaried work

Salaried work provides a very predictable money stream and typically a very predictable work schedule, involving showing up every weekday except for about 10-25 days each year.

A salary is paid when productivity is hard to measure because the effort can't be directly associated with a specific revenue-generating product or service. This means that productivity has little bearing on how much a person actually gets paid, salary being determined by contract negotiation skills and historical accidents, such as being hired the year before new hires are given a substantially higher starting salary. It may be that this is what has led to the widespread secrecy about what coworkers are paid. Such secrecy maintains order, because although managers may not be aware of how hard their people work, everybody knows, or rather has an opinion about how productive their coworkers really are. Piecework is often salaried because it's cheaper for an employee to train one full-time employee than it is to train two half-time employees. The systemic consequence is unemployment and thus competition for full-time jobs (see Job Competition), which drives salaries down. Conversely, it also creates more job security with a given employer, since hourly paid workers are the first to be laid off during downturns. Even if a salaried job does not involve piecework, it's often expected for employees to be present regardless of whether they're being productive or not. This often leads to water cooler talk for hours, pretend work, and other nonproductive activities, which many people actually enjoy. The preponderance of this is of course company-dependent, but seems somewhat proportional to the size of the company and the amount of bureaucratic procedure. But I don't think it's inaccurate to suggest that the atmosphere is

much like high school or college.

However, being paid on salary can lead to less satisfaction since the effort-reward connection is broken when the employee realizes that he gets paid the same amount regardless of how much or how little he works. Realizing that pay often has more to do with negotiation skills, politics, or tenure than productivity or even responsibility can be depressing. It divides the workforce into three kinds of people, popularly known as work horses, show horses, and horses' asses. In particular, some will realize that they can get further ahead through office politics and career management than conscientious work, some will realize that showing up and doing the minimum amount of work will pay equally well, and some will not realize either one. I'll let you guess which horse is which.

Traditionally, salaried work entails some form of continuous career where breaks are frowned upon. Furthermore, it'll be very hard to negotiate leaves of several weeks to take vacations or work on other things. There may be noncompete agreements to sign or other kinds of golden handcuffs and behavioral restrictions.

For these reasons, and because it tends to pay well due to the large number of hours worked, salaried work is the preferred method for accumulating a fund for financial independence (see Financial independence and investing). There's plenty of advice out there, the most important piece of which is, in my opinion, to pursue something you're good at rather than something you're passionate about--these are not necessarily the same thing--and consider the typical placement rates (unemployment levels), and in particular the cost of any kind of educational requirement, using either a discounted cash flow or internal rate of return analysis to see if it's worthwhile.

## Nonsalaried work

Nonsalaried work though it may involve contracting with a single employer, technically a client, shouldn't be considered employment (see this figure), but it still qualifies as a job. Such a job involves either providing services or making products directly (see The working man) or involves running a business turning assets into income (see The businessman). In both cases, the connection between effort and reward is readily apparent and work thus provides a greater amount of satisfaction. In particular, working extra (overtime) is compensated. Conversely, working less (undertime) isn't compensated.

Nonsalaried work is therefore one level closer to reality in the sense that if no action is taken, no compensation appears. Since the work is, in a sense, more real, credentials and politics become less important. It'll be easier to tell a good

job from a bad job. In addition, in some cases it'll be possible for you to tell exactly how your contribution added value. For example, you bought 1,000 pens for $1 each, presented them in a store and sold them for $3, or you knitted a sweater and sold it, or you repaired someone's moped. In a larger system, it'll often be hard to tell exactly what the point of those Form 32B-4s you spent all day filing is in terms of the operation of the company. It's interesting to note that even if the latter pays better, it can often be less satisfying due to the lack of control or apparent purpose.

Of course it's also possible that you have been assigned to file Form 32B-4s for some company as an outsourced contractor. In this case, there may not be any particular satisfaction in doing such a job. Sometimes this kind of piecework is paid on an hourly basis. This happens when it's hard to estimate the price of individual pieces because they're all unique. Lawyer's fees, filing reports, and editing papers comes to mind. This arrangement suffers the same problems as salaried compensation. However, since hours are strictly recorded, there's no longer any pay for water cooler talk, and working under such terms would be considered less "cushy" than doing the same job under salaried conditions.

In many countries, many social services, such as health care, are provided for by the government. But in the US, many of these services are provided for by corporations to those who are salaried corporate employees--this is made possible through group negotiation power similar to trade unions at the employer level, and special tax breaks. Typically, a nonsalaried worker has to provide these benefits himself, and if he's self-employed, he'll also be paying full social security taxes, whereas employees only pay half (the employer pays the other half). It's therefore not easy to compare income between salaried and nonsalaried work. Furthermore, it's not easy to evaluate the value of such benefits. For example, there are people who work almost exclusively for the benefits part of the compensation because they need their benefits to pay for drug treatments. Conversely, others get over-covered--for example, employees without children have no use for the free daycare services, yet it's part of their compensation package.

The upside of nonsalaried work is often a greater deal of control over one's time. This means that if the goal is to pursue some form of intermittent work (see Intermittent work) interspersed with longer periods of nonwork, nonsalaried work is superior. Some jobs are location-independent, such as anything that involves information, and some jobs--for example, contractors--are so ubiquitous that they are de facto location-independent. Conversely, some jobs, like accounting, law, and medicine, are regionally licensed and, say a dentist who is capable of treating people in country A will probably not legally be able to set up

shop in country B.

Since nonsalaried work is compensated per effort, it may be possible to put in supreme amounts of effort and end up with a very high total compensation by working around the clock.[106] This could significantly speed up the accumulation of savings. Conversely, it may be difficult to find sufficient work or sufficient energy to put in that much effort, since measurable work is often directly taxing of physical or mental energy.

# Making money work for you

Until I was 25, it never occurred to me that money could work for me. Certainly I was aware that money could be invested, and in return I'd get a fraction of it back each year in the form of interest or dividends. What hadn't occurred to me was that this money could reach a level equivalent to my expenses and that this money could then pay for things just as well as earned income does. I think many share this same mental block, because savings accounts are either very small, so the annual payout may pay for a night out on the town, or because savings are cordoned off in retirement accounts where the payouts go right back into savings. This prevents people from thinking about capital income, just as taking income taxes directly out of earnings *before* the paycheck is received prevents people from thinking about taxes, other than as an abstraction that's out of their control.

If you decide to make money work for you, over time you'll become very familiar with the tax law, how to get money out of retirement accounts while paying as little penalty as possible, and how to take care of the principal and keep the yield sustainable, to the point of being at least competent (see Gauging mastery). Again, individual plans will vary significantly, but the guiding principles will be quite similar. The rest of this chapter will therefore discuss overall principles which should hold for the next 100 years, rather than specific investment plans, which may change within a decade.

## Important financial ratios

Within the field of personal finance there is a lot of discussion about salaries, net worths, and what one's "number" (savings needed to retire) is. However, when analyzing the financial status of different people, it makes more sense to look at ratios than absolute numbers to see how well someone is doing. This is no different than analyzing financial statements of different-sized companies by dividing by equity, earnings, assets, etc. or by gauging the strength of a person relative to his bodyweight rather than his absolute strength.

### Emergency funds

Let's divide the income stream from working into spending on wants, spending on needs, and saving. For example, a typically recommended savings

rate for the average consumer is 10%. The division between needs and wants depends on personal circumstances. Most need far less than they think, but let us assume that 60% is spent on needs and 30% is spent on wants. As a general rule, emergency funds only need to replace needs. With the numbers given above, it thus takes 6 months to build an emergency fund that will supply all needs for 1 month. If the emergency (lack of job income) lasts more than 1 month, one will be wiped out and start to default. If an emergency is expected to last 6 months, one thus needs 6 times as much money. With the 10% savings rate it will take $6 \times 6$ months, or 3 years to build this fund. If emergencies happen more frequently, which isn't completely unlikely, then one will be wiped out because there is not enough time to rebuild the emergency fund.

Consider another example for someone with the same savings rate, 10%, but here only 20% is spent on needs while 70% is spent on wants. In this case it only takes 2 months of savings to replace 1 month of spending on needs. If the emergency fund is for the same duration (6 months), the time it takes to fully fund the emergency fund is 1 year instead of the 3 years in the first example. This means that for the same savings rate, a budget dominated by flexible (loosely coupled) wants is more resilient than a budget dominated by inflexible (tightly coupled) needs.

Now consider a third example. Here the savings rate is 20%, needs are 20% and wants are 60%. Here it takes 1 month of savings to replace 1 month of spending on needs. To create the 6 month emergency fund only takes half a year. This is the safest distribution of spending and saving of the three examples. But one can do better, as will be shown below.

The conclusion here is that the higher the ratio of savings rate to needs, the safer one is from emergencies. Also, the higher the ratio of wants to needs (more wants, fewer needs), the safer the person is. It should now be easy to calculate the size of an emergency fund. All you need is to identify your needs relative your income, your savings relative to your income, and the expected duration of your emergency (how long it will take to find a new job--this depends on your profession and the economy). You also need to estimate the frequency of your emergencies (how often you expect to get laid off).

**Savings rate for financial independence**

An emergency fund represents financial independence on the simplest level, because it means that given an emergency, there's no need to finance (borrow money to replace) living expenses.

Let us consider the required savings rate to replace both needs and wants. If the savings rate is 10%, needs and wants total 90% and therefore it takes (90/10=) 9 years of working to save enough money to spend on needs and wants for 1 year of not working. If the savings rate is 20%, needs and wants total 80% and so it takes (80/20=) 4 years of working to replace 1 year of spending. If the savings rate is 50%, 1 year of working saves enough money to take 1 year off. This table shows the calculations for all cases using the formula *(1-r)/r* (for example, for 20%, *r=0.20* so *(1-0.2)/0.2=4*) for the top half and *r/(1-r)* for the bottom half. Note that this calculation doesn't consider emergency and retirement savings. If you like, include retirement savings and emergency fund savings under general spending.

| If you work with a savings rate of *r*% for one year | You need to work this many years to take one year off |
|---|---|
| 1% | 99 |
| 5% | 19 |
| 10% | 9 |
| 15% | 5.66 |
| 20% | 4 |
| 25% | 3 |
| 30% | 2.33 |
| 40% | 1.5 |
| 50% | 1 |
| | **You can take this many years off before you need to work again** |
| 50% | 1 |
| 60% | 1.5 |
| 75% | 3 |
| 80% | 4 |
| 90% | 9 |

Simple savings rate calculations without interest rate.

**Intermittent work**

It's important to note that the time units in the table are irrelevant. Given a 50% savings rate, there's no rule that one has to work 1 year and take the next year off, although this solution is growing in popularity. It's equally valid to work 3 years and take the next 3 years off. A flexible work schedule would mean that instead of counting in years, you could be counting in months or even days or hours (a one hour work day, anyone?). In other words, with a 20% savings rate, you could take 1 month off each time you work 4 months, or 1 day off each time you work 4 days. Alternatively, with a 75% savings rate, you could work 3

months and take the rest of the year off. This works for anyone with a great deal of control over the timing of his income--for example, entrepreneurs, seasonal workers (farmers, tax accountants), freelancers, skilled travelers and contractors, handymen; in general, anyone who can easily find work without committing to an extended employment. Conversely, it doesn't work well for salaried career professionals.

## Financial independence and investing

The above calculations don't take investment returns on the fund into account. It stands to reason that if someone accumulates a 9 year fund by saving 75% while working for 3 years and invests it with a 5% return, it'll last longer than 9 years before it runs out, because of the investment returns on the money that hasn't been spent yet.

Presuming the returns can be guaranteed--more about that later--it's possible to calculate exactly how long such a fund will last if it compounds interest at a rate $i$. Suppose the fund has a size $P_0$ and each year $p$ is withdrawn on the first day of the year, while the rest of the money is invested for a year at a rate $i$. Then the amount of money after one year will be

$$P_1=(P_0-p)+i(P_0-p)=(P_0-p)(1+i)=P_0(1+i)-p(1+i).$$

Another $p$ is withdrawn (we have now withdrawn a total of $2p$) and the remaining amount $P_1-c$ is invested again at the rate $i$. The amount available at the end of the second year is then

$$P_2=(P_1-p)(1+i) = P_1(1+i)-p(1+i)$$
$$= (P_0(1+i)-p(1+i))(1+i)-p(1+i)$$
$$= P_0(1+i)^2-p(1+i)^2-p(1+i),$$

where we substituted in $P_1$ from the first equation. Repeating this, we find the remaining amount after the third year to be

$$P_3=(P_2-p)(1+i)=P_0(1+i)^3-p(1+i)^3-p(1+i)^2-p(1+i)$$

and so on up to

$$P_N=P_0(1+i)^N-p(1+i)^N-p(1+i)^{N-1}-...-p(1+i)^2-p(1+i)$$
$$=P_0(1+i)^N-p[(1+i)^N+(1+i)^{N-1}+...+(1+i)^2+(1+i)].$$

Write the term in the square bracket as ($S$ for sum)

$$S = (1+i)^N+(1+i)^{N-1}+...+(1+i)^2+(1+i),$$

then

$$(S+1)(1+i) = (1+i)^{N+1}+(1+i)^N+...+(1+i)^2+(1+i),$$

and so $(S+1)(1+i)-S = S+Si+(1+i)-S = Si+(1+i) = (1+i)^{N+1}$ because all the individual terms in the sum cancel out (set $N$ to any random number and write the sum out to verify if in doubt) leading to

$$S = ((1+i)^{N+1}-(1+i))/(i) = ((1+i)((1+i)^N-1))/(i).$$

Substitute this equation and this equation back into this equation to get

$$P_N = P_0(1+i)^N-pS = P_0(1+i)^N-pS$$

$$= P_0(1+i)^N-p((1+i)((1+i)^N-1))/(i).$$

We are interested in using this formula to determine how long the portfolio will last, namely, how large is $N$?[107] When money runs out, $P_N == 0$, therefore we rewrite this equation as

$$0 = (P_0)/(p)i-(1+i)(1-1(1+i)^N),$$

and so

$$N=log[(1)/(1- (P_0)/(p)(i)/(1+i))]/log(1+i).$$

From this formula--which incidentally is the point where you can wake up again if you fell asleep during the derivation--we see that if we have a $P_0=10$ year fund which pays out $p=1$ annually at a 4% ($i=0.04$) interest, it lasts $N=12.38$ years rather than 10 years. In comparison, a 20 year fund with the same parameters lasts 37.39 years. This is highly interesting, because by doubling the savings before beginning the withdrawal, an additional 15 years was gained on top of the 2.38 years from the 10 year fund's interest.

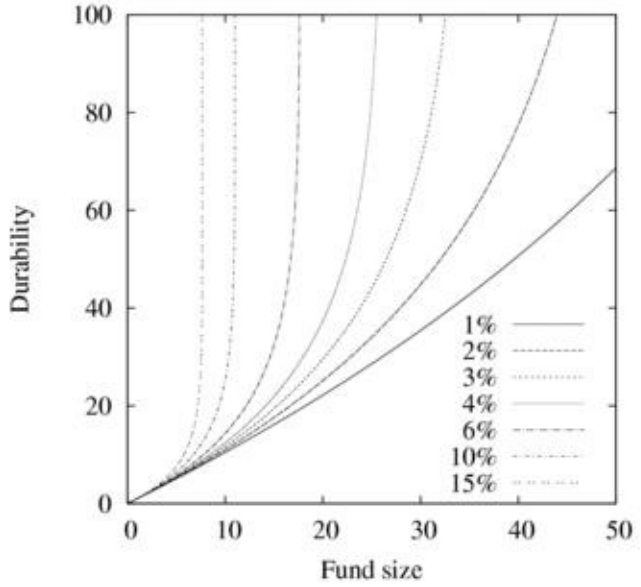
This equation is the key formula for extreme early retirement, so pay extra attention to this paragraph! The formula relates the number of retirement years (your life expectancy upon retiring) to the rate of return on your portfolio and the size of your portfolio given in either withdrawal rates $p/P_0$ or the equivalent "years of fund" as illustrated by this table. Note that these two numbers are each other's exact inverse,[108] since if $P_0$ is given in years, then $p=1$ year.

This figure shows the equation, relating the size of the fund to how long it lasts for different values of $i$. First, note that $i=0$ produces a straight line because if no interest is received, an $N$ year fund will last exactly $N$ years. Also, note that if $i = (p/P_0)/(1-p/P_0)$ then the denominator is $0$ and $N \to \infty$. This means that the portfolio will last forever. The reason is that each year the portfolio grows exactly by the amount that is withdrawn. This is also called a perpetuity and it will preserve the principal forever. A quick rearrangement of $i = (p/P_0)/(1-p/P_0)$ yields

$$P_0 = (1+i)p/i,$$

which is the required fund size to withdraw $p$ at the beginning of each period

when interest is added at the end of the period.[109] A perpetuity leaves an estate which is exactly equal to $P_0$. If less than $p$ (as given by this equation) is withdrawn, then what is not withdrawn can be used to grow principal. This means that $P$ will increase even as money is withdrawn.




Size of fund given in years of expenses versus how long it will actually last before being depleted given different investment return rates.

The time to accumulate the fund $P_0/p$ (given in years or months or whatever your preferred time unit is) can be calculated in a similar way. The simplest way to calculate it uses the method of this table

$$P_0/p=(r)/(1-r)M,$$

where $r$ is the savings rate and $M$ is the number of years worked. This is the same equation that was used to generate this table. Now, if the funds are invested at a rate $i$ and allowed to compound we get

$$P_0/p=(r)/(1-r)SUM_{i=1}^{M}\ (1+i)^{i-1}.$$

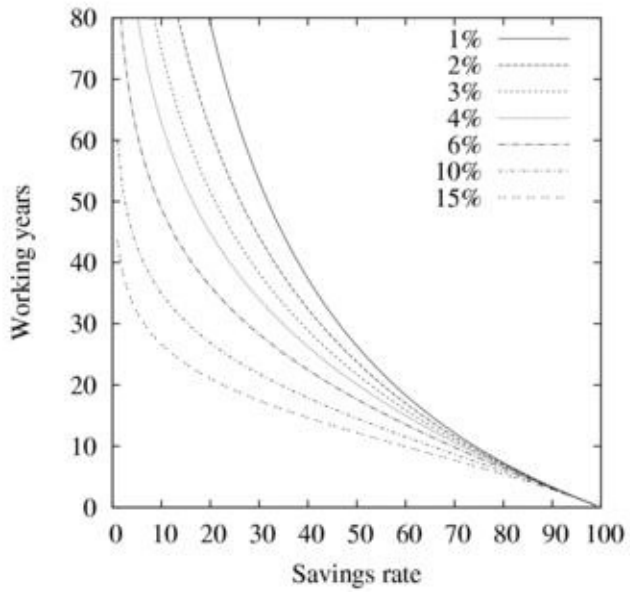
Note that this equation reduces to the equation above if $i=0$. Using a similar trick to handle the sum, we find

$$P_0/p=(r)/(1-r)((1+i)^{M}-1)/(i).$$

In traditional personal finance planning the time invested $M$ is the most important factor, with typical values around 30 or 40 years. Some people will be clever enough to achieve superior investment returns $i$. We are not counting on this. In the case of early retirement, $M$ will be small, and we will presume that $i$ is of the usual range, maybe around 6%. The main lever in this equation is thus $r/(1-r)$. For a traditional savings rate $r=0.1$ the lever is $r/(1-r)=0.11$, whereas for an extreme savings rate $r=0.75$, the lever $r/(1-r)=3$, which is 27 times higher!

Even with a lot of time to compound and a market outperformance of a few percent, it's hard to beat a factor of 27.[110]

This figure shows the time it takes to grow the fund to 30 years as a function of savings rate. According to this figure, a 30-year fund will last 70 years even at a modest 3% return rate.




The time $M$ it takes to grow $P_0/p$ to 30 for a given savings rate $r$. A fund nominally lasting 30 years should be safe to retire on in most circumstances. Note that a traditional savings rate of 15% requires a little over 30 years of work to make it given average investment returns of 10%. If, on the other hand, investment returns drop to a conservative 6%, more than 45 years of work is required.

Let us isolate $M$ from this equation to get

$$M = \log(1+i(P_0)/(p)(1-r)/(r))/\log(1+i).$$

Assuming that the life expectancy is 100 years and one is either financially independent or working to become so for the last 80 years of that time span (adjust your numbers as you see fit), then

$$80 = N + M,$$

where $N$ is the number of years living off your money and $M$ is the number of years spent accumulating it. We can now plot the working time $M$ as a function of the savings rate $r$ to find out how many years are needed to work to accumulate enough money for a given rate of return $i$. This is shown in this figure. This is the most important figure in this chapter. Specifically, it shows that high savings rates lead to extremely early financial independence. Conversely, the traditionally recommended savings rates mean working for 40

years or more, and they're very dependent on the return rate *i*. It also shows the difference between a savings rate of, say 35%, which most people would consider to be high, and a savings rate of 70%. It shows what your savings rate *r* should be to retire in *M* years. As is evident, saving three quarters of one's income creates financial independence in about five years! Conversely, a savings rate of 15% requires about 35 years of work at an optimistic return rate of 6%, about 20 years of work at a 10% rate, and about 45 years at a 4% rate.

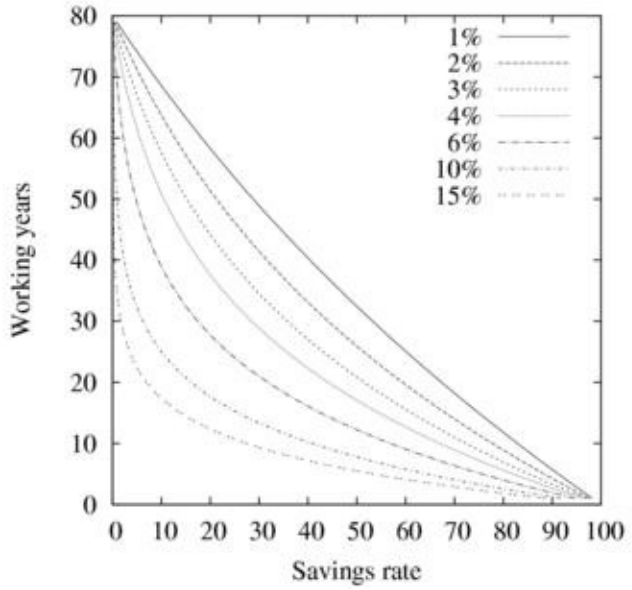



Figure showing savings rate against years to retirement for a range of investment return rates, presuming that the total number of years worked and years retired equals 80--for example, a person starts working at 20 and dies at 100.

## Investing and reasonable return rates

In the real world, it is unlikely that *i* will stay constant. The principal *P* may also vary substantially if it is invested in the market. Furthermore, there is inflation to contend with. The equations derived in Financial independence and investing therefore either have to be expanded or used with a significant margin of safety. It's very tempting to plug in return rates of 10% or even higher and derive very favorable terms--for example, a mere 15% savings rate and a return rate of 10% allows one to retire "early" after about 20 years of work. The problem with such exercises is known as "garbage in-garbage out". The limitations of the formulae must be understood to use them. The financial world abounds with stories of people and companies that put too much faith in their equations without understanding the limits.

To give an example of a more realistic derivation, suppose we invest in a broad market index and *assume* that future rates of return and future rates of inflation will exactly match those of the past. Then we can pick a historical set of returns and go through a calculation like above, except each year we use the value of $i$ equal to that of the market return for the corresponding year. Additionally, we account for inflation by using the corresponding historical values, increasing $p$ by the rate of inflation for each year. This can be done numerically. The analytic equation is just a quick way to derive the result when the values are assumed to be constant. If calculated numerically with historic data, it will quickly be found that the results $N$ and $M$ we want vary depending on the range of years the historic data are taken from. Using data from 1980 to 2005 will be different from using data from 1935 to 1960. To compensate for this, all possible periods from the past can be calculated. This is called a Monte Carlo simulation and there is one available at `firecalc.com`. Of course, this is only accurate if the future repeats the past numbers. Still, plotting for all possible historical periods shows how things have played out historically. This exercise can be repeated for different markets (domestic equity, international equity, commodities, real estate, timber, etc.) and for different investment methods (buy and hold, dividends, Dogs of the Dow, etc.). It will, however, quickly become clear that there are limits to how much the model can be fitted to the data. The objective of this exercise isn't to get a numerical value, but to get a sense of *possible* future scenarios, assuming that the future will likely repeat the past in one way or another.

Numerical simulations require a lot of effort, so it's easier and more accurate to account for inflation and return rates by setting $i$ to be the real rate of return, which equals the nominal rate of return minus inflation. Also, consider that official inflation numbers may not necessarily pertain to you. Consumer inflation is calculated based on what consumers buy and this will likely be quite different from what you buy.

Given this uncertainty, what is one to do? Accept that the worst that can happen is that your investments thoroughly collapse, which will likely mean the economy is dealing with mass unemployment or some other calamity. This in turn means that whoever pays their expenses with work will also be in trouble. In particular, since they don't know how to live efficiently, they will be in bigger trouble than you are, since they need to find high-income jobs, whereas you have a much larger selection of low-income jobs. In such a disaster, you may be poor with a low income, but everybody else will be broke with no income.

As an investor I live with the fact that sometimes markets go down, which makes me feel poorer, but also makes stocks cheaper to buy. Sometimes they go

up, which makes me feel rich, but also makes stocks more expensive to buy. We can calculate expectation values forever and ever, but they are just that--expectations. Nothing can be guaranteed. Reaching financial independence and having your money work for you at an early point means projecting out 60 years. A lot can happen in 60 years, including accidents that disable those who work for money, or technological changes that render entire industries (typewriters, telex machines, coach wagons, trolley cars, trans-Atlantic blimps, etc.) obsolete. However, it's likely that it'll still be possible to invest in some manner even 60 years from now. There's no telling whether those investments will be in the stock market, government debt, personal debt, annuities, mortgages, timber, real estate, plankton farms, cattle, potable water, topsoil, or what have you. It would be a big mistake to think that a choice made now will also be valid only 10 years from now, just as any particular investment vehicle I could suggest now will probably sound silly a decade from now. Thirty years ago everybody hated stocks but loved gold. Twenty years ago mutual funds were the hottest thing. Then after a decade of trending stock markets, which moved up no matter what people owned, it was decided that the managers weren't needed and index funds came into fashion--why do you need a manager if markets go up all on their own? At that point nobody wanted to own gold. In the past 10 years the market has been in a trading range and now gold is more expensive than ever, so who knows what the future will bring? My suggestion is not to presume that one can pick an asset class and then stick with it forever.

Despite this, there are a few established principles in the art of investing. Reward is often correlated with risk, where risk can either be quantified as volatility or qualified as uncertainty (lack of knowledge). This means that the higher the return rate, the higher the risk of loss of capital. Another principle, however, says that risk is more related to skill and knowledge. Both of these statements are true, but for different reasons. If you think about a fast race car, it's a more risky vehicle to drive, but if you know how to drive it, the risk goes down.

There are two conclusions from this. First, having a margin of safety in terms of principal is a good idea. In other words, having a low withdrawal rate is safer than a high withdrawal rate, because the required rate of return is lower. A larger fund thus allows for more safety. Second, invest in what you understand rather than what people tell you. This is the main reason I'm not telling you what to invest in. If you don't know anything about investing, make it a point to learn! It will be your new financial function in the world. There's no hurry--as was shown in Financial independence and investing, the investment return *i* is fairly unimportant during the accumulation period as long as it is short. A lot of

learning can happen during those years--people go to college and get degrees in the time you have to learn how to manage your money.

I invest in stocks because I've spent almost a decade reading about stock investing. Conversely, I know little about real estate investment. If you're more interested in real estate, perhaps you should invest in that instead. Some people own timber land and every few years they sell lumber and live off the proceeds. The reason I invest in stocks is a combination of personal interest, personal temperament, and historical accident. It's not because I have determined they are a superior investment by any means.

Each market has its idiosyncratic volatility and return rates. Timber, for instance, grows independent of what the market does, at a rate of about 3-4% per year. If prices are low, you simply wait to cut until they are high again. As lumber remains a major part of the economy, it can be expected to rise in price in sync with inflation. The US stock market has historically returned about 10% nominally--other stock markets have returned different amounts. Note that this result includes a significant two-decade-long bull market between 1983 and 2000. Other times, it has been flat for decades. In the periods 1905-1942, 1965-1983 and 2000-2007 market return was either zero or negative. Some of these periods are really long! If the investment strategy relies on capital gains, as it does in a buy and hold strategy, this will lead to failure if the withdrawal rate is too high during years of decline, as too much stock will be liquidated when the market is low. Monte Carlo simulations suggest that a withdrawal rate of 4% is good for 30 years of inflation-adjusted expenses and that a withdrawal rate of 3% is good for 60 years or more. A withdrawal rate of 2% will last forever--that is, if history repeats itself.

In the long run, real estate always goes up ...at the rate of inflation! Despite ups and down and bubbles and crashes, the rate of inflation is the long-term trend. This makes sense, because houses are nonproductive things. The reason people get rich in real estate is because regulations, or lack thereof, allow fantastic amounts of leverage which can be used during bubbles. However, if the principal asset is in the form of rental units and rents can be raised with inflation, inflation is taken care of. The withdrawal rate is then simply based on the average fill rate, say 80% or 4 out of 5 units, times the cash flow minus maintenance costs and taxes divided by the value of the units (also see Rent or own?).

In summary, the organic growth of any sector seems to concentrate around 3% real growth. This is the number I would use as a safe withdrawal rate. It's difficult to judge whether this number will be representative of the next 50-100 years. First, human population growth will peak out and probably decrease again

within this period. The energy available from fossil fuels that underlies the economy will certainly reverse and decline as fast or faster than it has been growing. Maybe consumerism as a productivity engine will cease and people will begin to maintain their stuff or wear it out instead of buying new all the time, which would significantly reduce the need to produce. Conversely, historical interest rates dating back thousands of years, for example, as measured in repayment of a borrowed pig or borrowed grain at the next harvest, are easily as high as 100% per year. If I was a skilled pig or grain banker, I would happily assume higher rates, but for someone who just pays attention to money management issues for a couple hours every month or so, I would be comfortable with 3% for now.

**The true cost of things**

This equation gives a quick way of estimating the assets required to be financially independent of a given recurring expense. Using a conservative rate of return of 3%, we find $P_0 = 1.03/0.03\ p = 34.33\ p$. If the expense is given monthly, as many recurring expenses are, the annual cost is 12 times higher, hence

$$P = (1+0.03/12)/(0.03/12)\ p = 401\ p.$$

This means that each $1/month not spent is equivalent to reducing the required fund size by $401. For example, the cost of a $20 monthly payment may seem inexpensive to someone earning $15/hour, but with an asset-based income, it actually represents $\$20 \times 401 = \$8020$, which represents over 4 months of work at the given hourly rate. Thus, frequently it costs much less to pay more for a one-time expense than to get involved in a recurring expense. If, for example, the monthly cable bill is $40, the corresponding asset-based equivalent is $16,040. That amount can buy a lot of movies and computer games, and those can be leveraged into even more movies and games by swapping them (see Bartering and swapping).

Costs which aren't monthly can be derived from the depreciation schedule in Depreciation schedules and converted into the required asset backing using this equation.

**So what should I invest in?**

How would you like to manage your money? Do you prefer to do it yourself or outsource the job? Do you like accounting and reading reports or are you

more interested in remodeling bathrooms and dealing with tenants? Maybe you're more interested in owning farmland for rent or windmills or solar panels producing electricity, a blog/blogging network, or other low-maintenance ventures? Until you know the answer to these questions, don't buy anything. Take time to figure out the answer while accumulating cash. If *M* in this equation is small, the strength of *i*, which depends on your investing skills, doesn't matter that much while saving. I saved cash at a measly interest rate in a bank account for four years while reading about stock investing before I began investing in stocks. This doesn't mean that you have to invest in stocks too. Furthermore, because I invest in stocks now doesn't mean I will be doing so for the next 50 years. If circumstances change, I'll change. Study the alternatives. Read, read, and then read some more.[111] This is what investors do. This is what I do.

Beware of the promise of high returns in general or brand new untested methods of investing. It's easy to get burned by this. If consistent returns of 12% or even 24% per year are possible, the fund size can be small indeed. However, if a new or exotic method (pig lending?) promises high returns, it's almost guaranteed that those returns will go down as more people buy in, or that the returns are simply not sustainable because the risks are far higher than anticipated.

That said, if you decide that you have no interest in managing your own money, it's, as always, possible to pay money to compensate. You can pay another person to manage your money, you can pay for your mistakes, or you can pay in terms of opportunity costs for having an underperforming portfolio.

In all these, the cost relative to the withdrawal rate will be high because the withdrawal rate is generally low. Typical management fees are asset-based and could easily be 1%, which has to come out of the withdrawal rate.[112] For example, if the withdrawal rate is 4% and 1% goes to fees, it only leaves 3% for expenses; in other words, 25% of the cash flow is spent on management fees. With fees this high, it means that the fund has to be proportionally larger to support financial independence. Is it worth it to spend time and effort learning how to manage your money yourself rather than increasing *M*? That's up to you.

## Asset management

Asset-based income is fundamentally different from work-based income. The primary difference is that asset-based income is proportional to assets and skill, whereas work-based income is proportional to time spent and skill.

Both require skills, albeit different skills, so the difference is time versus

assets. Naturally, asset management requires some time--for example, to think and observe--and work requires some assets like tools and resources, but the ratio between them is markedly different.

Consider a scenario where $2,000 in assets yields 4% ($80) without effort, but where asset management will raise the yield to 6% ($120). This is a difference of $40 from a few hours of work--it's presumed that the hours spent learning to do this work won't need to be repeated; once learned, there's no need to relearn. Spending more than a couple hours managing $1,000 in assets is therefore not worthwhile, as the hourly return on time would dip below the working wage. Now consider having $200,000 in assets yielding 4% ($8,000). Raising the yield to 6% ($12,000) is a difference of $4,000, which is a very nice return for a few hours of effort, the exact same work effort but now leveraged with more assets. Two observations: First, with almost no assets, the hourly compensation is too low to bother managing the assets. Conversely, with six-figure assets, the hourly return can be substantial. Second, even when the hourly wage is substantial, asset management doesn't allow you to keep increasing your income by putting in more hours like working does. The total compensation is thus less than what could be made while working for money until assets exceed income by a factor 25 or more. Since few people have that kind of money, they're often advised to apply the minimum amount of effort when it comes to investing.

With asset management, skill and wisdom are rewarded directly proportionally to the asset base, but *never* proportionally to the time base. This is probably the most important cultural barrier to overcome in a society that prides itself on being busy and productive. Frequently, asset managers get wealthy just by waiting and being wise. The real challenge, especially faced by professional asset managers, but hopefully not by you, is the tendency to ignore this fact. Many associate effort with taking action, but not taking action is also a form of action. In fact, often not taking action is just what is required. The easiest way to get in the right frame of mind is to stop thinking like a farmer and start thinking like a hunter. A farmer (and a modern salary-, working-, and businessman) gets rewarded by activity. The more he does, the greater his reward. Conversely, a hunter isn't going to catch anything if he thrashes around in the woods, frantically looking for prey. A strategy where he first identifies the best place to hunt (skill), and then waits patiently for the *opportunity* to present itself, will be more successful. In this sense, the farmer-turned-hunter is his own worst enemy. Patience is a virtue that can take years or maybe even decades to develop. An impatient investor is likely to fire off all his arrows before the situation is optimal and will never make as much money as someone who can wait.

Conversely, an impatient farmer will keep his beds free of weeds and therefore impatience and a strong inclination towards productivity works for him.

The goal of asset management or any management is to either create an environment or alternatively be in an environment that allows for optimal yield. Here optimal could mean the largest possible, the largest possible when adjusted for volatility, or the largest possible when adjusted for catastrophic loss. Like traditional management, micromanagement, which tries to increase yield by substituting time for assets, never provides the intended results.

**Investment science**

Economics (and investing) is often said to suffer from "physics envy", in that it would like to be an exact science. To do this, mathematics, which is precise though not necessarily accurate, is used to give the impression of accuracy. Using an equation is no substitute for understanding an equation. In fact, an equation isn't a black box where one cranks the handle to obtain a result.[113] Rather, it's an idea formulated in another language which just happens to be internally consistent, so that one idea may be transformed into another idea and remain consistent! In particular, the limitations of the equations should be understood--very often people make simplifying assumptions to make a problem mathematically tractable.[114] This works well in physics because the universe seems to be inherently simple. It works poorly when it comes to predicting behavior because people, even when treated statistically, are complex.

Investing is a skill to be learned. Copying requires no skill (see Gauging mastery). The easiest thing to copy is the average, since there are few numbers simpler than the average to describe a set. The average is also known as the market index. Since copying requires no effort, the cost is zero and so the return on effort is undefined. In particular, "average" is psychologically attractive, because people like to compare themselves to others and a guaranteed average usually feels better than below average.

Staying with the progression of mastery, the next stage is comparing. A particularly poor (and popular) method at this stage is chasing yield, where people compare the returns of different investments (funds, stocks, etc.) and buy whatever has recently performed the best. Never do that! It is akin to shooting arrows into the location where a prey was hit a few hours ago.

The next level is compiling (again, see Gauging mastery). Here, understanding is presented as fairly long lists of rules or tips about things that have worked well at one point or another. It's not yet understood why they have

worked and it's difficult to choose one, plus the rules never seem to apply to a given investment all at the same time.

However, having compiled a list of rules, one may use a "screen" to filter companies and even to sort them. It's thus a simple matter to calculate, say, the top ten of the list, the bottom ten, or top twenty on a combined list. This takes emotion out of the game, and many quantitative systems work on this level. This takes some effort to set up, but once it is, it can run automatically.

Coordinating rules requires understanding why some rules work better than others and why some only work in certain situations. This is a value judgment and a complex problem which is mathematically intractable. Still, even at this level you'll be competing with other investors who are likely using some of the same rules to form their strategies. The problem with these strategies is that the market is self-correcting and so opportunities disappear even as they are created. It's like a lake with a limited number of fishing spots. If people start showing up at the same particular spot, the odds of catching anything goes down for the individual fisherman.

At the highest level there are people who create new rules, that is, they find some aspect of the market and the economy that allows them to predict more correctly what the future price of an asset will be. Since they don't have to share their edge (fishing spot) with anyone, they can keep all the profit. Such research requires a bright mind and a lot of work, but the rewards are high (and of course proportional to assets). Typically, new investment techniques start at this level and then diffuse down to the lower stages as more and more people pick them up and reduce the former edge (in investment parlance called alpha) to volatility (in investment parlance called beta). Various theories are in various stages of diffusion, with some still having an edge and others appearing to have no edge at all.

Keep in mind though that you as an asset manager are not necessarily striving towards having an edge. Living off of your money will make preservation of principal, keeping up with inflation, minimizing taxes, and providing a stipend more important than outperforming the market.

# Epilogue

Upon graduating with a PhD in theoretical physics, I worked for five years as a research associate while saving around 75% of my net income and then I retired with enough money to last me the rest of my life. I now make my living, if judged by income, as a capitalist, and, if judged by (my lack of) spending, as my own personal cook, trainer, carpenter, electrician, mechanic, accountant, financial advisor, tailor, engineer, *etc.* My economic role is to invest and indirectly provide the productive factors, like factories, tools, supermarkets, and cash registers, that make work possible, rather than the 40-80 hours a week of work itself. My effort in that regard amounts to spending a few hours every month or so, and otherwise waiting for the money to make its way into my bank account from my investments. If those who work for a living knew how little time it takes to "make" money this way, they would probably be less willing to accept working 40-80 hours a week for 30-40 years. Of course, I needed to save the money that allowed me to become a capitalist, but anyone who can hold a regular job for a handful of years and who has the will to save most of it can do this, so maybe it's okay that I now get to enjoy the rest of my life without an alarm clock.

What I mainly learned from my formal education--and I'd say, in my experience this holds exclusively for going to grad school and writing a dissertation--was that *I* alone am responsible for and capable of making *my* decisions and solving *my* problems. As an undergraduate, and even when studying for my Masters degree, it was always clear that I could get the answer from someone smarter than me if my own attempt failed. It was also clear that if I didn't manage to get the correct result, it was no big deal since my work was in a certain sense redundant, as it was being duplicated by all my classmates. Furthermore, I was always being told "what" to do and "when" to do it. In that sense, what an institutional education resulting in a college degree does is to facilitate the replacement of your parents with your future boss(es), moving you from being dependent on your parents knowing better to being dependent on an employer knowing better.

Doing the doctorate, which aims for a very different goal--namely to produce independent researchers capable of doing original research--made me realize that the "They" or "Them" that people always mention in the phrase, "They'll think of something," had actually become me. As a result, I always feel slightly worried

when I hear the phrase, "They'll think of something..." This changed my attitude towards problems and solutions and I began to use the same approach that I used for my research job in the rest of my life, always trying to understand why something was the way it was, whether it could be different, and if so, how?

Instead of adopting the standard moneymanagement plan of saving 15% in an index fund in my retirement plan while getting in debt up to my eyeballs thanks to a "starter home," I started looking into the principles behind the system I was living in. I realized that the standard option of becoming an indebted consumer was just one of many, but that if anyone wanted different options, they'd have to take a different and more active approach rather than just asking "what?" and "when?" I would need another plan. More accurately, I would need a strategy, and to make such a strategy, I would need to understand the underlying principles and the world they operated in. Since there are no career tracks available for aspiring Renaissance people, we necessarily have to work with the options that are available to us and bend them to our purposes. Since everybody has different options available to them, I didn't think presenting a specific plan would be very helpful, so this is the main reason for its absence. My own history doesn't seem to follow a plan, specifically because there was no plan. I was increasing my understanding as I went along; eventually crystallizing it into the philosophy I've written down in this book. Despite not having a plan, I had an intuitive grasp of the strategy and guiding principles, and I quickly learned most of the tactics since these are very similar to standard frugal practice. The only thing left to do was to pick the level of effort (extreme) and stay disciplined.

I like the goal I eventually reached. I love not having to work for money, which means that not only do I get to set my own hours, something which is also possible for the self-employed, but more importantly, I also get to spend all day doing things that don't necessarily need to be done to meet some income quota to put food on the table, like serving on a board of directors for a nonprofit startup, volunteering my time for bike repair, crewing in yacht races, *etc*. Nor do I expect to remain interested in the same subjects all my life or that I'll follow a career track someone else laid out for me.

My withdrawal rate is very conservative, so my stream of money will very likely never run out. In fact, simply by doing nothing I'm more likely to end up with more than $1 million in net worth when I reach traditional retirement age, which is much more than what most consumers will manage to save. I'm set for life and I can do whatever I want, whenever I want, within reason, as long as I don't fall into any consumer traps. Having about 20 diversified streams of income from different investments, I never worry about being unemployed and

not having a job. Yet many are afraid of diversified investment income, despite having their job as their sole source of income, and by implication, their only source of food, shelter, and so on. The only reason that relying on just one job for money isn't considered risky is because it's a normal way of life, and most have gotten used to it or at least accept it much like they accept the risk of driving bumper to bumper at 55mph on the freeway, despite the real possibility of the driver ahead of them suddenly losing control for whatever reason. If more people spent five years saving money and learning how to live efficiently on their investments instead of spending five years to become plumbers or MBAs and zero years on living efficiently, and therefore working for the rest of their lives, financial freedom might not seem so scary. For those who are still unsure, consider that the worst thing that can happen to me, compared to someone who works for a living, is that I have to go back to work and do what they have been doing all along. Yet if the market falls sufficiently to cause me to struggle, most people will have lost their retirement savings as well and we would be in an economic situation with at least 30% unemployment. Relying on a salaried full-time job to make a living therefore does not seem any safer. In such a scenario, who would you consider more likely to do well, a consumer who relies on shopping for all his needs or someone living as I do? When I was younger, I used to deride the idea of jocks and how being a college athlete certainly didn't contribute to education; now I believe it does. The most important part of education is forming your character (see Ergodicity and destiny), whether as a worker, capitalist, leader, or follower, or whether you deal with people--that is, the social and the political--or reality. Participating in sports certainly builds character. This is partially or perhaps the exclusive reason so many people take up marathon running. Passing exams or keeping up a grade point average develops another kind of character and this is why businesses are interested in students with good grades; aside from the grades serving as a legal proxy in lieu of intelligence tests, employers know that over-achievers follow and take instruction well. Indeed, there is a common confusion between an education and a degree. A degree is something you get at college which can be used as an entry ticket to the white-collar job market. Similarly, a certification is something that can be used as an entry ticket to the blue-collar job market. However, a character transformation can be attained pretty much anywhere, whether in a classroom, laboratory, job, the Peace Corps, the military, or the swim team.

In fact, education is very different from training. Training is what you know whereas education is who you are as a person. As a result, people receiving the same training can end up with very different educations. I do believe there is a certain moral aspect to education. It forms one's character, good or bad. In that

sense, education is a form of indoctrination aimed to produce a certain attitude. This means that education works well if it reinforces and polishes an existing natural attitude, but it can be a painful experience if one is naturally incompatible with the indoctrination. This is why I don't believe that one education fits all. Ever notice how many successful business leaders are college dropouts? It did not take them long to realize that college was not helping them to become leaders and entrepreneurs. This is because a college education creates followers, or people who are habituated to being handed a bunch of instructions and then delivering a product, from years of practice. It doesn't matter what the form of the product is--that is, whether it's an essay or a math problem. The important parts are the assignments, the deadlines, the grades and the annual reviews; a structure that is repeated at the employee level in corporations. I have found that I don't make a very happy salary man--I should probably have gotten a clue from the fact that I was taking courses based on personal interest rather than strategically choosing the easy courses to optimize my grade point average--but I have, however, found that I make for a very happy Renaissance man. Like me, you may have gotten an education that wasn't compatible with your training. It may be that you don't know your type like I didn't know mine. Many confuse who they are with what they do! Some get an education for whatever reason and yet are not completely transformed into the intended result, just as children often don't do what their parents tell them to, but rather become the opposite in a counterreaction. So it will be for education. This book is my contribution to your education.

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# Footnotes

**(1)**

If you struggle to understand the book, it's likely that I'm just over-complicating and over-analyzing everything. Some like that, some don't. My life looks very similar to other extreme early retirees. Indeed, I've never thought so much about the concepts in this book as when I was writing it. Ordinarily, I don't use mind maps to fry an egg and I don't have a strategy for putting on socks. I do have a strategy for buying socks, though. I buy them all in the same color and form. That way I don't have to match them up pair by pair while doing laundry, and if one sock fails, I don't have to throw out the other one.

**(2)**

This idea follows from the belief from the Dark Ages that the best way to gain knowledge was to read and interpret 1,000-year-old books, something which still occurs in the humanities, though now it has taken to analyzing modern authors.

**(3)**

Also I found that the "quadrants" in Economic degrees of freedom are similar to the *Cashflow Quadrant* book by Robert Kiyosaki even as they were inspired by the types described in Maccoby's earlier book *The Gamesman* and the arrangement itself (the dimensions) comes from Charles Perrow's *Normal Accident Theory*. It's also possible to identify the "working man" with the working class or the working poor, the "salaryman" with the middle class, the "businessman" with the capitalist class, and the "Renaissance man" with the creative class in modern sociology. In feudal Japan, the four types were the gentry (samurai), farmers, artisans, and merchants. Richard Bartle's *Players to Suit MUDs* is an interesting paper analyzing the four different types of computer game players--killers, socializers, explorers, and achievers--classified according to their preference for *acting with* or *acting on other players* or *the game world*, respectively. That paper will teach you everything you need to know about management theory.

**(4)**

Modern movie watchers might prefer the film "The Matrix," which has a similar premise.

**(5)**

Thanks to government-induced inflation of the money supply, this is a growing number. $1 million now is considered insufficient by a growing number of people, even though most people will never accumulate such a sum.

**(6)**

The average American produces a little less than a ton of waste each year. Approximately 12% gets incinerated (plastic bottles), 33% gets recycled (metal, garden waste, etc.), and 55% ends up in a landfill. Given normal consumer behavior, most department store contents end up in a landfill within a decade. Being compacted and anaerobic--think vacuum-packed--landfills are more like tombs than composting facilities. In a study conducted by University of Arizona researchers found 25-year-old still-recognizable hot dogs in a landfill. When future archaeologists dig through the remains of our civilization, one of the things they will find are the ceramics, since ceramics are very stable compounds. Some of the biggest and most solid ceramic objects in our landfills just happen to be toilet bowls. This may be our legacy, our equivalent to the statues on Easter Island.

**(7)**

Frogs are a leading pollution indicator and are becoming threatened by extinction at an alarming rate.

**(8)**

On the other hand, there have been a few examples of the converse holding--if you buy your way into a top-ranked university, you can still succeed (make a lot of money) despite obvious lack of talent.

**(9)**

This euphemism typically means that your career is on the line if you don't obey and take the "opportunity."

**(10)**

Visit the website of The Bureau of Labor Statistics for more data on consumer spending.

**(11)**

If you don't believe me, try to give someone that isn't close to you a present you either bought used or that you made yourself.

**(12)**

govern, v. To control, restrain, retard, or regulate.

**(13)**

Although they do increase efficiency in terms of productivity per time

worked, as shown in the section on sigmoids.

**(14)**

J. Vanek, *Time spent in housework*, Scientific American, 231,5 (1975) 116-120

**(15)**

As profit is desirable, at least to the owners, without whom the business would not exist in the first place, shifting these cash flows around in time has therefore created an entire industry, the financial service industry, which until the recent stock market crash comprised 20% of the entire US economy in terms of market capitalization and 40% of GDP at the peak. This means that 20% of the economy was dedicated to moving money from person A to person B while taking a cut to do so (see this figure in Financial cash flow cycles). Needless to say, if 20% of a country's effort is spent on rearranging cash flows rather than on actually producing goods and services, this effort had better result in at least 20% more productivity for the "real" economy.

**(16)**

For the economics geeks, the availability of credit increases the velocity of money, which makes money more available, and thus decreases its value relative to goods.

**(17)**

Even greater distortions obtain if a debt-driven society interacts with a cash-based society. When the debt-driven society imports relatively cheap goods from the cash-driven society, it leads to overconsumption. The debt--claims on future production--gets exported to the cash-driven society. The repayments make the debt-driven country poorer which reduces demand and thus acts as a restoring balance. The balancing and the occasional overshoot can be financially devastating, though, particularly to the country in debt.

**(18)**

A plane has three degrees, pitch -> up/down, yaw -> left/right, and roll -> clockwise/counterclockwise.

**(19)**

It should be noted that a great amount of effort has gone into linearizing scientific work to make progress predictable and measurable. This has been achieved by using annual evaluations, a promotion system based on the quantity of publications, and milestones to force progress to occur in small incremental steps, thus making changes approximately linear. Science no longer progresses in the leaps and bounds of masters, but rather slowly and

persistently through an army of methodically progressing journeymen. This approach to research eventually leads to the point where people know more and more about less and less, which basically means that the forest is lost amidst the detailed study of trees.

**(20)**

Lately, salary men have realized the virtues of creating a buffer between their salaries and their obligations as layoffs have become more common.

**(21)**

There is a tendency to declare the present the pinnacle of evolution, but given that the idea of relying on so-called"human ingenuity" to solve problems is a few hundred years old, that industrialism, imported tea, and canned soup are more than 100 years old, and that it's a good 40 years since man last walked in the moon, I claim that from a secular, macro perspective, it has been a long time since anything radical has happened. In other words, if you took a person from the 19th century and transplanted them into the 21st century, the shift in culture would not be immense--only the change in technology would be.

**(22)**

It is also interesting to observe that practically all the proposed solutions for the systemic problems caused by technology such as overpopulation, climate change, and pollution, are technological in nature.

**(23)**

If you substitute kings with national governments, religion with the myth of progress and economic growth, and superstition with the widespread belief in technological fixes supplied by a small group of people, who are mostly unable to explain their knowledge to outsiders, you'll see that this world was perhaps more similar than dissimilar to the modern world. While modern people believe in different things, they believe in the same way as before and relate to their institutions in much the same way.

**(24)**

When suggesting a direction for the future I think many authors make the mistake of envisioning a top-down approach to what society and the people in it should look and behave like--typically an idealized utopia that is perhaps subconsciously reflective of the author's values and ideas. However, if you accept that succession (see Succession and the cycle of change) describes how society evolves, it's clear that large-scale change comes about only once the system adapts to the new "species" of humans with different behaviors. Since the societal adaptation is slow, it's therefore clear that individuals who desire to change their life need a bottom-up

approach, as they have to function within society's existing framework. Therefore an individual strategy that depends on a yet-to-exist world is of little use.

**(25)**

A caveat for those planning to pioneer a new world-changing lifestyle, though: It is worth keeping in mind that some pioneer ideas will eventually be leveraged and used to first control the masses until the masses understand and start gaming the rules, rather than following the original pioneering philosophy.

**(26)**

Due to the explosive compound growth of the human population over the past couple centuries, there are now more scientists living today than the total number of scientists who have ever been born.

**(27)**

Or at least we used to. I'm sure that someone with too much time on their hands has found a more politically correct word by now.

**(28)**

Sometimes a "housewife" salary is calculated by summing up market rates for similar services; this may be one way to do it.

**(29)**

See, for example, The Cambridge Handbook of Expertise and Expert Performance by Ericsson et. al., Cambridge University Press, 2006.

**(30)**

Currently buy and hold index investing and exchange-traded funds.

**(31)**

Assuming that income > expenses!

**(32)**

Typical prices are 1-2% of assets per year!

**(33)**

I'm guilty as charged.

**(34)**

Students and conference attendants take note!

**(35)**

You do not understand quantum physics until you can explain it to your mother--presuming that she is not a physicist!

**(36)**

For instance, boxing is not something you do, it is something you are (unfortunately the English language makes a distinction). This is an important distinction. You can't successfully do anything you are not. If you

are not a boxer, boxing is something you must practice to become a boxer.

**(37)**

This began happening to me in my early 20s.

**(38)**

The leading term is a second-order tetration, that is, $N^N$, where $N$ is the number of degrees of freedom.

**(39)**

It's interesting to note that meetings are often scheduled in 15-minute chunks for the simple reason that time management software divides the day into 15-minute chunks regardless of whether the content of the meetings takes, say, 10 minutes or 20 minutes.

**(40)**

Within the university world, course requirements are sometimes tightly coupled in that students need course A, B, and C to take course D and they need A, B and D to take E. Now, if the student has a problem passing C, this can cause his entire major to fail.

**(41)**

Likely, this list will be trivial for some--at least it was for our grandparents--if so, don't worry--there'll be more challenges to come.

**(42)**

For instance, I don't and will not own a printer. They break down all the time and are more trouble than they are worth. Also, I don't own certain investment vehicles because they're simply too complicated tax-wise.

**(43)**

In fact, action in itself seems to be the cause of many problems. Consider, for example, a middle manager eager to leave his mark on the organization (and his résumé) institutes some kind of organizational change. By itself, this isn't a big problem, but the combined impact of ten such changes from managers moving around in the system can ultimately be destructive to productivity. Perhaps a better example of this is the law or the tax code, which get incrementally more complex, though they don't reduce crime or make taxation more fair, respectively.

**(44)**

But put them on a bicycle, making it directly, physically obvious how much energy is wasted, and their behavior changes immediately. Instead of tailgating, they hang back.

**(45)**

This is similar to how many people consider a million dollar retirement portfolio a need. However, it's their want of a $40,000 retirement income

that makes it a need and only that. It's not an absolute need.

**(46)**

If you think this example is farfetched, you're probably older than 30.

**(47)**

Maybe it could serve as a ramp of some sort for dogs?

**(48)**

Conversely, turning a few old microwave ovens into a welding machine can be done faster than working to buy a welder outright.

**(49)**

This is very true for programming. Once you have the right data structure for the problem, the program becomes much easier to write.

**(50)**

This can be and was used to make laundry detergent which is as good as modern detergents but at 5% of the cost.

**(51)**

Chlorine gas also burns explosively with hydrogen, much like pure oxygen. It was a combination of oxygen and hydrogen that blew the roof off the Chernobyl reactor.

**(52)**

Overcompensating in terms of quantity (rarely quality) is a popular pastime because it fits well with the accumulation culture. A dinner set for 12? Well, if you feed 12 people on a regular basis, of course it makes sense. If you only feed 12 people once a year, take them to a restaurant and feed them there. Alternatively, ask them to bring their own silverware. It is okay to break consumer customs.

**(53)**

It will work given a lot of patience, but often this patience is hard to achieve.

**(54)**

Note that since there are three terms--write out the parentheses--the shape of the solution can be controlled by just two parameters, for example, *(dP)/(dE)=aP(1-bP)*, since the third would just act as a scale. This means that two parameters can be used to fit the form of the curve to any problem whose structure fits this model.

**(55)**

Most people store their stuff in their main residence. However, other places include the workplace, which may be a good place to store your technical books or tools, or dedicated storage units. Renting a storage unit will very likely cost less than an equivalent apartment/house with one more bedroom.

**(56)**

This is why, as a general rule, I restrict storage usage to *3/4* of full capacity; it makes it much easier to fit things in (see Decoupling and increasing complexity).

**(57)**

Effectively, only a fraction of the things we own contribute to our actual quality of life. These are the things we use on a daily basis (see How to get rid of things).

**(58)**

If you want to get fancy, you can add inflation and opportunity costs. However, the result will still be close to a couple bucks.

**(59)**

No, I'm not being paid to promote these items. I just like them.

**(60)**

Getting actively engaged in the community later led to a book deal, *The Final Energy Crisis*, Pluto Press, 2005, and several connections with international experts.

**(61)**

Durability depends on quality, but first and foremost on whether you use a dryer instead of a clothesline. Consider all the lint the dryer picks up during the process; these are clothing fibers that come from clothes. Line-drying doesn't result in a similar "sanding." With line-drying, you're closer to a 200-wash life cycle. If you hand-wash or at least run a gentler cycle, you may reach even higher numbers.

**(62)**

This happens because manufactures assume that the item is going to be thrown away rather than repaired, and thus they have ensured that no particular parts are overbuilt.

**(63)**

This can be a great idea when you don't want to own the thing--for example, toxic cleaners, cars, *etc.* It isn't great if you want fee-less ownership.

**(64)**

My local library has a web page showing new additions to their movie catalog for the most recent month.

**(65)**

When shopping online, the newest strategy is to use computers to analyze shopping trends and offer different prices to different people on different days. Using limit orders avoids this. If you want to beat the system, try

reloading the page or delete the site cookies and try again.

**(66)**

Lest I give the impression that the skilled trades are really that easy, let me say that they're easy in principle, but quickly discovering what the problem is requires a large collection of tacit knowledge. Without this knowledge, the apprentice will have to try a lot of possible solutions before hitting on the right one. In other words, the expert will be able to do the same job much faster, but the apprentice will actually be able to do the job about as well--it will just take much longer.

**(67)**

Fighting succession requires a lot of resources to prevent the next natural seral stage. Letting succession work for you saves a lot of money (also see Succession and the cycle of change).

**(68)**

Obviously this number varies wildly as real estate has a very large price range depending on location. In some parts of the United States you can get a mansion with a few acres and a lake for the price of a bungalow in the pricier areas.

**(69)**

For example, a motorhome or a boat is a home under those conditions, and thus interest on a loan for such would be tax-deductible. Also, there may be other benefits of the politically influential homeowner class to be had.

**(70)**

The same goes for doing IPOs and buying and selling stocks on Wall Street.

**(71)**

Many times the argument is made that the interest can be deducted (government subsidies). However, if the tax bracket is 25%, then paying the bank $100 to save $25 in taxes for a net loss of $75 still seems like a losing deal. If you were in a 100% tax bracket, it would obviously be a great idea.

**(72)**

Maintaining a bike in wet conditions requires about 15 minutes after each trip wiping it down, so it may be faster to leave the bike at home.

**(73)**

If appearances are important, wear an expensive suit or develop some other luxury eccentricity. It's certainly less expensive than housing.

**(74)**

Radiative (warm and cold sources in your vicinity), conductive (ambient temperature), evaporative (humidity and ability to sweat), and convective (wind chill) heat transfers. With so many variables, there are several

solutions.

**(75)**

Four layers could be an undershirt, a shirt, a sweater, and a suit jacket for the top. For the legs, long underwear and tweed pants. For the feet, double layer socks. Finally a scarf to round out the intellectual look.

**(76)**

The most efficient wardrobe will typically be based on the above mentioned base colors. It can be expanded by adding a color/shade that goes well with your skin tone, eye color, hair color, *etc.* This step is not necessary if you're okay with a bland style. For bags, belts, and shoes stick with one color. Black matches everything, but brown is more casual.

**(77)**

Perhaps being surrounded by madness redefines madness as normal, while making depression and other health issues a natural response to an unnatural situation? In other words, is it really healthy to be adjusted to an unhealthy culture? I say no.

**(78)**

Imagine how a health care system that focused on promoting health rather than treating diseases or symptoms would look. It would not be a particular institution or corporation. It would be a system which was completely integrated with everyday life to form healthy habits.

**(79)**

If the food energy is not burned, it must be stored--think of the fuel tank as being made out of expanding nonrupturing rubber, making an overflow impossible. As food is eaten but not burned, it's stored in the tank as fat. Fortunately, storing more fuel makes the body spend more energy to carry it around. This is perhaps not as comfortable for the "owner" of the body, as it detracts from the handling characteristic, but it prevents the fuel tank from growing infinitely large as the increased amount of calories required to carry it around eventually matches the caloric intake.

**(80)**

On a parallel note, The United States used to be known for its auto companies. Today, some of the biggest industrial companies are in the business of selling junk food and cholesterol-lowering drugs. Food for thought?

**(81)**

Jogging means speeds between 10 minutes per mile and 15 minutes per mile. Anything faster is running. Anything slower is walking.

**(82)**

The body which has been evolutionarily conditioned over millions of years thinks, "I'm being pursued and I don't get to eat much. How do I survive this? Better hang on to the energy I already have. How do I do that? First, by storing all the fat close to the muscles where it is going to be used (thighs and butt). Second, by decreasing muscle mass to its bare necessity--that is, just enough power to keep me jogging, which is nothing more than a controlled continuous fall forward, and by becoming a more efficient runner to use less energy."

**(83)**

Compare Anakin Skywalker to Luke Skywalker.

**(84)**

In itself, the biceps are fairly useless muscles which mainly act as support to hold the elbow joint together when pulling a heavy load. In the past, a large bicep thus suggested that the functional muscles of the back and torso, which aren't immediately apparent when seen from the front, were really strong. Similarly, the pectorals, which are visible from the front, aren't as useful as the triceps and shoulders are for pushing. Large pectorals thus suggested very strong triceps and shoulders. Definition--that is, the visibility of muscles under the skin, usually achieved through a combination of diet and exercise before a contest or a photo shoot, suggests that muscles are larger than they actually are. Tanned skin enhances contrast and shadows, further enhancing the effect.

**(85)**

The reason is that a chain is no stronger than its weakest link, and by isolating muscles, stabilizer muscles remain underworked and thus they'll limit the weight that can be lifted without sitting down or pulling/pushing in a particular direction. In real life, you rarely get to lie under the weight and get a good wide grip with both hands on a thin bar.

**(86)**

Use lots of tape and double bag the sand.

**(87)**

For weight loss it's much more important to consider total calories burned versus total calories eaten. It's much better to burn 300kcal in a high-intensity workout than it is to burn 250kcal in a low-intensity workout. The latter will burn a greater fraction of fat *during* the exercise, but there will be 50kcal left on the table.

**(88)**

It is quite sad to realize that we have become so sedentary that most of us are far from this goal. For example, looking in an old school strength

training manual, I found that being able to press your own bodyweight to an overhead position was merely considered "good," and that a "man-building" exercise constituted 10 clean and jerk repetitions with two 80-pound dumbbells. Many modern gyms don't offer free weights above 50 pounds because doing so would apparently contradict the "family-friendly" image they want to promote.

**(89)**

Push-ups are a rather poor measure of overall performance, although one can certainly do far worse; for push-ups, this is roughly equivalent to doing 115 push ups in the alloted time.

**(90)**

There are a lot of exercise myths. First, you can make a muscle larger and/or stronger or smaller and/or weaker. You can't make it longer or otherwise change its shape without surgery. Toning refers to the state of your muscle contraction. When couch potatoes exercise, their muscles initially tend to tighten up. This state of bliss lasts a couple of weeks unless the intensity is continuously stepped up; and you can't keep doing this. Unfortunately, toning is often confused with definition, that is, the ability to see muscles under the fat and skin. This leads to the spot reduction myth. Just as it is impossible to lengthen a muscle unless you undergo surgery, you can't spot reduce without surgery. The body uses the most easy-to-get fat first--typically the fat on the face, forearms, and calves; and the stubborn fat last--typically on the belly and hips (love handles). All you can do is reduce overall fat.

**(91)**

This is the reason restaurants serve high-glycemic foods like bread or tortillas and then make you wait a long time to order, in the hopes that you have developed a sense of hunger or, more euphemistically, worked up an appetite.

**(92)**

"Intermittent fasting dissociates beneficial effects of dietary restriction on glucose metabolism and neuronal resistance to injury from calorie intake.," R.M. Anson et. al. Proc. Natl. Acad. Sci. U. S. A., 100(2003)6216.

**(93)**

It's therefore possible to eat a simple diet consisting of just a few different kinds of properly designed meals, as long as they include all the necessary macro and micronutrients. However, the general recommendation is to eat a varied diet, for the same reason people are told to buy index funds when investing--namely, a lack of knowledge. By eating a wide, random selection

of what is sold in the market, it's believed that all needs will be covered. In a similar vein, much can be done to alleviate the effects of diabetes by avoiding all high-glycemic food. However, again people are told to eat the normal varied diet because it's believed to be easier to teach them to inject insulin before each meal than it is to restrict their diet and internalize an admittedly long list of glycemic indices. And given the one-size-fits-all approach, the institutions are probably correct. Knowledgeable individuals may make better personal choices, however.

**(94)**

I hate to sound like a Luddite, but from the perspective of financial and consumer independence, nearly everything was done better in the "old days." Many modern innovations are only an improvement insofar as one is a shareholder of the company producing them (See Foundations of economics and finance).

**(95)**

Take care of cast iron pans and they will last a lifetime--that is, your lifetime.

**(96)**

Someone who is used to walking will clock just under 4mph on a sustained basis. Sedentary people or hikers who are not used to fast walking barely reach 2mph.

**(97)**

This is not compensating for the likelihood that the cyclist is likely healthier than a sedentary driver and is thus inherently expected to live better and longer.

**(98)**

These pertain to US traffic regulations and generally don't hold in Europe.

**(99)**

If we have, unknownst to me, reached the point of personal bathroom assistants, I don't want to know about it.

**(100)**

Check out www.earlyretirementextreme.com.

**(101)**

Although I must admit that practically all TV shows show people living a high-consumption lifestyle, and while they may have all sorts of interpersonal problems, they never seem to have any money problems.

**(102)**

Libertarians (believing in low economic control, low social control) have a similar problem when dealing with left-wing (believing in high economic

control, low social control) people or right-wing (believing in low economic control, high social control) people. With either group there is something to agree with, but there is also something to disagree with. A preference for agreement or truth comes down to personality type.

**(103)**

They are finite on time scales shorter than geologic time scales.

**(104)**

In a capitalistic society, this option is not open to all, but neither is working (100% employment).

**(105)**

If you haven't started making money yet, seriously consider getting into a field with guaranteed income potential. About the worst thing anyone can do financially is to spend four years piling up student loans for a degree with a low starting salary. Here it's not so much the starting salary which is the problem as it's the debt. If you're going to finance a degree, you better calculate the internal rate of return first.

**(106)**

For example, I'm a freelance editor and I bring in a few hundred bucks a month whenever the mood strikes, but I could theoretically make a six-figure income if I put in the same effort as I used to put into my salaried job.

**(107)**

Business students may note that this equation is very similar to the formula for a fixed rate mortgage. Reading further along, mortgage holders will then realize why "mortgage" is French for "death pledge." It's essentially a financial construct to keep a person working all his life in exchange for the privilege of owning a large house. Conversely, this financial weapon can be turned around and used to become financially independent and retire extremely early.

**(108)**

Much like P/E and earnings yield are each other's inverse in stocks.

**(109)**

Those who are familiar with the equation of a perpetuity may be slightly confused about the $(1+i)$ term. The reason for it is that the withdrawal of principal and the addition of interest does not happen at the same time. Hence, the portfolio needs an extra boost of $(1+i)$ to make it back up to the traditional perpetuity value after the first withdrawal.

**(110)**

Anyone who can do better than that should start a hedge fund. Consistent

outperformance on that level is worth millions.

**(111)**

There are plenty of books describing how to invest in stocks, real estate, businesses, *etc.* but this isn't one of them.

**(112)**

Some will point to low-or no-fee arrangements, but these often have a price in opportunity costs. A consistent underperformance isn't cheap either!

**(113)**

The difference between an engineer and a scientist seems to be that the scientist understands this, but the engineer does not, nor does the economist.

**(114)**

The efficient market theory is such a simplifying assumption. It simply says that price equals value. Without this assumption, a person would have to find the value of every company in the stock market. Instead he can simply say that the value equals the price. This is a genius insight, insofar as it renders the problem mathematically tractable, but it isn't technically true. It's similar to how the insight that gravity is a two-body force and that the gravitational force between the sun and each individual planet is much stronger than the force between the individual planets makes it possible to compute planetary motion. In astrophysics, this always holds true. In economics and investing, it only holds in most cases. When it doesn't, we have market bubbles and crashes. These occur when a substantial number of market participants start behaving according to how the market is behaving--that is, how they themselves are behaving. Their behavior becomes self-referential without them realizing it! In particular the problem is now that the average of all investors is so well tracked that a large fraction of the market responds to the average--and as it very often happens, decisions are strongly influenced by what can be measured, rather than what should be measured. In other words, the market is guided by factors (trading, retirement savings) outside of what it really is (equity financing of businesses). This should make for more volatility, and this is indeed what we see. A great example of this is walking along with a group of people in a new place, like a resort or a city, without a map. It often happens that nobody really knows the way, but everybody thinks that somebody in the group knows the way. As a result, the group will walk along for quite a while, appearing to make decisions until someone finally asks if anyone actually knows where the group is heading. The ensuing discussion can be quite amusing: "I thought *you* knew where we were going." "No, I didn't

know. I was following you." With the popularization of herd behavior and "crowd performance"-based investment techniques, the market now tends to act in exactly the same way.