

Motivation, action, and uncertainty

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people. The overall objective is to help readers decide what to do and be happy to act on what they have decided, even if things are somewhat incomplete or uncertain. The approach is rational and pragmatic. The focus is on personal decisions and motivation, not organizational decisions or motivating other people.

It offers insights and solutions for a range of difficult phenomena often linked to 'motivation', ranging from those moments when we just don't feel like doing something to periods in our lives when we profoundly doubt the direction or meaning of our lives. This includes situations where:

- we once thought something was a good course of action for us, but now we are in doubt and reluctant to start;
- others think we should do something but we are unwilling and struggle to understand why or suggest any logical reason, so we delay starting; or
- we find it hard to continue with an important but challenging project because we find our willingness is ebbing away.

The direct solution to almost all motivation problems is to develop a better plan for yourself with a more robust rationale. Usually, getting more information helps in this. The long-term solution is to develop greater ability at making and evaluating plans for yourself. The interesting details concern what extra information to seek, how to improve your plans, and what processes to use.

Although this publication is written in plain English it contains many ideas and connections, some not obvious. Careful reading and re-reading may be necessary.

The first section of the publication makes some general observations about this whole area. The second section offers a

breakdown of potential problems with motivation and plans, and links them to potentially useful techniques described later. The third section describes the characteristics of good plans. The final section is the core content: a collection of 50 powerful techniques for creating good plans and so tackling common problems that arise with motivation/direction in our lives. Each of these is tied to the situations in which it is useful, creating what is sometimes called a 'pattern language'¹.

There is a lot of content here so if you want to get most benefit from it you will need to come back to it repeatedly, learn the techniques, and so gradually build your skills. The material is too rich in ideas to be evaluated quickly.

2. Uncertainty and motivation

2.1 Motivation is largely rational

Our thinking is generally more rational than is often thought. Motivation is neither a kind of fuel nor a baseless psychological commitment. Motivation is tied to a particular course of action, unlike energy, which can be applied to any course of action. Motivation is the result of believing that our course of action is the right one, or at least a good bet.

When we say we are 'motivated' or 'have motivation' we mean that we have motives (i.e. good reasons) to do something.

It makes no sense to say 'I know what I want to do but I cannot find the motivation to do it.' This kind of conflict is not a failure of motivation but a misreading of the situation. Logically

¹ This is rather an odd name for a collection of often-useful solutions to commonly-occurring problems, but perhaps the idea is that the names of the techniques are the 'words' in the language.

reasonable alternative explanations include:

- 'I know this is something I probably should do but I am not really convinced.'
- 'I want to do this but not right now because I feel tired.'
- 'I know what I want to do but do not know how to start, so I am stuck.'

Typically, the strength of our motivation to do something varies with the strength of the rationale for doing it, and a stronger rationale can be created for a good plan. If we are sure we have an outstanding plan, for good reasons, then we usually carry it out determinedly. If we think we should be doing something else instead then we will probably do that other thing. If our preferred course of action has a weak rationale then we probably will not pursue it determinedly. Instead, when we feel a bit tired, we will give it a miss. If we have some distracting alternative activity then that may be chosen instead. If progress is poor then we will quickly be distracted by doubts about the plan and thoughts about what we might do instead. If the rationale for a course of action is weak then there is a larger risk that we should be doing something else.

Alternatives to starting the best plan we have include thinking more, resting then thinking more, hanging on until a deadline forces action, and waiting while hoping that someone else will solve the problems or they will just go away. One of these alternatives may be the best option. If we are struggling to find a satisfactory plan then we may find the experience tiring, worrying, or both. This can become a deep sense of being stuck. We might even start to avoid thinking about our problems because the experience is too unpleasant and debilitating, reducing our chances of

developing a better plan and ending our misery.

Since motivation is driven by the quality of our plans and the robustness of their rationales, developing a better plan with a more thorough rationale will usually increase motivation. Beyond that, having greater ability to make and evaluate plans helps motivation in two ways. First, it gives us a better flow of attractive plans with robust rationales. Second, we can expect ourselves to upgrade our plans in future, and to detail and execute them better. This gives us more positive expectations for our current plans.

However, it may not be obvious at first how to improve our plans, rationales, or planning abilities. Problems with 'motivation' are usually more subtle than often thought. Our doubts about courses of action may well have legitimate, rational grounds that need to be addressed, or may be the result of subtle reasoning mistakes within an otherwise mostly rational view.

The purpose of this publication is not to help people get motivated to do things they already think they want to do. That would be irrational. It is to help readers develop courses of action that they also know are good for them or, at least, a good bet so they will carry them out determinedly. It is also to help readers improve their planning and plan-evaluation skills.

2.2 Fluctuations in motivation

Our motivation to continue with our chosen courses of action varies over time.

In some periods of our lives, we are content with our work and relationships and simply enjoy them and the patterns of behaviour that we have developed.

In a typical day most of us experience long periods where the justification for our

actions is solidly established, usually being entrenched in mutual commitments with other people. For example, we go to work each day because not doing so would trigger a difficult situation, eventually leading to job loss and potentially serious career problems. Given our situation the best approach is clearly to get up and go to work. We rarely agonise over it.

At other times we have the opposite situation, with a seemingly endless set of possibilities and little to help us choose between them. If we do choose a course of action in this situation, we may find it hard to focus on it without being distracted by alternatives. We may be deeply uncertain of our best direction.

Sometimes we face major choices with profound and lasting implications for us, such as choosing an educational course, a career, a lover, a job, or a new place to live. At these times we may be undecided for days at a time, uncertain of which to choose, and so unmotivated to proceed with any of the options. (But we will be motivated to decide.)

2.3 Motivation through life

The fluctuations in motivation follow some typical patterns as we go through life.

Other things being equal, motivation tends to improve as we get older and more experienced. This is because motivation is higher for courses of action worked out in good detail with predicted outcomes that have an attractively positive distribution. Typically, the more competently we plan and predict, the more of these we will have and the more motivated we will feel. Competence develops over time through learning. Our predictions also reflect our assessment of our own ability to solve new problems as they emerge, and that too will tend to rise with increasing life experience and competence.

This overall pattern is modified by some other effects.

There are some things that get more difficult as we age and become less important because we have fewer remaining years at stake. This is particularly noticeable when we are elderly, especially if we live alone.

When we are children our parents and other adults provide important action planning functions for us. For example, they encourage us to put effort into schoolwork and avoid getting fat for reasons they understand but most young children do not. The adult knows that progress at school helps a person's prospects and their contribution to society. The child more often just does the work because they do not want to get into trouble and sometimes it is fun or at least less boring than doing nothing.

Many children experience motivation problems with activities that are good for them in ways they do not understand, but adult guidance and encouragement help.

When a person transitions from childhood to adulthood (during their teens or early twenties) they will try to plan and choose for themselves. They may use adults increasingly as advisors rather than take their instructions or may reject parental guidance.

This period usually includes some major life decisions about education, careers, and sometimes romantic relationships. There may also be relocation (e.g. living away from home for a university course) which brings day-to-day self-care challenges and new relationships. There may be medical decisions that now fall to the young person instead of their parents.

In all these there is a risk of getting stuck (i.e. unable to think of a satisfactory way forward). The action planning challenge is

high but the person's ability is still relatively low.

A young person's assessment of their own competence may be confused by large differences in competence across their different skills. Many young people develop amazing abilities in academic subjects (e.g. mathematics, literacy, science), sports, and computer games. In all these areas they benefit from structured, graduated, massive practice opportunities and usually receive systematic instruction and coaching. In contrast, they may have had little instruction in the life skills they need in their teens and have almost no personal experience. They may have received bad advice from friends or the internet.

Some young people are protected from feeling stuck by irrationally positive assessments of themselves and their plans, helped by poor awareness of negative possibilities. Others are more aware of the potential for problems especially in some areas of their lives (e.g. getting a job, making and keeping friends, finding and keeping a lover, choices about medical help). They may have high aspirations but low expectations of themselves, making them less content with the plans they have.

It may not be a coincidence that rates of depression and substance abuse peak in the late teens and early twenties.

Other life events that create new challenges and the possibility of struggling to make action plans include starting a new romantic relationship, starting a family, changing job, and relocating. All these tend to be more common at particular ages and stages of life.

2.4 The variety of motivation problems

The general solutions to motivation problems are (1) to develop a better plan

with a more robust rationale, usually after getting more information, and (2) to increase our ability to devise good plans with robust rationales. However, there are many different specific ways that our 'motivation' can be problematic so no one technique solves all problems.

A particular problem might be dominant for a particular person on a particular occasion but next time they struggle a different problem could be the reason.

The real challenge is to work out, quickly and accurately, which problems are facing us in each situation, so that we can act effectively to resolve them.

2.5 Typical situations

Here are some situations where 'motivation' is a well-known issue:

- **Persistence/diligence:** Keeping going with things that are good for us but a bit boring or tiring – exercise, tidying, maintenance, healthy eating, studying, working hard. We often wonder if these efforts are paying off and whether they are worth continuing.
- **Abstinence:** Continuing to avoid doing things that are bad for us – eating junk food, boozing, late night gaming. When temptation is strong, we again wonder if resistance is worthwhile.
- **Direction:** Education and career choices. What to do if you run a business. These are high stakes decisions in the face of huge uncertainty, mostly about the far future.
- **Anomalies:** Where we feel strangely reluctant to do something that most other people think is a good idea and very likely to be good for us.

- **Activation:** Where it is hard to do anything at all. We feel stuck, demoralised, depressed, even ill.

Our thinking is slightly different if we have made a commitment to a course of action. If we are not yet committed to an action and discover an extra disadvantage with it our determination to take the action is usually reduced. However, once we have made a commitment then the discovery of an extra disadvantage usually causes us to try harder to overcome it.

2.6 Some unhelpful techniques

Some techniques often offered as solutions to motivation problems have serious weaknesses, often because they fail to understand the rational nature of motivation and the role of uncertainty.

2.6.1 *Following your dreams*

The often-heard idea of 'following your dreams' can lead to mistakes like these:

- Accepting a preference for a course of action that you developed without much thought or knowledge, perhaps in childhood.
- Choosing a career goal that reflects the desirability of the end goal but not the chances of getting there or the likely consequences of failure.
- Choosing a career goal according to your welfare with no consideration of the welfare of others.

Following your dreams more often leads people to want to be singers than actuaries, sports stars rather than builders, and TV presenters rather than estate agents. Childhood dreams tend to focus on the job roles that children often see (e.g. movie star, sports star, singer, police officer, teacher, shop worker) and overlook the important roles that children rarely see (e.g. accountant, manufacturing supervisor, warehouse worker, engineer).

Following your dreams is probably one reason why more people want to work in entertainment than can find jobs there. In these popular areas there are a few, visible successes and vastly more nearly-invisible failures.

It is better to do up-to-date research and consider more information and more options. Considering the welfare of others is a good step towards finding future roles that will be valued and, therefore, rewarded and secure.

2.6.2 *Seeking happiness*

One objective for life that seems to have unexpectedly negative effects is to pursue happiness. In theory, if you intend to pursue happiness then that should help you achieve it. In practice, it seems that most people who try this end up less contented, more lonely, and less happy (Kahriz et al, 2020) than they otherwise would have been. Presumably, they make a mistake.

This flawed pursuit of happiness typically leads to long periods of dissatisfaction before, during (Mauss et al, 2011), and after activities that are at least somewhat enjoyable (Kahriz et al, 2020). It also leads to greater loneliness (at least in Western cultures), probably because happiness is associated with individual pleasure and achievement (Mauss et al, 2012). The demands of friends and family can seem like an unwelcome distraction from more important things.

This may also be linked to addictive behaviours (e.g. food, drugs, internet use, gaming, gambling) because:

- dissatisfaction is a predictor of later addiction (e.g. Peeters, Koning, & van den Eijnden, 2018);
- intense happiness leads to lack of caution and increased willingness to try dangerous activities (e.g. binge

eating, drugs) (Gruber, Mauss, & Tamir, 2011); and

- the feelings provided by many addictive behaviours are a form of happiness.

Feeling happy for long periods is statistically linked to mania and psychological problems (Gruber, Mauss, & Tamir, 2011).

These problems from seeking happiness may be due to an unrealistic view of how much happiness can be expected.

A more realistic view of happiness recognises that we feel definite happiness infrequently and for short periods (e.g. a few seconds or minutes). Most of the time we feel neutral – neither happy nor unhappy. Often we feel discomfort in the form of physical aches and pains, nausea, tension, and anxiety. Occasionally we feel unhappy. For most people a good state is one where we feel comfortable (i.e. warm enough, no aches or pains, not hungry or thirsty, not too tired) and unworried.

Maintaining a lifestyle that provides this optimal mix of long periods of comfort and occasional, short bursts of mild happiness requires effort. Usually this means doing chores, work, and getting exercise. Some of this is tiring and sometimes uncomfortable. A trade-off is required.

The effect of pushing for an unusually high level of happiness, especially one that is sustained for more than a few minutes, is often a downwards crash afterwards. Push moods up too far and they tend to swing down.

Another possible reason why pursuing happiness often causes problems is that people are not very good at predicting their happiness. The links between our actions and our long term, all-things-considered happiness are complex and not well understood.

2.6.3 *Just goal setting*

Setting goals in itself does not help a person achieve more and can be counter-productive. Visualising the great outcomes you desire may even have a negative effect on achievement.

The problem is that having a goal does not mean you have a plan to achieve it, still less that you act. Results are achieved by having a specific, feasible plan of action and acting. You cannot even start to act unless you have at least one practical step of your plan in mind.

The occasional negative effect of having goals, especially when desired outcomes are imagined, is because people tend to feel that they have already achieved the results they imagine and this reduces effort towards achievement (Oettingen and Mayer, 2002).

2.6.4 *Time management without enough time*

Time management is likely to be successful if you are currently wasting time on activities that have little or no benefit. It is sometimes hard to know which these are because resting is necessary.

Time management can also be helpful if you are flitting between activities but not finishing them before deadlines.

However, if you can't do a task in the time available, even when you are doing nothing else, then you need a better method of doing the task, not better time management. If you do not have an effective method for the task then no amount of time management will bring success.

2.6.5 *Self-administered rewards and punishments*

One approach to motivation is to promise yourself a reward for doing an action, such as food or some other treat. You might also set up a punishment.

The two obvious problems with this approach are that (1) it distorts the costs and benefits of an action, biasing your evaluations, and (2) the promises tend to be unconvincing because you are supposed to enforce them on yourself.

Self-administered rewards and punishments lack credibility in a similar way to pure affirmations i.e. telling yourself something over and over in the hope you will come to believe it despite the lack of convincing evidence.

3. Problems with motivation and plans

This section presents a breakdown of potential problems with personal motivation and courses of action.

Throughout, the term 'course of action' is used as an encompassing term for things we could do. It includes plans, designs, approaches, processes, practices, techniques, and so on.

To choose our courses of action wisely, know that we have done so, and therefore be motivated we need the following:

- The ability to think of good courses of action and evaluate them, including the ability to predict the consequences of alternative courses of action.
- Information about our situation and abilities.
- From which we need to develop:
 - at least one intended course of action, with
 - a rationale for taking that course of action,
 - that takes into account our current state (e.g. energy level, health).
- Feedback on the value of action we have taken.

Here is a summary of these elements:

Contributors to motivation:

Abilities

Information

Course of action | Rationale | State

Action

Feedback on value

Now here is an analysis of ways that this can go wrong. (The patterns referred to in SMALL CAPITALS as solutions to these problems are explained in the next section.)

3.1 Abilities

A person's ability to think of good courses of action might be poor due to low cognitive ability or lack of knowledge of good potential solutions to commonly occurring problems. As a result, they may struggle to form any course of action or may form ideas that, if executed, would perform poorly.

There might also be problems predicting the consequences of alternative courses of action. A person who cannot do this at all will struggle to choose between alternatives (though there are alternative methods for choosing that do not require predictions).

More often, a person may have a poor ability to predict the future, either because their predictions contain little useful information or because they are systematically biased in some way.

Another potential problem is being overwhelmed by the complexity of possible future courses of action and possible future events. The person may structure their thinking incorrectly, leading to poor choices.

Underlying many of these issues is something called bounded rationality.

We often behave in a largely rational way, especially when we have time to think, we are doing something where we have become expert, and when the stakes are high.

We mostly want to make the best use of our time and other resources. We are also most willing to do the things that make best use of our time and other resources.

Consciously or not, we often consider the net benefit of alternative courses of action. That might also mean taking particular note of the peak effort required, or worst pain or discomfort.

We tend to react in a broadly sensible way to new information and new realizations.

However, there are limits to our thinking. We cannot consider every possibility and we are often hindered by huge uncertainty². We tend to review our plans only in a limited way because challenging everything on every occasion would be overwhelming.

Sometimes we get confused by our options. We focus on whether to go ahead with a course of action or not, failing to clarify what else we could do with the time and other resources involved.

Being overwhelmed by possibilities may leave us feeling confused, unable to clarify our options, and perhaps also lost in uncertainty. We need to find ways to structure the possibilities so that they are ordered and not overwhelming. We need to find ways to search for good courses of action in the most likely places (because it is impossible to check every theoretical possibility) and ignore what are probably dead ends.

We also need to accept that finding the best course of action is usually unrealistic.

² The term 'bounded rationality' was introduced by Herbert A Simon. It is explained again in Simon (2019).

We need to be willing to go ahead with an action that is only satisfactory, though this is easier if we know we have flexibility to change in future.

Useful patterns to respond to bounded rationality include SATISFICE, PLAN WITH PERFORMANCE PERIODS, PLAN WITH ROLES, ADAPT TO UNPLANNED PROGRESS, CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS, EVALUATE AGAINST HEURISTIC CRITERIA, CHOOSE FOR EFFICIENCY, and RETRIEVAL PRACTICE.

3.2 Information

To make specific predictions, a general ability to predict the consequences of our actions needs to be combined with knowledge of our current situation and abilities.

Lack of this information, combined with limited ability to predict, can lead to great uncertainty about the consequences of action and so to difficulty deciding what to do.

Part of evaluating a course of action to decide if it is a good use of resources now is thinking about what will happen if we do it. How hard will it be to do and what will it achieve? This is often very uncertain, particularly if we need to look far into the future. This is one of the hardest parts of professional risk management for large projects in organizations and policy decisions by governments. It is hard for individuals too.

These factors can increase uncertainty about future effects:

- Novelty
- Complexity
- Effects into the distant future
- Feedback loops
- Non-linear effects
- Stocks and flows
- Lack of direct control over results

- Competitors
- Dependency on the perceptions and evaluations of other people.

Many career and business planning problems have most of these factors. If something goes well and people respond positively and strongly then this could lead to a virtuous circle where a good reputation leads to more success. Or something else could happen.

Consequently, the plan could have hugely positive results or could fail despite long effort.

When we are uncertain about the effects of courses of action, we can struggle to decide what to do and, even when we have made a choice, we lack strong commitment to the course of action we have chosen.

Typically, thinking more and getting more information will give us more certainty about the effects, but not always. Sometimes we make discoveries that make us less certain.

This problem of overwhelming uncertainty can feel like a persistent inability to make up our minds. We have some interesting alternate courses of action but cannot decide which is best. Maybe we have tried to predict the future but it was too hard.

Useful patterns for these problems include RECONNAISSANCE, BUILD PROBLEM SOLVING KNOWLEDGE, BUILD KNOWLEDGE OF CONSEQUENCES, USE SIMPLE NUMERICAL MODELS, SATISFICE, WRITE ABOUT THE FUTURE (CERTAINTY FIRST), GET MORE INFORMATION, DEVELOP STRATEGY BOTTOM UP, MAKE FLEXIBLE PLANS, DEFER COMMITMENTS, BUILD RESOURCES BEFORE TAKING RISKS, ADAPT TO UNPLANNED PROGRESS, EVALUATE AGAINST HEURISTIC CRITERIA, PURSUE WELLBEING (NOT HAPPINESS), EVALUATE AT 10-10-10, CONSIDER THINKING MORE, EVALUATE ADVICE, CHANGE AT THE MARGINS, and MAKE SMALL DAILY COMMITMENTS.

3.3 Course of action

Not knowing a good way to do a course of action makes doing it less attractive for three reasons:

- It makes the effort involved look large.
- It makes the likely benefits look small.
- It makes the downside risk look large.

If we have no idea how to do something or a poor plan then we expect to struggle and to achieve little, possibly making matters worse.

People vary in what they know how to do and this is one reason they evaluate the same course of action differently.

More thinking about the plan for a course of action usually results in a better plan and so a more positive evaluation of its net benefits and more willingness to go ahead.

A similar effect occurs because people have different skills. If we spend more time developing the skills needed for a course of action then that course of action will usually look more attractive as a result.

Lack of a plan can be experienced as feeling a bit lost, stuck, or surprisingly reluctant to do something that seemed to us like a good idea, or that others are saying is a good idea. They seem to know what to do but we do not, or we have a feeling we do not know how to do all the steps of the action. It may be that we feel reluctant but have no idea why.

The problem could be one of these:

- We had a viable plan where every step is something we know how to do, but have forgotten that plan. Perhaps it is not very clear in our minds, or we are struggling to recall the steps.
- We had a high-level plan but now, thinking about it or just trying to get

started, we realise we do not have enough practical detail.

- We have part of a plan but one or more steps are not worked out in enough practical detail to be performed.
- We had no plan at all. (Perhaps we just had a goal but no steps to get there.)

Useful patterns for these problems include BUILD PROBLEM SOLVING KNOWLEDGE, PLAN THINKING, SCULPT LIFE PLANS, DEVELOP STRATEGY BOTTOM UP, PLAN WITH PERFORMANCE PERIODS, PLAN WITH ROLES, MAKE FLEXIBLE PLANS, DEFER COMMITMENTS, BUILD RESOURCES BEFORE TAKING RISKS, CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS, PURSUE WELLBEING (NOT HAPPINESS), EVALUATE AT 10-10-10, PLAN WITH RESOURCE ALLOCATIONS, PLAN WITH TIMETABLES, CHANGE AT THE MARGINS, PLAN METAWORK TIME, MAKE SMALL DAILY TIME COMMITMENTS, PLAN FREQUENT REST TIMES, PLAN WITH ROUTINES, MAKE AND LEARN A BETTER APPROACH, ATTACK PERSISTENTLY UNSOLVED PROBLEMS, and CHOOSE FOR EFFICIENCY.

3.4 Rationale

A rationale for doing something is the thinking that shows it is currently a good use of our time and other resources.

Lack of rationale might be experienced as a simple lack of any feeling that an action we intended to do, or someone has told us to do, is a good use of time. Here are some possibilities:

- We have never considered the rationale for the action.
- Someone else has a rationale and explained it but we did not understand or remember it.
- We knew the rationale once but have forgotten all or part of it.

- Nobody has a good rationale for doing the action.

Useful patterns for these problems include BUILD KNOWLEDGE OF CONSEQUENCES, USE SIMPLE NUMERICAL MODELS, RELEARN YOUR RATIONALE, and RETRIEVAL PRACTICE.

The strength of the rationale for some actions varies over time.

E.g. Many people resolve to get fit in January. At that time they are feeling particularly unfit and overweight after eating and drinking too much in Christmas and New Year celebrations. They have also been off work for a few days and feel they have time and energy to exercise. They start exercising, perhaps paying for gym membership. A month or two later they feel a bit slimmer and fitter, but they are also getting tired and short of time now they are back at work. They miss a session, or two, and soon stop going to the gym altogether. The serious gym members get their space back and enjoy the subsidy provided by the lapsed exercisers.

A pattern to address this is PREDICT FLUCTUATIONS IN STRENGTH OF RATIONALE.

Sometimes we find we are losing motivation for something because a problem remains persistently unsolved. We may, perhaps for good reasons, have been anticipating finding a solution or, at least, making progress but now the progress so far is disappointing.

To address this we may need to do a proper reassessment of the course of action (PROCESS INDICATIONS THOROUGHLY), or may need to make a strong effort to make progress on the persistently unsolved problem (ATTACK PERSISTENTLY UNSOLVED PROBLEMS).

Sometimes we delay starting something because it seems to be difficult to do except in particular circumstances. For

example, perhaps it needs an undisturbed period of two hours, or a few days. Or perhaps it requires us to feel in top physical condition, or to have enough money as a reserve.

Useful patterns for these problems include PLAN WITH TIMETABLES, KEEP SOME MANAGED SLACK, BREAK TASKS DOWN, MAKE SMALL DAILY TIME COMMITMENTS, REFINED PUT-DOWNS AND PICK-UPS, and RETRIEVAL PRACTICE.

3.5 State

Sometimes we just don't feel like doing something because we are not in the right state for it. At this instant, the course of action may or may not be something we should act on. We might say 'I have no motivation today'. But motivation is not a fuel that we need a supply of. More likely the problem is that we feel one of these:

- Tired
- Sleepy
- Hot or cold
- In pain (e.g. a headache – perhaps not a very bad one but just enough)
- Ill (e.g. nausea, shivery)
- The wrong mood

This means that an action that is a good idea for us typically is perhaps not the right action at this moment because it is currently too hard.

Useful patterns for this situation include TOLERATE PERFORMANCE VARIATIONS and CHANGE STATES DELIBERATELY.

3.6 Feedback on value

Once we start to take action we begin to expect to see results. If we have inadequate feedback then we can become discouraged, even if we are making worthwhile progress without knowing it.

Sometimes the outcomes produced by a course of action are not easy to see. This

is true for many efforts to get healthier or fitter, to develop expertise, and to do things to help society as a whole or protect our natural environment. Either the difference is not visible, or it is slow and gradual.

If the feedback is too late, unreliable, or incomprehensible, then again we may be discouraged.

Our expectations for seeing worthwhile outcomes tend to rise over time so if the quality of feedback does not meet those rising expectations, we can lose motivation.

A pattern to address this is IMPROVE PROGRESS DATA.

We can also be misled if we receive indications of progress, or lack of it, and do not process those indications fully and correctly.

Sometimes we can sit down, focus, and carefully evaluate evidence and our options. In between those times we also revise our views about what we should be doing but without the benefit of a comprehensive review. These mini-revisions are often prompted by new information that weighs in our minds without being carefully analysed (i.e. partly processed indications). Several problems are possible from these.

Finding an obvious inefficiency in a course of action triggers thoughts that there might be a better course of action still to be discovered. This is a big issue for study courses at school and university because they often include useless material. It also affects large purchases, such as shopping for a car, where the discovery of a problem with our favoured model can lead to a renewed search.

Even a major flaw does not necessarily mean that the option is not the best. It is reasonable to be prompted to look further when we find one of these problems but it

is helpful to recognize what is happening and not get caught in a never-ending search for a perfect option.

If we receive a series of indications that a course of action is a poor one or that some alternative is a good option, we may either under- or over-react to these if we have not carefully integrated their combined effects. It may be useful to write out the old and new information and consider it carefully and comprehensively together.

Sometimes, a bad experience doing something in the past causes us to avoid it forever more. This could be irrational if things have changed. For example, if a medical procedure did not work for us 30 years ago it is irrational to expect the modern equivalent to be no better.

Sequences of successes tend to give us a good feeling and encourage us to make more effort. Sequences of failures have the opposite effect. We are not always very careful in evaluating what counts as a success or a failure. We like to see that things are getting done, that we are capable, and that we are getting more capable. If we are not getting that confirmation, we can become discouraged.

However, we may fail to consider the difficulty of a task and be discouraged or encouraged to the wrong extent as a result. Or we may overlook the fact that we are facing fewer tasks for some reason. Some people need to have successes nearly all the time to keep going while others can function even when they have experienced many failures consecutively.

It is crucial to understand the degree of difficulty faced and to recognize even small achievements and improvements. This is important to sustain our willingness to start new actions and for our willingness to continue with ongoing

actions. Continuing with ongoing actions is discussed in more detail in a later section.

Useful patterns for these problems include DEFER REACTIONS TO UNPROCESSED INDICATIONS and PROCESS INDICATIONS THOROUGHLY.

4. Characteristics of good plans

This crucial section describes the characteristics of good plans. Just knowing these may help you create better plans for yourself, but the section that follows this one will explain techniques for generating good plans.

Typically, plans involve us taking action and then the action having consequences that eventually are outcomes we want. Ideally, the actions should be easy and pleasant while the outcomes are considerable and good for us. Often, subtle tweaks can make a plan significantly more attractive.

4.1 Resources used

Other things being equal we want to minimize the resources used to take action. These resources include our time, energy, health (because some actions damage our health), money, and space. We might also be concerned about the resources of other people, pollution generated, and so on.

Ideally, resources should be efficiently used. However, this is far from the only consideration.

4.2 Feelings generated

Taking action can generate feelings for us and these may be more important than resource consumption.

Negative feelings include fatigue, pain, nausea, embarrassment, and shame. Often, subtle changes to body position, use of tools, or the way we describe our actions to others can have large, helpful effects on our feelings.

E.g. Desperately cramming for an examination is likely to be tiring and unattractive. However, spreading the effort over more time, working a bit slower, and taking frequent rest breaks will make the effort less unpleasant.

E.g. Doing a task in the garden or home without the right tools often feels unpleasant because it involves uncomfortable body positions and puts strain on small body parts, such as fingers. Using the right tool often allows us to do the task in a more comfortable position and spread the load over larger muscle groups. Instead of strain and pain we get a gentle workout that might even be welcome on a cold day.

E.g. Imagine that you cycle to work each day and on your route there is short but steep hill. If you pedal up it you sweat heavily and arrive at work damp and smelly. By walking up that hill you can avoid the unpleasant feelings of sweat and lingering dampness, and the embarrassment of feeling smelly and looking sweaty.

E.g. Suppose your holiday starts with a four-hour drive but you hate driving, especially for so long. To reduce this you plan two stops along the way, one for shopping and the other for a short walk in the countryside. The time taken from start to finish is more but you have already started your holiday on the route and avoided the unbroken tedium of four hours on the road.

Positive feelings include physical pleasure, effectance (the feeling we enjoy when we can see we are making things happen easily), and social happiness.

E.g. Some people find a task easier to bear when they have company they enjoy. Others like an excuse to be alone.

E.g. Taking exercise can be made more pleasant in various ways. Watching videos can reduce the boredom of low intensity gym work. Swimming can give pleasant, relaxed feelings of weightlessness. Others enjoy the sense of speed from cycling. Others enjoy competition. Others dance. Game computers can create the illusion that our exercise motions are causing spectacular effects, giving heightened feelings of effectance.

Sometimes we can alternate between useful action and pleasant treats.

4.3 Available resource fit

Rarely do we have just one plan to carry out on any particular day. Instead, actions we could take jostle for our attention. Plans that contain tasks that are hard to fit into our day can be delayed and unattractive.

Tasks fit the available resources more often if they:

- are quick to do;
- are undemanding physically and mentally (so we do not have to be unusually rested to start and will not be left exhausted);
- do not create a risk of something time consuming or tiring happening immediately or soon;
- are easy to pick up and put down without a lot of wasted time; and
- do not require a special location or time of day.

E.g. Imagine you have to revise for an important examination. You make key notes, photos, and knowledge quizzes available on your phone. Now you can fit in a few minutes of revision at almost any time.

4.4 Outcome profile

Sometimes the consequences of our actions are just what we wanted and predicted. However, more often we are not sure exactly what the consequences will be and there may be some negative effects along with the positive ones. Occasionally we cannot see how to succeed but start anyway, hoping we will discover a way to succeed later.

Before we act, and while we are acting, we have a sense of what the outcomes might be. This can be thought of as a probability distribution over the possible outcomes.

We would like that distribution to have little or nothing that is unwanted ('risk'), with all the likely outcomes being positive. In other words, we want little or no downside and lots of upside. Although we usually feel happier if the outcomes are more predictable, we will accept more uncertainty if it is caused by the possibility of wonderful but unlikely outcomes.

4.5 Incrementalism

One characteristic of good plans that cuts across some of the others is incremental delivery of valued outcomes. This incrementalism achieves successful outcomes a bit at a time, as you go along, and is almost always the best approach. The opposite of this is working for a long time with no valuable results until the end.

E.g. Most houses are built in such a way that the house cannot be used until all construction work is finished. This is not a problem for large housebuilding companies constructing simple buildings in large numbers³. However, it is a problem for ambitious, innovative, self-build projects that will

³ But they will often finish one building on a large site quickly to use as a show home and may have some buyers move in before all the homes on a site are finished.

be hard to do and hard to afford. For these it can be helpful to finish part of the building early so the owners have somewhere better to live than a caravan nearby.

E.g. If you want to create a website, do not spend months building it on your home computer, aiming to upload and launch it when everything is in place. Instead, start with a very simple website and upload it to the web without delay. Then make it better, day by day, week by week, uploading the improved site each time.

Incremental delivery of valued outcomes has some huge advantages:

- The first valued outcomes are received earlier.
- Learning is faster and earlier, including learning how to achieve best results and learning what those results will be.
- The peak investment of resources is reduced since payback starts earlier, offsetting the cost of actions.
- If the work is interrupted by events, value has already been received and waste is reduced.
- Agreement to start is usually reached more quickly and easily because the risk profile of the plan is more attractive.

4.6 Flexibility

Another very desirable characteristic of plans is flexibility. Flexibility allows adaptation to changing circumstances, goals, and abilities. It also allows improvements to the plan as better ideas emerge. Flexibility and incrementalism naturally go together.

Often, plans for the current increment are detailed but plans for later increments are not. Although it sometimes helps to work out crucial details far in advance,

lightweight planning for future increments is usually a good thing. Planning effort is wasted when plans change, which they often do. Excessive plan detail too far into the future can reduce flexibility because we feel reluctant to change from a plan we have worked so hard on.

5. A pattern language

This section presents techniques for creating plans with the positive characteristics discussed in the previous section. It presents the techniques as a pattern language with patterns put into groups with similar objectives. Many of the patterns support each other and are often used together.

For each pattern a standard explanation format is used.

5.1 Develop ability to plan and decide

The following patterns contribute in various ways to our *ability* to plan and decide.

5.1.1 Reconnaissance

This pattern is similar to and supports GET MORE INFORMATION.

E.g. Tina has accepted a great job offer as a project manager in another company and is due to start in three weeks. She has already learned a lot about the company and the role to win the job but does not stop there. She wants to increase her factual knowledge of the company so that, whatever challenges her new job throws at her in the first few weeks, she is well informed and well placed to solve the problems that arise.

Using the internet she learns about the company's history, structure, operations, scandals, court cases, product launches, top team, major

successes, and current challenges. Within a few days she knows more than many of the company's employees and feels better prepared.

New situations often bring unpredictable challenges but we can prepare by increasing our factual knowledge in advance.

Useful sources of information may include material from the internet (e.g. website pages, videos, podcasts, news stories, presentations by employees), talking to people, visiting locations, and reading books.

In addition to being better prepared you may be able to identify some potential problems and opportunities, and even lay some plans.

In summary, we are likely to face challenges we have not predicted so:

Prepare mentally by gathering and learning potentially useful information.

5.1.2 Build problem solving knowledge

E.g. Marina has always been concerned about the natural environment and sustainability, but as she nears completion of a course on how to be an interior designer her interest starts to become more practical. She reads about products for home decorating that are less polluting, such as organic fabrics and special paints. She learns about home heating and ventilation systems, about special types of insulation and windows. She gets enthusiastic about low-energy cooking gadgets. As she learns more about the total environmental impact of all these things she begins to realise that everything matters, not just the products she buys. She learns about different work processes, about reclaiming objects and materials, about

timing refurbishments, and so on, and on. Even as she struggles to get a job as an interior designer she keeps on learning more.

Her efforts make her head a giant database of good design ideas for sustainable, beautiful, low-cost interiors and renovations. Gradually she develops her own design principles to help her use the huge mental database of solutions she has acquired. She practises redesigning rooms she sees in magazines.

Effort is needed to build a stock of good solutions to common problems.

When she does get a job she soon finds that her wealth of good solution ideas is useful almost every day. Soon her boss is asking her for ideas on every job and often uses them. When Marina does her first proposal for a client it is in competition with two other design companies but Marina's scheme is chic, easier to live in, lower in cost, and environmentally far superior to the alternatives. Her company wins the job.

A better stock of design ideas leads to better designs that generate stronger motivation to proceed.

As the years go by Marina⁴ just keeps getting better and she is soon a partner in a leading design company. Her advice is sought after and many of her clients stay with her for years because she makes plans for the long term and has suggestions for every room and the garden, adapting as the owners age and as items need replacement or refurbishment. Her stock of great design ideas means that

her proposals are often the ones that people prefer and adopt.

Coming up with good plans and designs usually requires a lot of carefully acquired and refined knowledge of good solutions to typical problems.

Being good at planning and design usually requires more than intelligence and a design process. A much more important driver of success is a person's stock of good design ideas and this is typically acquired over time through persistent effort.

In the example above, the problems and solutions were in a specialist professional domain. Other knowledge of problems and solutions will be common to most people, covering domains such as relationships, money management, food, accommodation, and travel.

A person with a good stock of solutions will tend to have better ideas for actions and designs, be more positive about the future, and be more motivated to move ahead.

In summary, we are more likely to go ahead, enthusiastically, with good designs and plans, and these require expert knowledge so:

Build knowledge of typical problems and good solutions to them.

5.1.3 Build knowledge of consequences

E.g. Eva and Terri are sisters with very different approaches to life. For example, Terri enjoys a large coffee from her favourite coffee shop every day. She hardly notices how much it costs and has no idea what she spends over a whole year. Eva used to have the same coffee but then, as part of a wider effort to understand how saving money would affect her life, she calculated how much it cost her each year (£620 – the equivalent of working

⁴ Marina's is, sadly, a fictitious example like all the others in this publication. However, if there is a real-life Marina out there, please get in touch because your advice will always be appreciated.

for about 52 hours at her job); she was shocked and now makes a better coffee at home for a fraction of the price.

Developing better understanding of the consequences of our actions can help us choose more wisely.

She also worked out how much more quickly she could afford to buy her own flat if she saved more money each day (moving from saving about £3,000 a year), and how much that would save her over her life. Saving £20,000 at a rate of £3,000 a year would take 6.67 years but at £3,600 a year it would take only 5.56 years – about a year less. Eva considered rent to be wasted money (compared to buying) and was paying £600 a month rent, so this was a saving of £8,000.

In summary, in 6.67 years she would save £4,000 on coffees and £8,000 on rent. The more she thought about how nice it would be to own her own place and perhaps choose who shared with her, rather than having to accept the decisions of landlords, the more she valued coffee at home.

She also worked out how many disposable cups she was saving and their carbon emissions. She had always known the pleasure the coffee provided, but the cost was a surprise.

The implications of our actions can be hard to understand, but without that understanding we often have no rationale for acting well.

Having a sense of the impact of our actions, including actions we repeat many times, requires us to build knowledge about the implications of actions. Just building this kind of knowledge is a powerful step towards making better plans and decisions.

Among other things, this is a type of knowledge that helps resist short termism when it is dysfunctional. For example, it helps you:

- resist eating too much now to avoid becoming poor and obese later (and for a long time);
- keep working hard in the gym to feel better a few days later and be healthier after that;
- save some money today to get something more important, perhaps with longer lasting benefits, later;
- go to bed now instead of gaming all night to feel less negative tomorrow and make more progress in your life; and
- work hard on studies now for a better experience of studying in future, better results, and more career options.

Developing this knowledge of consequences might be done as part of making a particular plan or decision, or separately. In the illustration above, Eva does the calculations about her coffee habits as part of a wider effort to understand how her lifestyle would affect her future.

Most importantly, if this pattern of thinking about consequences is repeated many times a body of knowledge will develop that informs and motivates many actions. It makes a person generally more focused and motivated than someone who has no idea of the consequences of their actions.

Many aspects of our lives are similar to most other people and the usual consequences of actions are quite well understood by most mature adults. Typical elements of a person's life are birth, childhood, education, work, family, retirement, illness, and death. Working harder and more effectively at education,

and choosing to learn knowledge that is useful, makes us more capable and impressive and this affects where we start in the world of work, and how fast we progress. Spending time making friends tends to lead to having more friends and meeting more potential life partners. Working hard and effectively in a job affects our progression, income, and job security. Taking care of children diligently makes it less likely that they will die, be ill or injured, and more likely that they will be happy and progress well in their turn. Saving money along the way leaves us with more at retirement and greater security in our old age. These are only the most obvious points and most mature adults could elaborate for hours on these themes.

However, children, teenagers, and young adults may be less aware of these connections and consequences. This is important because the actions we take when young can have a profound effect on the rest of our lives.

In addition to age, differences in experience, intelligence, curiosity, and approach to life contribute to large differences between people in their understanding of the consequences of their actions. Some have almost no idea what their actions lead to and may struggle to justify any efforts at all. Others have strong ideas about the results of their actions but these are incomplete and highly misleading, so their choices are harmful. Still others have well developed knowledge of possible futures and this gives them the drive to keep going and the wisdom to do good things.

The more you know the better your knowledge guides you. However, sheer quantity of knowledge is not the only factor. The qualities the knowledge should have are listed and explained below. Each quality is picked out in bold.

Your knowledge should be **solution-oriented**, in the sense that it incorporates possible actions you could take and their likely effects. For example, you might think 'If I did X then I could also do Y and that would improve Z'. A person without solution-oriented knowledge might not realise there is an opportunity to do Y and so not realise that X would be helpful. For them the future looks less positive.

E.g. Josh chose to start a degree in mathematics because it was his best subject at school and he could not think of anything else. He struggles to work hard on the degree course.

Karina chose maths because it has good 'employability' and she wants to get good results in examinations. She understands how effort she makes translates into marks and how a good result will help her get a good job after university. She works hard but only on the mathematics that will appear in the examinations and does not expect to need mathematics later in her life. In her mind this is just temporary.

Karina is predicting consequences but not thinking much of additional things she could do to exploit the results of the efforts she is making now.

Junhan chose maths for career reasons at first but has been learning more about the value of each module within mathematics as a whole and in applied mathematics in particular. He has also connected these topics with other interests he is developing. He has realised that some modules are a platform for others, and that some are much more relevant to professional use of mathematics than others. He has started to focus his efforts on those modules. While he wants to get good grades, he is more selective and also willing to learn mathematics that is not going to be in an examination.

Junhan is thinking more about how he can build on his efforts now by doing other things in future.

Roberta took a similar approach to Junhan but soon realised that quite a lot of her course had little practical value. After some thought, she decided to take those parts as an opportunity to develop her learning skills. She sees mathematics as a modelling toolkit and those theoretical dead ends are still interesting exercises in toolkit development, which she sees as important in applied maths, computing, and problem solving generally.

Karina, Junhan, and Roberta all have solid motivation to continue because they understand the implications of their efforts, but Josh is struggling. Junhan's understanding of the value of his efforts is more comprehensive and likely to guide him well, but he is at risk from a late discovery that some of the material is of low value. Roberta's motivation is the most robust because she has already seen that problem and worked out a solution.

Your knowledge should also **recognize uncertainty**. Often, outcomes are *influenced* by what we do but not *determined* by what we do. We can only improve our odds. Predictions of the future should be able to capture potentially positive surprises and negative surprises. For example, many things we do are mostly failures but we keep trying because the occasional success is so valuable compared to the cost of repeated attempts. Conversely, there are many negative outcomes we need to consider carefully even though they only happen very occasionally.

A typical bias in human thinking is a tendency to think we have more ability to predict and control the future than we

really have. Knowledge of consequences should guard against this bias.

Another type of bias is caused by having only a partial understanding of the consequences of our actions.

To avoid this, our knowledge should, ideally, trace **all major causal pathways** and, hence, all major types of effect. Gaps can lead to bad decisions. In the example above, Terri knows the pleasure the coffees give her but has not properly considered the various costs the coffees cause.

Drawing a picture with bubbles and arrows can help us think more broadly about consequences, including indirect and unintended consequences.

As a result of tracing all major causal pathways, our knowledge should be balanced in the sense that it predicts **both positive and negative consequences** of our actions.

One reason for having incomplete and, therefore, misleading knowledge of future consequences is a tendency to think about only the desired effects of actions we have already decided we want to take. The purpose of developing this knowledge is to make better decisions on actions, not to support the same decisions we have made in the past.

A tendency to think the future will turn out as we want it to is a typical bias, but people suffering from clinical depression tend to think the opposite⁵. They imagine that everything will turn out badly. However, like most other people they are too confident of their gloomy predictions.

Our knowledge should **give value to the consequences** we foresee. This often

⁵ For example, this is studied a bit further by Zetzche, Bürkner, and Renneberg (2019) and approaches to reduce this stubborn negativity are tested by Kube et al (2019).

comes from looking further into the future or from translations. In the example above, Eva thought about how saving money would allow her to buy her own home a bit earlier. This was more than just thinking about how much money she would save directly; she thought about what having more cash in future would mean for her life. This *thinking further ahead* allowed her to value the coffee savings better. She also *translated* the price of the coffees into the number of hours she had to work to earn that much money.

In decision theory methods it is quite common to translate outcomes of different types to numbers on a common scale so that they can be combined into one number representing the overall value of each decision option. This is a way to simplify problems. Instead of thinking even further into the future, we give a numeric value to an outcome at a particular stage and stop thinking further ahead.

For example, we might summarise in terms of money. Money itself is not a better life, but we can use it to get a better life, so we usually accept that having more money is better than having less.

Our knowledge should help us understand and value the consequences of actions **across periods in the future**, especially into the far future (e.g. to the end of one's life).

Sometimes we are better able to cope with a task at some times than at others. For example, if you are unwell for a few days then there are things you usually do that you can leave until you feel better. There may be other things that you cannot leave but perhaps you can do them during a period when you are not feeling quite so bad. As an example on a longer time scale, it is a mistake to buy a

dog as a pet a year or so before starting a family. Without children the dog may be relatively easy to care for but with a baby it is an extra burden you could do without⁶.

Thinking about how easily we can cope with challenges at different times in our lives is vital. Our ability to cope is influenced by physical maturation and aging, the accumulation of skills and experience (including solutions to particular problems in our lives), the accumulation of lasting assets and money, and the work of looking after children and elderly relatives.

As a result we typically have lower ability to cope with extra demands when we are children, young adults short of money and experience, parents of young children, and when we are frail with old age. We usually have higher ability to cope when we are older adults before starting a family and after the family has grown up but before old age sets in.

Some problems are best put off until a time when we can solve them more easily; others are best dealt with now before things get tougher. For example, many people should downsize their homes when their children grow up. The work of maintaining a larger home, perhaps with a garden, is tough when elderly. This downsizing should be done before you are too old to cope with the work and worry involved in moving.

Money can, to an extent, compensate for low physical and mental coping ability and higher workloads. Building up some savings makes a huge difference to security.

There are also long-term trends in society that can make things harder or easier over

⁶ Fatal dog attack statistics show that a new baby is also at risk from a dog already in the home. Dogs are competitive and also predators.

time. In the UK, technological advances make most things cheaper in real terms over time, for equivalent performance. Housing is perhaps a rare exception because of our growing population. Some issues in our lives can reasonably be pushed into the future to some extent in anticipation of technological solutions being created in future, though this is a risky course.

Another important time-related issue is that, when we think about the future, we tend to view time in a strangely distorted way (unless we use calculations and logic). Our intuitions about time tend to make an hour in the far future feel like it is less time than an hour now (e.g. Takahashi, 2005). When we are young, old age can seem unimportant and unattractive. When we are older we realise that life is better than we expected and surprisingly long.

Specifically, in the UK full time education usually lasts about 17 years and, at the time, may seem like an eternity. Working life may last around 45 years (but for most people only an initial period involves career progression). Retirement on average is about 16 years, but a few people live on for as much as 20 more years after that. These are long periods compared to childhood.

Period	Yrs	Graph
Pre-school	4	--
Education	17	-----
Work	45	-----
Retirement	16	-----

It may help to make these numbers explicit and show them as a picture. For example, if you get a tattoo then it will look good for how many years? And then

for how many years will it look like a grey-blue skin disease or an area of scarring following removal?

If you become obese in your youth then this will create a problem that will probably be with you for the rest of your life, even if it is punctuated by occasional dieting successes. A few years of indulgence should be set against decades of suffering.

The knowledge of consequences should **quantify the consequences** where possible. The quantification does not have to be perfect to be much better than unaided judgement. Sometimes some internet research is needed. Here are some simple examples:

- If we eat too much consistently, we will put on weight but not indefinitely. Eventually the extra calories used by a larger body will match the calories we eat. There is a relationship between how much we eat each day and the eventual weight we will reach⁷.
- The cumulative effect of daily money amounts, daily wasted time, and daily waste creation can easily be calculated.

One major reason for quantification is the ability to **combine, accurately, many small effects**. (This is different to combining multiple factors of different types by translating them to a common measure of importance, which we also do badly by judgement alone.)

Combining multiple small effects by judgement, without calculation, is very difficult and we do it badly. We tend to ignore anything that seems to be of low

⁷ See Katan and Ludwig (2010). An extra 60 kcal per day would eventually add 2.7 kg (average). Unfortunately, when we try to lose weight our bodies take steps to conserve calories by burning less to stay warm, so a larger than expected calorie deficit is needed.

importance considered on its own but those individually insignificant effects can be important in aggregate.

Here are some examples:

- £2.75 for a coffee is just a small amount of money but accumulated over a year it becomes an amount worth thinking about.
- 1% interest on your savings may not seem like much but 1% compound interest on £30,000 for 15 years gives £4,829.
- What is the cumulative impact on your quality of sleep from a workout at 8 pm, a cup of tea at 9 pm, and browsing the internet until 10 pm? What if that leaves you a bit too wakeful to start getting ready for bed so you spend some time on social media and texting until midnight? The hours of sleep lost from this behaviour must be made up or you will feel sleepy, gloomy, and hungry the next day. Lost sleep also accumulates from one day to the next (Dement and Vaughan, 1999), so half an hour a night for 5 nights means the week will feel increasingly miserable as it drags on and requires a 2.5 hour lie-in on Saturday.
- Imagine you are looking for a job. Suppose you estimate that adding your CV to one more database will increase the number of people who see it by just 2%, improving the CV will increase the shortlists it reaches by 2%, practising telephone interviews will improve your success rate in getting to final interviews by 2%, and getting a haircut will improve your odds in interviews by 2%. Each of these improvements seems so small it is hardly worth bothering with, even though easy to do. Yet, in total, they improve your chances of getting a job

by a useful 8.24%. (It is more than 8% because these gains compound.)

Ideally, our knowledge should give **accurate predictions of details**, but this can be difficult.

Our knowledge should cover the **implications for other people** as well as for ourselves. A major factor in acting morally is to understand how our actions affect others and so choose considerately. For example, Hungerford and Volk (1990) discuss factors found, by research, to be important in getting people to act in a responsible way towards the natural environment. Knowledge of the issues is one of the crucial factors.

This is the end of the explanations of the qualities our knowledge of consequences should, ideally, have.

In developing knowledge of the consequences of actions we could take there will be disappointments. Often, an attempt to predict a particular outcome will be unsatisfying and unhelpful. However, over time a persistent effort to learn more about the results of potential actions will build a body of knowledge that is a powerful asset.

In summary, the more we know about the consequences of our actions the better we can make plans and decisions, so:

Develop more complete, detailed, reliable, and solution-oriented knowledge about how actions might lead to consequences.

This pattern is supported by USE SIMPLE NUMERICAL MODELS.

5.1.4 Use simple numerical models

This pattern supports BUILD KNOWLEDGE OF CONSEQUENCES.

E.g. Gemma is an auditor, which means she spends a lot of her working time talking to people and looking at documents to gather evidence, then analysing it, doing tests, and writing

reports, which then get argued over before any action is taken. She wonders how effectively her audit interviews gather and use the evidence available. Like any good auditor, she makes a spreadsheet to automate the calculations.

She represents the total amount of evidence available in the interview as 100%. What proportion does she ask for? She guesses it is maybe 70%. What proportion of the answers does she hear and understand correctly? Maybe 80%. What proportion of this does she correctly record in her file? Maybe 75% she thinks. What proportion of this remains after some is ignored because she has also written down some things that are wrong and that undermine the credibility of her notes to some extent? Perhaps 70%. What proportion of that appears in the final report, either explicitly or because it supports summary statements? About 60%, because some conclusions are only tentative and get left out. What proportion of the evidence is wasted because the readers of her reports do not notice it, do not agree with it, do not accept it, or just decide to take no action anyway? That's about 60%, leaving 40% still used.

In total, what percentage of the evidence available is, ultimately, used? That amount is $100\% \times 0.7 \times 0.8 \times 0.75 \times 0.7 \times 0.6 \times 0.4 = 7.1\%$. Gemma can see from the model that there is scope for improvement at each stage and she speculates about what would be worthwhile trying. Each time she adjusts the numbers to see what difference the improvements would make. It is clear that several small adjustments combined would help. For example, with the improvements she has thought of, the calculation could become: $100\% \times 0.8 \times 0.85 \times 0.85 \times$

$0.9 \times 0.75 \times 0.45 = 17.6\%$. That would be about two and a half times better.

Unaided human judgement is bad at combining multiple factors, especially if there are many small elements, and bad at being precise. Simple calculations can aid judgement.

Helpful models do not have to be accurate or validated, though these things are very desirable. Sometimes it is helpful to simply understand what could be true. Models can also give a sense of the importance of uncertainties and sensitivity to interventions.

Models come in different forms. The model in the example above is purely multiplicative. Additive models are also possible, and hybrids, and more complex forms.

E.g. Zac is a student with fairly typical study habits but he is dissatisfied. The problem he really wants to reduce is the time he spends in lectures totally confused and making no progress. He sees this as painful. He also feels some pain when trying to do the problems set for his modules and, later, when trying to revise material that he did not quite understand and has largely forgotten. Surely there is a better way.

He looks at videos on the internet and sees some advising doing some study before each lecture, then reviewing content soon after lectures. This seems like more work, not less, so Zac is not attracted at first. However, he does some calculations on a spreadsheet. He can see that some pre-lecture study will increase the proportion of lecture time that is useful and reduce the proportion that is painful. Combined with a quick post-lecture review he can imagine that making a difference to how long he spends on problems and, later, on revision. His calculations, based on nothing more

than his intuitions about time, tell him that by doing the extra things he can keep his useful study time the same yet cut his overall study time by 13% and his painful time by 70%. He tries some variations and finds that this pattern remains even if he is somewhat less optimistic about the effects. In particular, reduced pain is a clear benefit of this study pattern.

It's only a theory, but enough for Zac to decide to try the advice for two weeks to see how it goes.

Simple numerical models can also help us deal with uncertainty. It is relatively easy, using a spreadsheet program like Excel, to do calculations many times using different values for important estimated numbers. There is also a technique called Monte Carlo simulation that lets us try combinations of different values for important estimates on a massive scale and combine the results in useful graphs. This is a lot easier than it sounds but still outside the scope of this publication.

In summary, combining many factors, especially with precision, is not done well by unaided human judgement, so:

Create simple, quantified models and use calculations to combine information (including judgements) instead of relying only on judgement.

5.1.5 Get calm to tackle distressing problems

E.g. Candy has just finished the first year of her law degree and is deeply disappointed with her examination results. Some were in line with her aspirations but two results were affected by a relationship issue that erupted during the week of those exams. She was so upset by the relationship issue and by the ensuing exam results that she finds it hard to

think about how she is going to come back from these setbacks.

So, for two weeks she focuses on getting calmer about those two issues. Instead of trying to solve her problems and make new plans she focuses on the facts that she is not in any physical danger, she has other friends, she can study law effectively and do well in exams, she has time to solve her issues, and she is otherwise happy with her life. Gradually her emotions ease and she feels increasingly ready to make new plans.

Being upset by a problem can get in the way of solving it, but there are things that can be done to get calmer first (Leitch, 2020).

Having a great plan to overcome our problems is reassuring and reduces stress reactions, but what about when we do not yet have that plan?

In this case we can almost always confirm to ourselves that we can relax and stop worrying because:

- We will not need to make an immediate, intense, physical effort (fight or flee).
- We do not need to tense our bodies to brace for impact or freeze to hide. We are safe.
- We do not need to solve our problem right now; we have time to rest and deal with other issues.
- We do not need to focus completely on searching for information on a particular uncertainty immediately and until the uncertainty is resolved. We can turn our attention elsewhere.

Other techniques that may help include systematic desensitization using relaxation techniques and getting psychological distance by imagining someone else has the problem, not us.

In summary, being upset about an issue can get in the way of making good plans to overcome it, so if this is a problem then:

Get calmer about the issue before trying to solve it.

5.1.6 Plan thinking

This pattern supports many other patterns.

E.g. Sarah is starting to plan a summer holiday for herself and her husband. The idea is to tour the south coast of England, staying for a short time in each location, then moving on via some interesting location about half way along each journey. This will avoid long car journeys without a break. Sarah is determined to design the best holiday possible and get excellent value for money.

The planning is complicated so Sarah plans her thinking on a piece of paper. She notes down small mental tasks she can do, such as listing her favourite destinations, identifying potential dates for the holiday, checking journey lengths on the internet, and locating useful shops along potential routes. She places these tasks on the paper so that things to be done early are near the top and then links tasks with arrows to show where doing one task would make another easier. She then works through her plan, ticking off tasks as she does them. Sometimes she revises or extends her plan. This helps her be systematic and avoid a lot of fatigue and stress.

Thinking is itself an effort and can be harder if it is disorganized and unfocused.

It takes some skill to plan our thinking in this way and some plans will not work out very well. However, the effort is usually worth it. A key element of the technique is to make each task easy by making it

small, feasible, and preparing the way through other tasks that are completed beforehand.

In summary, thinking itself is effortful, so:

Plan larger thinking tasks by drawing a plan with tasks that build on each other and work through the plan on an easiest first basis.

5.2 Develop and maintain life plans

The following patterns are for higher level personal planning.

5.2.1 Sculpt life plans

E.g. Paige is a second year undergraduate studying psychology at an English university. She is doing well academically but, perhaps more importantly, she is slowly transforming herself. She and five other siblings were raised by a single mother and a succession of her boyfriends on one of the roughest estates in the country. Paige was 8 years old when she realised that she was much, much smarter than her mother and most other people she knew. Paige's decision to go to university was a shock to her mother, who knew nothing of higher education and had assumed that Paige would go on to be a young mum on benefits like her.

Now away from home, Paige has taken control of her diet and lost the pale, slightly grey-tinged skin she had as a child. She has changed her hairstyle and clothes, softened her accent, and started to correct her mistakes in English. For example, she now says 'those books' instead of 'them books'. Paige never smoked and hardly touched alcohol. Now she has started to go for walks for exercise and is learning to play badminton.

Instead of an inevitable life of poverty and bad decisions she now faces a

world of attractive possibilities. Her problem is, which to pursue? She needs some life plans but with so many options she feels a little overwhelmed.

She opens her laptop and starts to think of facts about her life and future and then deduce what she can from them. For example, she has chosen to study psychology and her reasons are also relevant to her choice of specialism and career. There are many areas she can ignore. For example, she is not interested in banking or finance generally and she is bored by the entertainment industry. She finds some useful statistics about the careers people most often choose after completing a psychology degree and looks at further qualifications for educational and clinical psychologists. Gradually, she narrows down her options by discarding broad areas and focusing on what is left.

She is single but would like to find love and have a family of her own – one man and two children maximum. This also leads her to some simple realizations. Gradually her future becomes just a little clearer. She has a long way to go before she has a clear favourite plan, but this is a good start.

Making plans for your life is hard because of the deep uncertainty and large number of options.

A life plan should not be created and then followed, with no changes, determinedly. Plans of all kinds tend to become obsolete very quickly as events unfold. A realistic life plan might need to be revised often. It may also need to chart more than one possible future.

The overwhelming problem, often, is a sense that there are too many options and too many unknowns to make a plan, and

that any plan chosen will, therefore, be just a guess and almost worthless.

One way to tackle this is to come at the problem from multiple directions. Start from different observations about the world, ourselves, our circumstances, and so on. Then deduce what we can from each one. Use this method to discard broad areas and gradually focus on the best areas.

A visual metaphor for this is the way a sculptor takes away material from a large block of stone or wood, roughly at first, but more precisely as the figure begins to emerge.

In summary, life planning is difficult but can be helpful, so:

Develop life plans by using different sources of information to point towards some possibilities and away from others.

This pattern is supported by WRITE ABOUT THE FUTURE (CERTAINTY FIRST), and by DEVELOP STRATEGY BOTTOM UP, PLAN WITH ROLES, MAKE FLEXIBLE PLANS, BUILD RESOURCES BEFORE TAKING RISKS, and ADAPT TO UNPLANNED PROGRESS.

5.2.2 Satisfice

This pattern supports SCULPT LIFE PLANS.

E.g. Ravi has just started his own business to do website development from home. He wants to make a plan for his business and for two weeks does a lot of thinking and research to make what he thinks are crucial choices. In particular, he wants to decide which development tools to use, which client sectors to specialize in, and how to go about marketing. After the first two weeks he is still struggling to decide on development tools and client sectors, partly because they all seem about equally challenging and there is quite a lot of uncertainty.

He thinks about spending some more weeks trying to make up his mind, but then has a crucial realization. If he chooses any of the leading contenders and starts trying to get clients then he will be doing better than if he keeps wrestling with his choices. A good enough plan, executed, is better than taking no action due to indecision.

In many real-life situations it is impossible to know that you have made the very best possible decision or created the best possible plan or design. Instead of optimizing we need to satisfice.

An aspect of rationality is that it is bounded (Simon, 2019). This is because the number of possible alternatives in most real decisions is too great for all possibilities to be considered fully, evaluated, and compared with all others. Besides, we have too much uncertainty about the effects of most courses of action to make a confident choice.

Because of this, we can almost never make an optimal choice and, even when we do choose the best, we usually cannot know that we have done so. Thinking carefully, gathering and using information, and being logical are good things to do but there are limits to how far this takes us. Sometimes just choosing one of the leading contenders at random and getting on with it is better than wasting more time on analysis that it is very probably futile.

Choosing an option that is good enough, though not necessarily the best, is called satisficing.

If we lose the will to act whenever we doubt, we have the best possible plan then we will rarely be able to act at all. We must be willing to act on weaker rationales too. We need to be able to act when we have a good enough plan, a plan that is probably one of the best, the best we can think of for the moment, or just a

good bet along with several others we might have chosen to act on.

The risk of missing out on a better approach can be managed to an extent by continuing to refine our approach over time, especially if we plan our actions to GET MORE INFORMATION, MAKE FLEXIBLE PLANS and DEFER COMMITMENTS.

In summary, knowing we have the best possible approach is usually impossible, so:

Be willing to satisfice rather than insisting on optimization. Act on a good enough plan even if you do not know if it is the best plan.

This pattern is supported by GET MORE INFORMATION, MAKE FLEXIBLE PLANS and DEFER COMMITMENTS.

5.2.3 Write about the future (certainty first)

This pattern supports SCULPT LIFE PLANS.

E.g. Shanice is in her second year at university, studying mechanical engineering. She's doing well and on course for a good result. But what should she choose for a career and how will that guide her choice of options in her third and final year at university? Shanice starts with a large, blank sheet of paper and asks herself what she 'wants' to do. This does not work, so she starts to sketch a timeline showing the things that will almost certainly happen in her future and when. She thinks about the family life she would like and where she wants to be living. Her father's health is a worry. Then she looks further into the future and wonders what jobs will be in particular demand and which will be over-supplied with people. She looks at some official statistics and sketches some trends. She also thinks about the aging society, climate change, and some trends in engineering. Gradually,

the future starts to take some shape. She begins to jot down some ideas for her own career.

Making big, long-range plans is particularly difficult because of the high uncertainty and seemingly unlimited range of possibilities for action.

Because the possibilities in the far future seem endless it helps to support our minds with written notes. These could be a diagram, an essay, a table, or in some other format. Something that can easily be edited, rearranged, and expanded is ideal.

Think about how things will change for you as the days, weeks, months, and years go by.

Write down first what is most certain about the future. What conditions will you almost surely face? How will you change, almost regardless of the decisions you make now? Fill in what is nearly certain because that helpfully constrains your thinking.

Demographic trends are among the most important and predictable predictions we can make.

Technological trends linked to major challenges for humanity are also relatively obvious. Sustainability will remain a challenge for many decades to come and technological innovation is the key to success.

Our own aging and that of our families is another relatively certain area.

In summary, the far future can appear overwhelmingly complex and uncertain, so:

Write about the future, perhaps with a timeline, and focus on the most certain points first.

This pattern is supported by GET MORE INFORMATION and PLAN WITH PERFORMANCE PERIODS.

5.2.4 Get more information

This pattern supports SATISFICE and WRITE ABOUT THE FUTURE (CERTAINTY FIRST).

E.g. Deanna is thinking of cutting down on the amount of meat she eats. She wants to reduce the CO₂ emissions caused by her diet but is concerned that she might suffer from malnutrition if she does. In particular, she is worried that she might be short of protein. She looks online for articles on the subject but they seem complicated and inconclusive. Since this approach to getting more information has failed, she tries something else. For a few days she records her diet in detail and calculates the quantities of various nutrients, including protein.

This shows that she is currently eating enough protein for her body size and level of activity. She then calculates the difference it would make if she replaced some of her meat-based meals with something based on vegetable alternatives. There is a clear risk of being short of protein unless she is careful to use high protein vegetable substitutes where she would have eaten meat, and sometimes increase their portion size. This will compensate for the lower protein content of some plant-based substitutes compared to meat.

She decides to go ahead and cut her meat consumption, but with care.

Many of our decisions are in the face of high uncertainty, but it can be reduced with a little effort.

Too often we try to work from what we already know and try to answer the question 'what do I want to do?' purely by searching our own feelings.

Obvious ways to get more information include searching the internet, asking people, and keeping records. News media

tend to provide information that is incomplete, biased, and often misunderstood by the writers. It is better to use data from sources such as the Office for National Statistics and scientific papers. (Try Google Scholar instead of ordinary Google.)

To get most value from record keeping, turn your numbers into appropriate graphs.

It helps to focus on what can be said with reasonable certainty to create a context for what is uncertain.

In summary, it is often possible to reduce uncertainty by further research, so:

Gather more information using techniques such as internet search, asking experts, and keeping records.

This pattern is supported by EVALUATE ADVICE.

5.2.5 Develop strategy bottom up

This pattern supports SCULPT LIFE PLANS.

E.g. Phil likes music and wants to earn money by making music. The problem is that he cannot read music, cannot play an instrument, and all his attempts to solve these problems over several years have failed. He just cannot get his hands to do what they need to do and music 'theory' makes no sense to him. His grand plans have consistently failed because of this. However, Phil has been working as a computer programmer and one day comes across some software that lets him write computer programs that then generate music. Phil tries using it and makes quick progress. The types of music possible this way are limited but still he writes some stylish and catchy pieces within a few weeks. Now he has a tactic for making music that really works for him. He begins planning to develop this ability and find an audience for his creations. Finally,

his plans are built around something that works.

Sometimes plans fail because crucial implementation details are missing.

Marketing experts, Al Ries and Jack Trout, expressed this idea with an analogy. The tactic is a nail; the strategy is the hammer. They advised finding a tactic that works⁸ and then developing a strategy to exploit that tactic.

The same principle applies to any planning exercise. It is easy to come up with grand plans (with goals and resource allocations) without knowing in detail how you will achieve any of the success you envisage.

One solution to this problem is to focus initially on finding one or more tactics that work and then develop strategies around those winning tactics.

In summary, plans only work if you can do the detail successfully, so:

Find tactics that work and then build strategies to exploit them.

5.2.6 Plan with performance periods

This pattern supports WRITE ABOUT THE FUTURE (CERTAINTY FIRST) and PLAN WITH ROLES.

E.g. Katie is a keen athlete (400 m hurdles mostly) and a trainee auctioneer. Over the coming year she faces some important exams and hopes to compete in races during the summer. It is natural for her to think in terms of periods of time (and indeed specific dates) where she wants to be at her best. Her winter training for athletics is very different to the spring. Further changes are made shortly before each competition and the aim is to be at a peak for each race. She does not aim to be fit or fast; she aims

⁸ In their book (Ries and Trout, 1990) these are marketing tactics.

to be fast on *a particular day*. She thinks about her exams in a similar way, aiming to peak at the right time. The result of this is that she can see when she must put in effort to raise her level and when she can afford to put effort elsewhere. She knows she will need to maintain an adequate effort at work but hopes to put in some extra effort in the autumn, raise her profile, and show she is ready for promotion. Earlier in the year she will not be able to maintain that level and do the exams and races.

Life is not a destination. We live through periods of time and have competing priorities.

It is a mistake to plan in terms of where we want to be at some point in the future, as if that is an end point. The bigger picture is that, eventually, we will die, but until then our lives will continue. What will we experience and do for others along the way?

Many activities require us to perform effectively. Sometimes there is a standard to reach. Sometimes we are in competition with others. Sometimes we simply want to create as much value as we can. Some activities are only valuable if they are done at the right time.

This means that we need to consider the performance that will be required of us and our assets during particular periods and so what preparation we can do to improve and prepare ourselves and our assets. Often, after we have got through that period, it is sensible to allow ourselves to go down to a lower level of performance on those abilities, making time for other priorities, or simply to rest and recuperate.

This is not just true for athletic competitions and academic examinations. For example, when you want to find a life partner to start a family you will want to

be attractive and adept at flirting and developing relationships. Once this goal is achieved your focus will shift to being a good partner and then perhaps parent.

Similarly, when you look for a job you will want to tune up your CV and interview skills, and improve your knowledge of potential employers.

In addition to these high profile, special performance types we also have some areas of performance to which we almost always need to give some attention. These include:

- Our health, grooming, and appearance generally
- Energy, stress reactions, and sleep debt
- The cleanliness, tidiness, and maintenance of our homes, vehicles, and some other possessions
- Compliance with legal requirements and related administration.

In summary, we are continually moving through different challenges, so:

Raise and lower your capability at appropriate times as you go through life. Plan to do this.

This pattern is supported by CHANGE AT THE MARGINS and EVALUATE AT 10-10-10.

5.2.7 Plan with roles

This pattern supports SCULPT LIFE PLANS.

E.g. When Bart left music college as a young man he was single, jobless, and sharing a house with three other people he did not know. Over the next few years he first became a band member, picking up some occasional work playing at small events. He then added to that the role of music teacher, becoming the musical inspiration for a growing army of children and some adults. Soon after that he became a lover, then a

husband, and then a father. He and his wife took on different roles in the family, each contributing in their own way.

Our lives mostly revolve around relationships with other people in which we work out detailed expectations of each other. Thinking of these in terms of roles provides useful simplification.

Cooperation is the basis of human societies. Many of the important things we do in life are part of relationships with other people, ranging from selling to marriage. Within these we often work out complex and very specific expectations and routines, often a bit different with each other person. In the example above, the music teacher will provide slightly different help to each student, and the father will support each of his children in a slightly different way.

However, roles can often summarise these relationships in a way that helps to make sense of them and makes it easier to plan. You can think about what roles you will have in the future, who will be involved, what you will most likely do for other people, what capabilities you will need, and how and when you will need to develop those capabilities.

As we go through life we both *discover* and *develop* our roles.

We discover roles when we learn about what other people need and what we can do. For example, academic examination results guide us towards some types of work and away from others. Careers advice helps to inform us about what society needs doing. Job advertisements identify roles at organizations.

We develop roles when we conceive of them in more detail and when we change them by our own efforts. Those efforts include developing our capabilities and proposing variations in relationships. For

example, a person who becomes self-employed in a new business must develop their role.

Modern societies are sometimes seen as competitive. In reality, their technological sophistication and publicly-funded support for people who are struggling mean that almost everyone has the material wealth to live a comfortable, long life. This means that we are looking for valued roles that suit us, not trying to beat other people.

For example, going to university is not necessarily winning. Going to university is helpful and worthwhile for some people but not for others. Failure would be going to university when it does not help you, or not going when it would have helped.

In summary, much of our lives can be summarised in terms of roles, so:

Plan your life in terms of the roles you will occupy during different periods.

This pattern is supported by CHOOSE BETWEEN SYNERGISTIC BUNDLES OF ACTIONS, PLAN WITH PERFORMANCE PERIODS, PLAN WITH RESOURCE ALLOCATIONS, and PLAN WITH ROUTINES.

5.2.8 Make flexible plans

This pattern supports SCULPT LIFE PLANS.

E.g. Zari is planning to travel by train from Epsom (south of London) to Euston station (a north London main station) to catch a train for the long journey north to Manchester, on which she has booked a seat. The travel planning website says she should change at Vauxhall to get on the Victoria Line. However, she realizes that if she does that and there is a problem with the Victoria Line then she will be stuck with no options. If she stays on her train and changes at Waterloo instead, she will have a choice of using the Northern Line (the direct route) or move north by the Bakerloo Line or Jubilee Line and then

take one of a number of other lines to reach Euston or a nearby alternative. This is a more flexible plan that gives her options if there is a problem with one line. Getting to Euston as quickly as possible is not as important as getting to Euston in time for her train to Manchester. She therefore ignores the planning website and stays on her train to Waterloo to catch her Manchester train with more certainty.

Being efficient in an ideal world is rarely as important as being confident in an unreliable world.

Look for ways to give yourself flexibility so that you can change your plans in future if you need to or think of something better.

Many wise career choices amount to deferring decisions until later by doing something that will give us good options in future. These typically give us contact with many interesting people and varied skills with wide application. For example, broad degree subjects like economics, business studies, mathematics, and finance are popular choices. They give good prospects for employment but with a less specific commitment than, for example, medicine or architecture.

In summary, flexibility is valuable, so:

Make plans to give flexibility in future.

This pattern is supported by DEFER COMMITMENTS.

5.2.9 *Defer commitments*

This pattern supports MAKE FLEXIBLE PLANS.

E.g. Siqi is planning a research project that will be the last part of her Masters in management. She has 4 months to do the research and write a dissertation of about 15,000 words. For her, this is a massive challenge. She decides to collect information from the annual reports of big companies where they explain what they are

doing to become more sustainable. Her idea is to summarise it in a helpful way. There are several aspects of sustainability that she is particularly interested in.

However, she does not know how long it will take to gather the relevant pieces of text and summarise them. After thinking about this for a day or two she prioritises the areas of sustainability and decides that if she covers the top two that will be enough for an adequate study. She plans to collect just that information, summarise it, then see how long it has taken to do that work. She can then add other aspects of sustainability if she has time. She hopes to add more but defers committing to a large study.

Sometimes it is not necessary to commit until later and deferring will allow time for further information to be obtained.

Deferring commitments by developing flexible plans is particularly important. Often it is better to do this than to make a wise choice between less flexible options.

One good way to defer commitments is to take some initial actions that simultaneously start progress and provide more information. For example, if you are trying to choose a career direction you could try to speak to people already working in the relevant areas to ask them for their advice. You will learn more from this and make or strengthen some contacts.

In summary, often we do not need to commit to plans immediately and it is good to get more information before finally committing, so:

Consider deferring commitments to a course of action and think of ways to gain information and insights in the meantime.

5.2.10 Build resources before taking risks

This pattern supports SCULPT LIFE PLANS.

E.g. Richard has always wanted to be a garden designer and gardener. He has just finished a course to develop his skills. His dream is to be his own boss, getting his own customers and doing projects for them as well as doing some garden maintenance. However, he hardly knows anyone who might become a customer, he has very little money saved, and he has no equipment. He could try to get a loan from a bank and then pay it back, but without any customers that seems very risky and he wonders why any bank would lend him money in that situation.

So, he looks for a job working for someone else and eventually gets one. After just over 5 years as an employee he feels much more competent, has worked out many of the details of his business idea, and has built up enough money in savings to buy his own equipment and live without income, if necessary, for over a year. With these resources in place, he thanks his employer, resigns, and starts his own business.

Most types of risk are reduced if you have reserves of resources.

In education and career choices there is sometimes a question of whether to bet on something new and not yet widely accepted. This kind of option often leads to failure but occasionally to very high levels of success. It is riskier.

Similarly, bets on becoming a music star or professional football player are long shots. You might win big but most people who do this will experience some years of frustration and hardship before having to give up.

It may be better to take a less risky path initially, accumulate resources, and then try something riskier when you can afford to fail, at least on a small scale.

In summary, risk can be managed by having reserves of resources, so:

Focus on plans that build resources before taking big risks.

5.2.11 Adapt to unplanned progress

This pattern supports SCULPT LIFE PLANS.

E.g. George has wanted to travel the world since he was a young boy but has never had the opportunity. Every time he is about to set off something happens. As time passes he meets and falls in love with a wonderful woman. They start a family and George is very successful at his job. His customers love him and he becomes a key figure in the town where he lives. His family loves him. The problem is that he still wishes he could travel and so feels dissatisfied with his life, even though everyone around him can see that George's life is comfortable and full of love. Then, one day, he is knocked down by a car and seriously hurt. As he lies in hospital, barely conscious, all he can think about is his wife and children. They visit him in the coming weeks as he slowly recovers, and so do many of his customers and other friends. He realizes that his yearning to travel was a childhood fantasy that has long since become irrelevant and that he loves the life he already has.

What we want and what we get often differ, but sometimes that is a good thing.

Our hopes for achievement (whether we call them goals, objectives, targets, dreams, or something else) tend to become obsolete as events overtake them. We also make mistakes in choosing aspirations.

Holding on to aspirations even as events make them obsolete is a mistake. It is better to recognize that things have changed and adapt.

In summary, aspirations often become obsolete, so:

Adapt aspirations and plans to take advantage of unplanned progress.

5.3 Choose between alternative plans

The following patterns are for making wise choices while developing personal plans at any level.

5.3.1 Choose between bundles of synergistic actions

This pattern supports PLAN WITH ROLES.

E.g. Santosh is trying to decide between two job offers. Both are marketing roles but one is at a company that sells sports equipment while the other is at a charity that raises money and runs projects for disabled children. Santosh realises that this is not just a choice about a job.

There are two bundles of actions that would work well together.

If he chooses the sports equipment company then he will want to learn more about sports equipment, probably do more sport himself, probably get more equipment and perhaps think about a home gym. He will make new friends, often sports oriented. The location means he would probably start looking for somewhere to live that is further out of the city and nearer to the company.

On the other hand, if he chooses the charity then he will want to learn more about disabled children and the donors. He will spend more time at social events for these people. He will make new friends with these interests

but probably continue to live where he is because the charity is conveniently nearby.

Decisions are linked, and this can be complex.

When we have a new course of action in mind, we should not try to choose between taking it and not taking it. Instead, we should usually think of choosing between a life where we take that course of action and a life where we make no changes to our current plans.

We also need to recognize that, if we take the new course of action, we will probably have to stop doing something else to make resources available. More generally, other things will probably need to change in our lives to accommodate the new course of action, or to exploit its advantages more fully.

This can become complicated. However, a sensible compromise is to think of our choices as being between bundles of actions we would take together. These might not constitute our entire life plan, but they capture those parts that are linked together.

This means that, in theory, there will be many bundles to choose from. For example, if you have three linked decisions and each one has four choices then you are considering 64 bundles (i.e. $4 \times 4 \times 4$).

However, the set of bundles can usually be filtered quickly by considering only those bundles where the actions support each other i.e. are synergistic. For example, in the example above, Santosh does not consider taking a job then moving to live in a location even further from the job than he currently lives. Nor does he plan to become expert in one industry while working in another. (In special circumstances both those might make sense, but in this example decision

Santosh considers that there are no special circumstances.)

This does not necessarily mean choosing a bundle that is narrow and inflexible. For example, suppose you were considering a university degree in computing. You could spend all your free time learning about computing, going to social events for computer people, reading books about computing, visiting places associated with computing, and trying to meet people involved with computing. That highly focused approach would be appealing to some people and would be effective. However, you might prefer to spend some of your free time on some other topic, perhaps with the idea that you would then do computing linked to that other topic, or would find friends or a mate associated with that other topic.

A varied bundle gives more flexibility and options but less focus on one theme.

Another way to build attractive bundles is to put together individual actions that look promising when considered (roughly) alone, and that do not conflict with each other in any obvious way.

In summary, decisions are usually linked and this can get complex, so:

Bundle actions together that are attractive individually and support each other, and choose between bundles of actions.

This pattern is supported by EVALUATE AGAINST HEURISTIC CRITERIA, PURSUE WELLBEING (NOT HAPPINESS), EVALUATE AT 10-10-10, CONSIDER THINKING MORE, and EVALUATE ADVICE.

5.3.2 Evaluate against heuristic criteria

This pattern supports CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS.

E.g. Geoff is lucky enough to have two job offers to consider. He is not sure which he prefers so he writes a list of

criteria. These include ease of commuting, pay level, scope for promotion, growth rate of the employer, financial stability of the employer, the attractiveness of their offices, and several others. He makes a big spreadsheet on his laptop and evaluates the two jobs side by side.

The consequences of many courses of action are too hard to estimate accurately, but we do not have to give up.

A useful approach is often to evaluate each course of action against heuristic criteria. (Another name for such criteria is 'objectives'.) These are criteria that will help distinguish between courses of action but not necessarily reliably and not always by quantifying the value of each one.

For example, to evaluate academic courses you could grade each promising option against criteria such as the following. To what extent does the course help you to:

- meet people and make contacts
- build your credibility/reputation
- learn from results/feedback and improve
- see/measure your progress
- defer commitments until later (i.e. gives you flexibility)
- move towards jobs that:
 - satisfy basic needs for others
 - move towards sustainability
 - are not dependent on technology that is, or soon will be, obsolete?

A simple table is good for recording your analysis. Use the criteria as row headings and your action options as column headings. In the table use some kind of symbol (e.g. a tick or cross, a number, a colour) to show your evaluation of each option against each criterion. There is no

need to work out an overall score, though you could try.

In summary, many decisions have implications for future outcomes that are too hard to work out, but we can still identify courses of action that are likely to be better, so:

Evaluate courses of action against heuristic criteria.

5.3.3 Pursue wellbeing (not happiness)

This pattern supports CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS.

E.g. Jessie likes to stay healthy and exercises three times a week, usually on her own but sometimes with a friend. She is a bit fussy over food and careful to get enough sleep. She works hard in her job, but not too hard. She is determined to improve her skills and develop her experience. She avoids alcohol, caffeine, and nicotine and is careful about her sugar intake. She has several good friends. In contrast, her friend Angie vapes, drinks until the early hours two or three times a week, and considers this justified by her pursuit of happiness. However, while Jessie is mostly comfortable, contented, and feels she is making progress, Angie is often hung over, hates her flabby body, and is deeply dissatisfied with her life most of the time. Angie feels desperate to do something that will make her feel happy but nothing seems to work for long.

Sometimes it is possible, and even useful, to have an overall measure of alternative futures that is used in decisions.

That measure should not be happiness, for reasons discussed earlier. Instead, a more viable objective is to seek well-being, which generally flows from rather obvious progress such as being healthy,

having food and shelter, having friends, learning new things, and so on.

In summary, if you want something to work towards – an overall objective perhaps – it is better to:

Pursue wellbeing rather than happiness.

5.3.4 Evaluate at 10-10-10

This pattern supports CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS and PLAN WITH PERFORMANCE PERIODS.

E.g. Sonja is a physicist working at a university and her specialist subject is string theory. She has written several papers about it and her PhD was on string theory. The problem is that she is beginning to suspect that string theory is not the way ahead for physics. She has been looking at alternative theoretical frameworks she could steer towards and has a couple of candidates in mind. Most likely she would focus on criticisms of string theory before selecting something more promising. She thinks about the impact of changing direction in this way.

How will she be in 10 minutes?
Probably a bit relieved but also frightened of what is to come. She would feel free to pursue other ideas.

How will she be affected after 10 months? She expects her colleagues to notice her change and to start to react to it. When she tries to publish her first negative paper about string theory that will probably cause some personal problems for her.

How will she be after 10 years? This is not so clear but she thinks she will either be a forgotten academic ploughing on alone or build a reputation as a leader in a major competing theory area. She cannot predict this.

In view of her concerns about relationships over the coming months, she decides to quietly develop new contacts with other physicists who are pursuing theories that compete with string theory. If she feels she can be part of an alternative community then she will make the change.

Effects can be evaluated at different time horizons.

A useful refinement to heuristic evaluation (and other evaluations) is to consider how things will be after 10 minutes, 10 months, and 10 years (Welch, 2009). This helps to get a view of how progress might develop over time, including long term effects. This may be particularly useful for activities we intend to do for a long period or choices that will have long term consequences.

Our views at different time horizons can be expanded to a fuller prediction of the consequences for different periods of our lives, even quantifying the duration of impacts. This might also be useful when planning to achieve particular levels of performance during particular periods of our lives.

In summary, consequences play out over time, so:

Consider how you will be affected after 10 minutes, 10 months, and 10 years.

5.3.5 Consider thinking more

This pattern supports CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS.

E.g. Pelham is trying to choose his next car. Initially he was just browsing the internet but for several days now he has been considering particular vehicles and purchase options in detail. He made a spreadsheet with all the leading contenders listed, along with details of their specification, good and bad points, purchase prices, other deals, running costs, and so on. But,

so far, he has not chosen a vehicle and bought it. Instead, at the end of each session of thinking about his options, he has chosen to think some more – usually after getting some more information or including an additional vehicle in his search.

Getting more information and thinking about it is often worthwhile.

In decision theory the option to just think a bit longer is often not shown explicitly, but it is there. In practice, this is the option we choose most often until we finally decide that no further consideration is worthwhile and it is time to move on.

Consider what further information might be helpful, how you could get it, and how you might use it. What difference could the new information make? This often leads to identifying specific uncertainties that are important and hunting for information about them.

In summary, more information and consideration can be worthwhile, so:

Do not forget the option of thinking a bit more.

5.3.6 Evaluate advice

This pattern supports CHOOSE BETWEEN BUNDLES OF SYNERGISTIC ACTIONS.

E.g. Alexandra's friend tells her she has recently started going for a walk every day for exercise. She walks for about 45 minutes each time. She asks Alexandra if she would like to join her. At first, Alexandra is not very enthusiastic. Like her friend, she works long days in an office and does not have much time free in the evenings when the walks would be. Her friend says 'I am doing this because a walk every day is better than the gym twice a week, and I don't like the gym. I have been reading about this and found several good, science-based sources, that recommend it and say it

is particularly good for office workers like us. It would help me if you came too, of course, but I will still do it alone.'

Alexandra currently gets almost no exercise each day and it is a worry to her. She has been thinking of joining a gym for several months. She knows her friend is well aware of this situation.

Alexandra wonders if her friend's information about walking is likely to be good advice. Her friend has a personal motive for persuading Alexandra to walk but, set against that, she seems to have done some research into the idea and she knows Alexandra's personal circumstances. Alexandra decides to trust her friend and agrees to give walking a try.

When other people give us advice there are several reasons why it might be bad advice.

It can be hard to know whether advice is good or not, but it is sensible to give it some thought. Consider if the advisor is motivated correctly, if the advisor is well informed, and if they have considered your personal circumstances:

- **Motivated correctly:** Do they have something to gain from persuading you to make the choice they seem to be suggesting? Maybe they just want to keep you around for company, or have someone join them in a bad habit of theirs (e.g. going boozing, all-night gaming), or stop you making more progress in life than them (which would make them feel bad).
- **Well informed:** Have they carefully researched and considered their advice? Maybe they are experts on a topic already, or perhaps they have done some reading or spoken to another expert. Someone who is

generally knowledgeable and intelligent is also more likely to give good advice, but specifically relevant knowledge is more important.

- **Personal:** Have they considered your personal circumstances, characteristics, and wishes? A good advisor, even if they know you well, will usually ask questions to establish facts in detail and, even then, will only make suggestions or recommendations. They will not argue with you about what is best for you to do. Ideally, their advice will be justified by reference to your circumstances. In the example above, Alexandra's friend mentioned that daily walking was good exercise for office workers like Alexandra.

The advice can also be analysed critically for points that seem to be illogical, inconsistent, vague, contrary to other things you know, or ill-thought out in any other way.

In summary, advice can be useful but it can also be misleading, so:

Evaluate advice by thinking about the advisor's motives and behaviour as well as critically considering the advice given.

5.4 Plan in the short term

The following patterns are for planning in the short term.

5.4.1 Plan with resource allocations

This pattern supports PLAN WITH ROLES and PLAN WITH PERFORMANCE PERIODS.

E.g. Bianca is training to be a qualified accountant and faces examinations in five different subjects. She has 12 weeks left in which to prepare and for most of that time she will still be doing her full-time job as an accountant. She calculates she can spend about 155 hours on study before the exams. That time divided equally suggests 31 hours

per subject. However, she finds Management Accounting easy and Tax very hard. Company Law is a bit tougher than Auditing. She takes 10 hours from Management Accounting and gives 5 to Tax, 3 to Company Law, and 2 to Auditing. The allocation to Business Law is unchanged. She then makes a rough plan of what to study in each week, within her overall time allocation.

It is often hard to plan in detail, especially without constraints. However, the typical correlation between resources and results can be exploited to simplify planning.

Resources that can be allocated in personal planning include time, money, and space within our homes.

The resources being allocated might be all your resources (of that type) or just some.

Also, resources allocated to an activity can be sub-divided in a lower level of allocation. In the example above, Bianca allocated a total number of hours to study and then sub-divided those hours between her examination subjects.

If you desire an appropriate 'work-life balance' then resource allocation is one way to at least choose that balance, even if you are not sure what is appropriate. Set aside time for rest, exercise, recovery, social activity, and treats.

Usually, if we give more resources to something we can achieve a higher level of performance on it. However, sometimes this relationship is broken by new ideas that let us achieve more with less.

Having allocated resources to something the idea is to achieve the best results you can within that allocation⁹. Occasionally you will learn more over time and want to revise your initial allocation.

⁹ When the resource is time, this idea is sometimes called 'timeboxing'.

In summary, resources usually link to performance levels, so:

Make or adjust resource allocations to respond to differing needs for performance levels.

This pattern is supported by PLAN WITH ROUTINES, PLAN WITH TIMETABLES, KEEP SOME MANAGED SLACK, PLAN METAWORK TIME, and CHANGE AT THE MARGINS.

5.4.2 Plan with timetables

This pattern supports PLAN WITH RESOURCE ALLOCATIONS.

E.g. Monica works in software development and lives with her sister in a city. Although her job is quite varied and she has almost complete freedom to use her time outside work in any way she likes, she has made a timetable for her week. When she left university she just carried on with that approach and found it suited her. She knows what time to get up, when to start breakfast, when to catch her train, what she is doing most lunchtimes, and so on. In the evening her timetable is coordinated with her sister's so they take turns to cook meals and often go out to exercise or socialise together. Time is allocated for one-off activities too. When demands on her change, she adjusts her timetable.

It is tiring and tiresome to go through the day repeatedly wondering what to do next.

Timetables can cover all your time, or just some periods of the day, with the rest left free or managed by some other planning approach.

Having a timetable, even if it is just an outline that can be adjusted, helps to reduce the burden of day planning. Most people live lives that have repeating patterns weekly, four weekly, calendar monthly, and annually. The weekly

pattern is the strongest and most often useful, but timetables on the other schedules can also be created.

These repeating patterns come from the fact that other people have patterns on those cycles, and from the natural cycles of night and day, sleep and wakefulness, body temperature variations, and energy fluctuations.

We all benefit from fitting in with the patterns of those we interact with.

A timetable provides a helpful consistency to our lives. If we know what we have been doing and what has happened as a result then that helps us adjust our behaviour in response to this feedback and in anticipation of changing demands. Without consistency it would be hard to know how to adjust.

A timetable is also a good way to execute an allocation of time. If you know you have allocated your time according to sensible priorities then you can trust your timetable to make sure you are spending your time wisely.

As a minimum, people who are in love should schedule time to be together. Without make a date with your lover there is always a danger that activities that do have a schedule – like work and some chores – will keep getting in the way.

In summary, a timetable gives useful discipline to your use of time and a comforting regularity, so:

Have a weekly timetable at an appropriate level of detail, and consider timetables for other cycles too.

5.4.3 Change at the margins

This pattern supports PLAN WITH PERFORMANCE PERIODS and PLAN WITH RESOURCE ALLOCATIONS.

E.g. Bianca has been studying for her accountancy exams for 5 weeks and now has a much better sense of how

much effort each of the five exams requires. Based on her initial time allocation and time spent so far, the hours remaining and originally planned are as follows: Management Accounting, 13 / 21 hours; Company Law, 25 / 34 hours; Business Law, 22 / 31 hours; Auditing, 25 / 33 hours; and Tax 25 / 36 hours. However, Tax is proving even tougher than she thought and Auditing is a lot easier. The other topics are as she expected. She decides to reallocate three hours from Auditing to Tax. Auditing is where she needs time least and Tax is where she needs it most.

Resource allocations – even by calculation and modelling – can be time consuming and accuracy is often limited, so adjustments are needed.

In between more thorough analyses of resource requirements, a quick and easy method of adjustment is to move small amounts of resource between categories.

Because this involves only small adjustments it is the marginal impact of a small change in resourcing that is relevant.

Reallocations should be from the activity with the lowest marginal gain per unit of resource to the activity with the highest. If you repeatedly make small adjustments like this then the activities with the lowest and highest marginal gain per unit of resource may change from time to time.

To identify worthwhile reallocations, it is necessary to monitor your situation over time. If PLAN WITH PERFORMANCE PERIODS has been used then it will be very natural to monitor the performance levels of interest. These will include performance areas of temporary importance and those constant, maintenance areas.

In particular, it is crucial to monitor overall wellbeing, including health, sleep debt

(i.e. accumulated lack of sleep), energy, and stress reactions. These need to be sustainable over time, though short-term dips in high pressure situations may be reasonable. If wellbeing is falling then more time probably needs to be switched to calming, rest, and perhaps physical exercise.

In summary, resource allocations often need to be adjusted, so:

Monitor your performance levels and move small units of resource from the activity with the lowest marginal gain per unit to the activity with the highest.

5.4.4 Plan metawork time

This pattern supports PLAN WITH RESOURCE ALLOCATIONS and PLAN WITH TIMETABLES.

E.g. Donna has been working for several months as a computer programmer in a tiny software company. She likes the company and was excited to start her current project. However, over the past few weeks she has become increasingly despondent. She and her boss, Jonathan, have been struggling with the project and there have been several misunderstandings and mistakes that have put them behind. In response, they have been working for longer and trying harder, yet the problems continue.

Jonathan is a good person and she trusts him so she raises her frustrations with him. In response he looks a bit panicked and seems confused. He says nothing but the next day he appears with a young woman that Donna has seen around the office but never spoken to. Jonathan introduces her as Martine and explains that he has asked her to look at the problems on their project and make some suggestions.

Martine seems super-focused and asks lots of questions about the project and how they have been working on it. After 45 minutes she says she has some suggestions and begins to explain them. Donna is stunned as Martine calmly explains so much of what has been bothering Donna and suggests sensible improvements to the way she and Jonathan have been working. Some of the suggestions are good ideas in any situation, while others are specific to the project.

This is the first time Donna and Jonathan have thought about improving the way they work on the project. The changes they agree give Donna a huge surge of optimism. Even though they still have a lot of technical work to do she sees that, by repeatedly refining their way of working, they can expect to get on top of those problems more easily than before.

There is nearly always scope to improve the way we are working, but doing so takes time.

Metawork¹⁰ is work to improve the way work is done. You can also improve the way you do metawork and one simple step towards this is to plan time for it.

If you estimate the value of an activity assuming no improvement in your abilities then the value will usually be much less than if you assume some ability improvements over time due to effective metawork. Consequently, doing metawork tends to be encouraging, especially when it discovers worthwhile improvements.

In industrial settings this effect is called an 'experience curve'. The idea is that

¹⁰ The term metawork has also been used to refer to useless management that gets in the way of doing real work. If that is your experience of metawork then you are not doing it very well.

each time you double the number of items manufactured so far, the cost of producing each one is reduced by a roughly constant percentage. For example, each doubling of cumulative output might reduce costs by 15% (not unusual in industry). This may not sound like much but consider the early period. By the time you have made your 1,024th item you have doubled output 10 times and reduced costs by just over 80% (according to the model). This only happens if you *try* to improve.

In summary, with effort we can improve the way we work and this should be reflected in projections of the value of activities, so:

Make time for metawork.

5.4.5 Keep some managed slack

This pattern supports PLAN WITH RESOURCE ALLOCATIONS and PLAN WITH TIMETABLES.

E.g. Caroline has a busy life and last year had to take time off work to recover from a stress-induced burnout. She had been trying to make maximum use of every minute of every day and had found it intensely stressful. She had planned rest periods (yoga, walks, lunch, etc) but had overlooked the difficulty of re-planning her time when unexpected things happened. With her diary always packed every change was complex. Her new approach is to leave slack time with nothing planned at various points in her day plans. This is for the unexpected.

Attempting high utilization of resources tends to lead to inflexibility and/or high costs.

Important resources for which this is true include time, space, and money.

If your time is carefully planned, with no slack, then unexpected changes may be impossible, or may involve changing one

or more other activities to make room. This is a hassle. Just adding a new activity, such as finding time to meet someone, may be difficult. It also makes you less responsive to the needs of others.

Similarly, if your space is used to the maximum, almost everything involving that space is harder. For example, imagine that you have a large cupboard packed very nearly full of stuff. When you want to get something out of it you often must move other items to do so. If you want to put something back in the cupboard then you often must move other items to do it. You are constantly on the point of not being able to get another thing in the cupboard. What is true for a single cupboard can be true for a room or even your entire home.

Similarly, if your entire monthly income is always spent by the end of the month and you have no savings then you will live a precarious life. Unexpected expenses could cause extra expense from short term loans and emergency cost cuts. It is much better to build up a reserve of savings and live safely within your income. This means you can ride out short term variations in income and expenses with less impact for your lifestyle and lower stress and expense.

In summary, since the unexpected is to be expected:

Do not commit all your time, space, or money. Leave some slack.

5.4.6 Break tasks down

This pattern supports PLAN WITH TIMETABLES.

E.g. Jordan has always wanted to write a novel but has never found time to do it. He expects it will take weeks or even months and cannot afford to take that much time off work. But one day he has a great idea for a plot and some main characters, and that

motivates him to plan more seriously to get started. He draws diagrams and lists of the things he must do to create his novel. He breaks down those tasks and links them up. After a couple of hours thinking he has come up with over 20 initial tasks, all about an hour of work or less. Each day from then on he looks at his plan, revises and extends it, and picks something to do for an hour. Occasionally he has to skip a day, but after a fortnight he has developed his character descriptions, improved his plot, and chosen the book's working title. He keeps going in this way, breaking a huge task into small tasks he can find time for.

Many tasks take too long to fit into our busy days.

It is easier to find time slots for tasks that are short so dividing a larger task into smaller sub-tasks can help you use the time opportunities you have. These sub-tasks should be self-contained as far as possible so that you feel like you are completing a train of thought and not leaving something hanging.

In summary, finding time for long tasks is hard, so:

Divide larger tasks into smaller sub-tasks so that you can find time to do them.

This pattern is supported by PLAN SYSTEMATICALLY WITH TASKS.

5.4.7 Make small daily time commitments

This pattern supports PLAN WITH TIMETABLES.

E.g. Tim has been reading about meditation techniques and wants to try meditation for a while. The problem is that his busy days mean he does not have the recommended 25 minutes spare each day for meditation. Perhaps if he meditates he will be more productive during his day, in some way, but he cannot persuade himself

that this justifies spending 25 minutes per day on meditation.

So, instead, Tim decides to meditate for two minutes per day for a while to start getting used to the idea. He makes an entry in his diary and keeps a log to make sure he does the two minutes. After a few days he finds he is doing two or three of these mini-meditations a day and two minutes feels surprisingly long. Eventually he settles into a routine that provides 20 minutes a day in two sessions.

Starting a new routine can be difficult at first if it involves significant investments of time or effort.

It is usually possible to find two minutes a day for something new and often this is enough to get started. It may take an initial investment of time to get set up to do the activity at all, but this effort is more bearable if other time demands are kept very small.

Later, the time spent each day can be increased and this may be justified.

In summary, some routine activities are difficult to start because of the time required each day, so:

Consider starting with a very small daily time commitment, such as two minutes.

5.4.8 Reserve blocks of time

This pattern supports PLAN WITH TIMETABLES and PLAN WITH RESOURCE ALLOCATIONS.

E.g. Bianca is working towards her exams but also has other activities competing for her time. In particular, she has friends and family who contact her, things to do around her home, and other administrative chores. To study effectively she must be undistracted so she uses her daily timetable to reserve time for particular activities. During those periods nothing else is allowed to be done or even

thought about. Because she allows time for all the activities, she knows she needs to do she does not worry about not getting around to things. Occasionally something unexpected comes up and some of those things need urgent action, but usually she can handle them in her 'general admin' block just after lunch.

Distraction from other tasks is a major source of fatigue and inefficiency.

To reduce distractions and the fatigue and loss of productivity they can produce it is helpful to reserve time for particular activities, or for activities of a particular type (e.g. 'admin'). Not all time has to be reserved in this way.

If something arises during a block that is reserved for something else then it can be noted (to avoid forgetting it) and dealt with in its allocated block.

In summary, multi-tasking is tiring and inefficient, so:

Reserve specific blocks of time for particular activities or types of activity.

5.4.9 Plan frequent rest times

This pattern supports PLAN WITH TIMETABLES.

E.g. Bianca has divided her blocks of study time so that she gets frequent rest periods. Her chosen schedule is the 'pomodoro' schedule, except that she only has time for two hours of study in the evenings on most days. She uses this time by studying for 25 minutes (on a chosen topic) then resting for 5 minutes, studying for 25 then resting for 5, studying for 25 then resting for 5, then studying for a final 25 minutes. At weekends she does blocks of four work periods with longer rest periods in between, which she often uses to get some exercise by going shopping on foot.

Resting is important in a variety of work types but the desire to make progress often keeps us going continuously without taking rest breaks.

Mental tasks can be tiring in ways we do not notice as the fatigue builds up. Typically, we get less and less efficient as fatigue and mental muddle grow. A rest of a few minutes can help reduce this problem but is not long enough for us to get distracted onto something very time consuming, like cooking a meal or watching a movie.

Planning physical movement is important along with mental rest.

In summary, we need to rest frequently and regularly, so:

Schedule time to rest and to be active frequently.

5.4.10 Plan with routines

This pattern supports PLAN WITH ROLES, PLAN WITH RESOURCE ALLOCATIONS, and PLAN WITH TIMETABLES.

E.g. Peter and Penny have three young children with lots of interests. Getting everyone ready for school and work requires taking care of many details each day but things get really tricky after school. Each of the children has different activities and on Wednesday all three children go out at some point, sometimes overlapping, which makes the journeys hard to fit in. To make this possible, Peter and Penny have worked out their routines in detail, covering who is doing what at what time, who is using the car, when the car keys get handed over, what time dinner will be, who makes it and for which children, and so on. Because they do mostly the same thing each week, they have been able to refine their routines, achieving better than military precision.

Using our resources efficiently often requires refined, complex plans. Fortunately, the repetition of our lives makes this possible.

Thinking in terms of routines that get developed, refined, and adapted over time matches the typical pattern of our lives and simplifies planning.

This can interact with timetabling and time allocation because routines sometimes do not take exactly the time initially allocated or timetabled.

In summary, routines simplify planning, so:

Clarify, develop, refine, and adapt routines.

This pattern is supported by PLAN SYSTEMATICALLY WITH TASKS.

5.4.11 Plan systematically with tasks

This pattern supports PLAN WITH ROUTINES and BREAK TASKS DOWN.

E.g. Jane and Simon have two grown up children, a house, and rather a large garden. The garden was great when the children were young and Jane has been enjoying gardening for a few years but has found it increasingly time consuming and tiring. She would like to do other things but feels stuck with the gardening chores. Simon suggests redesigning the garden to reduce the work needed and borrows a book from the library on 'easy care' gardening. It is full of good ideas and Jane reads it carefully from cover to cover.

She decides that, with an effort this spring, she can probably reduce the work involved radically, but she needs to be systematic to identify every worthwhile change.

Jane draws a plan of her garden and patiently considers every distinct area of the garden, every edge, and every

plant, thinking of all the labour-saving changes that could be made. She marks them on her drawing and lists them too. She also looks at the calendar she has been using to plan her gardening for the past two years, and thinks about each task on it, one by one. From this she gets several more ideas, including ideas for planting different food crops in her greenhouse.

Finally, she groups and orders the tasks, deciding when she will do them, and identifying everything that will cost money. This produces a few more alterations and, finally, a detailed plan listing every task needed to transform her garden into one that is still attractive, still produces some food, and yet will be less than 20% as much work to maintain.

This way, Jane works systematically to identify everything she can do that will contribute to her overall goal of creating an 'easy care' garden.

Sometimes we need to do many individual tasks to accomplish some overall goal, so it would be easy to miss some without a systematic approach.

One good way to be systematic is to base your search on one or more existing 'frameworks'. In the example above, Jane bases her search on the elements of her garden, down to individual plants in some cases, and on her annual plan of garden chores.

Similarly, you could pack for a trip away by going through each step of your journey and each day of your trip and considering what you will need along the way. You could identify cleaning tasks by considering each room of your house, and each area of each room. Or you could identify car maintenance tasks by looking in your car's user guide to see what is suggested.

In the example above, the individual tasks are largely separate from each other, in the sense that they do not have to be done in a particular order. In contrast, other types of project involve quite detailed sequencing problems. For example:

- Cooking
- Decorating
- Construction, from building furniture to building a house
- Studying
- Exercise programmes.

Construction, in particular, tends to create subtle sequencing problems that can only be identified by thinking through the steps of your plan in detail, usually with drawings. One of the most frustrating situations is to find that you must take something apart (undoing earlier work) in order to fit some later element.

Another common problem is that doing some tasks can make a mess of work done earlier. For example, to decorate a room it makes sense to paint the ceiling, then paint the walls, then paint the woodwork, then do the floor covering. This minimises the risk of making a mess of earlier work during later work.

When searching for sequence issues it helps to think what the items you are working on will look like at each stage.

Regardless of the problems, being systematic to identify all the tasks/steps¹¹ is one of the keys to success.

In summary, identifying all the tasks to be done can be complex, so:

Be systematic in identifying tasks to be done and potential interactions between

¹¹ The terms 'task' and 'step' are somewhat relative. A task might be a step within some larger task. The term sub-task could also be used.

them that make some sequences better than others.

5.4.12 List next steps to do

This pattern supports PLAN WITH ROUTINES.

E.g. Ginger is the book-keeper and administrator for a small plumbing company. He has many, many tasks, often short but still crucial to do correctly and promptly. At first he kept a 'to do' list on a spreadsheet but this seemed to be quite a chore. Then he noticed that many of the items on his list were part of repeated routines with predictable steps. He redesigned his spreadsheet to take advantage of this. For example, setting up a new job for a customer involves 7 steps by Ginger, usually done in a fixed order. On his new spreadsheet he puts the name of the job and enters 'new job' to identify the routine involved. His spreadsheet then shows him the first step of that routine for that job and the step after that (as a preview). When he has completed the first step, he updates his spreadsheet by simply typing in the next step number, '2', and the spreadsheet then shows the second task and previews the third. This way he does not have to type in every step every time and his 'to do' list does not show steps that will not be relevant until other steps have been completed.

To deal with one-off tasks that are not part of one of his routines he also allows 'miscellaneous' as a type with just one step.

This new approach is less typing overall and helps remind Ginger of the next steps in his standardized routines.

Some jobs and lifestyles involve large numbers of relatively unrelated tasks that must not be forgotten.

People who make lists tend to be more organized overall than people who do not,

but the importance of listing depends on the nature of your work and your lifestyle generally. In the example above, Ginger has many tasks to remember to do. At the other extreme, a novelist with a simple lifestyle and no family might have so few tasks to remember that listing them is not necessary. The many things to remember when writing a novel are part of a single project, with work planned in a different way and often not needing to be documented.

The idea of listing next steps to do is a refinement of the simple 'to do' list. It provides a simple structure and, when automated with software or an electronic spreadsheet, the work of listing tasks is greatly reduced.

Each task is given a type. Each type of task is associated with a standard list of steps to be done for that type of task. The system needs to pull up the next step for each task when the previous one is marked as completed. When all steps for a task have been completed it should show that the overall task has been done.

In summary, many people have to remember to do many unrelated tasks, so:

Use a system to document and recall the next steps to do.

5.5 Develop efficiency

The following patterns aim at cultivating greater efficiency. This is not just efficiency in using resources; it is also important to reduce unpleasant feelings and increase pleasant feelings.

5.5.1 Make and learn a better approach

E.g. Lemmy is a PhD student who has just started doing some teaching with undergraduates and is marking essays in a business school. This is the first time Lemmy has marked any kind of essay so, after reading the instructions

for markers, he starts reading the first essay out of 127 to be marked. The essay is incoherent and irrelevant so Lemmy stops reading. Then he remembers that, unlike most papers he reads, he has no choice but to read all the way through. Just because this essay is useless does not mean he can toss it to one side and try another. After 45 minutes he gets to the end and tries to award some marks. It is not easy and he feels very unsure of his choices. The next essay is almost as bad and Lemmy stops reading after 5 more minutes. He gets up and wanders around his flat, demoralised, tired, and wondering how he is going to get through all 127 scripts. How is this pain worth the small payment he will receive?

After a rest he starts to design a process for marking. He reads the instructions again and types out some ideas on his laptop for his personal marking process. After going through it a couple of times he memorises the process then imagines going through it to make sure it is clear in his mind.

His next attempt at the second essay feels much easier and this time he knows how he wants to handle incoherent text. Throughout the next two days he refines his process in several more ways and begins to monitor his progress numerically too. This allows him to calculate if he is going fast enough to finish marking by the deadline.

When he originally agreed to do marking it seemed worth the money. When he first started it seemed definitely not worth the money. But, with a better plan, thoroughly learned, it once again became worthwhile.

Lack of a good approach can lead to difficulty starting or continuing action.

The solution to many issues caused by lack of a good approach is to recognize the problem, do some planning/design, and then learn the steps of your approach by mentally running through them a few times. Once the steps, or at least the first few, are clear in your mind and come to you easily it is much easier to get started.

The approach may need improvement in four ways.

1. There may be gaps where you simply have no executable method. Executable means that the steps you have in mind are ones that you already know how to do.
2. There may be steps that are not viable. Viable means that the steps planned can be carried out, even if the results are poor.
3. There may be actions that are resource-intensive, unpleasant, or hard to find a good time for.
4. The outcomes anticipated may be poor.

In the example above, Lemmy realized his approach (i.e. his way of marking) had gaps and sections that were not viable when he tried to mark the first script. The work also left him mentally feeling tired. This left him feeling demotivated for a period. However, he fixed those problems and then improved performance further, making the work worthwhile.

Ways to refine an approach so that it is more efficient include the following:

- **Time and motion:** The movements and journeys made to accomplish a task can be examined and, often, reduced. For example, frequently needed tools or stocks can be relocated and journeys can be combined.
- **Softening:** The actions required can often be made more palatable by reducing the intensity and duration of work, and by increasing pleasant feelings and decreasing unpleasant feelings. Take a look at physical comfort and consider possible tools.
- **Sequencing:** Sometimes tasks are easier if done in a particular order. Perhaps doing one gets you ready to do the next. Perhaps just grouping tasks that need similar tools is more efficient.
- **Prioritization:** Sometimes it is possible to allocate resources unequally and focus on higher priority items, such as the people most likely to say 'yes', the exercises that give the most benefit for the time they take, or the clothes you wear the most.
- **Streaming:** Sometimes it is possible to divide items into types and process each type in a different way. A useful pattern is to automate simple cases but deal with complex cases personally.
- **Automation:** There are often ways to improve an approach by using a smartphone application or spreadsheet. In the example above, the progress tracking could easily be automated by using a spreadsheet to do mark calculations and display progress.
- **Prevention:** There are many ways that prevention can be more efficient than cure. For example, not making mistakes is usually less work than correcting them after they have been made. Tidying a mess before it spreads out is easier. Removing weeds before they grow large is easier.
- **Incrementalism:** Many tasks can be done with lower risk and often higher speed by breaking them into small deliveries of value to someone.

- **Combining improvements:** Multiple improvements can be combined and sometimes produce a gain greater than the sum of the parts. For example, automation may make streaming worthwhile, and when this is combined with prioritization and incrementalism there is no need for complex planning and control.

The extra planning/design will usually lead to greater willingness to take action, but could also lead to the realization that the course of action is not a good one for you at this time. This happens when looking at a step in more detail shows that it is much harder than originally thought.

In summary, action can be delayed (initially and once an attempt to start is made) if you do not have a good plan, so:

Develop a good plan and learn it thoroughly.

This pattern is supported by RETRIEVAL PRACTICE.

5.5.2 *Attack persistently unsolved problems*

This pattern supports MAKE AND LEARN A BETTER APPROACH.

E.g. Ben is 14 years old and a keen badminton player. He's very good and near to being included in his county's squad. However, he feels that his backhand is weak and he cannot hit far enough on that side. In one recent club match his opponent ruthlessly exploited this weakness and Ben is starting to feel that if he does not solve this problem he will fall behind others his age. He has tried to improve this shot and at group coaching sessions it has been covered a few times, but so far Ben has not improved.

He is seriously considering giving up on badminton but decides to have one more go at solving this persistent

problem. He searches the internet for useful videos and articles. He spends an afternoon with his brother just practising this one shot. He emails a coach who has produced the best video on the topic and asks what he should do to improve. Then he writes notes on all this and lists some ideas to get better.

These include some exercises to increase his strength and power for the relevant movements, some tests of techniques, some ideas on how to practise, and a plan for several sessions of focused practice with his brother. He starts to work separately on hitting with the centre of his racket, increasing his strength and power, and perfecting his movements. If none of this works then he will give up badminton but at least he will have given it his best.

Some of our problems remain persistently unsolved and this can undermine courses of action that should be attractive.

Sadly, there are some things that are persistently unsolved problems for us. Some of these are also unsolved for most people and just something that most people accept. However, others are problems that most people have solved but we have not. These individual persistently unsolved problems can be quite upsetting and embarrassing. They can make it hard or impossible for us to do things that most people can do easily.

Do not give up on these until you have tried at least these methods:

- Ask someone sympathetic and competent for their suggestions. Push them for detail because people usually find it hard to give instructions for doing something that is easy for them but much harder for someone else.

- Write down your thoughts on the problem and possible solutions.
- Make a systematic attack on the problem using a plan of analysis and trials.

If the problem remains after you have tried all this then you may still need to continue trying. The worst mistake would be to make (perhaps many) weak attempts at finding a solution and, from those, conclude that the problem cannot be solved.

In summary, some important problems that remain unsolved for us but which many or even most people have solved can remain major barriers for us, so:

Make a focused, intelligent, energetic attempt to solve such problems using powerful methods.

5.5.3 Choose for efficiency

E.g. Anjali has quite a lot of money and invests it by buying shares in public companies. She likes to make the investment decisions herself and keeps a portfolio covering between 10 and 30 different companies most of the time. Having looked in detail at various methods of allocating her money to shares she has concluded that the evidence that one method is better than another is unconvincing. So, she turns her attention to the difficulties and costs of each method. She prefers tracking an index to spending lots of time analysing companies, and she learns that the so-called 'efficient' portfolio is actually no better than allocating equal value to each company because the co-variances cannot be established reliably in practice.

Sometimes we are uncertain about the results of different courses of action so that they all seem equally promising (before costs are considered).

If you can identify a set of relevant actions with some good prospects (e.g. they all do well on a heuristic evaluation), but you can't distinguish the best, then choose any of the contenders and try to be efficient. This is better than doing nothing and better than being inefficient. If you are going to be notably successful then you will almost certainly need to be unusually productive, whatever your field.

Some good ways to be more productive are:

- Do more than one thing at a time. For example, can you write an article for a newsletter and develop your knowledge and contacts at the same time?
- Do combinations of things that support each other synergistically. For example, if you decide to take a course in website development you could join a social club for people who make electronic music and read a book about how Amazon was founded and became successful. These things are related and support each other.
- Simplify your life by cutting out activities that are no longer a good use of your time. Some of the things people initially did to make friends or as a change from work eventually become complicated, demanding, and expensive as they get taken further. What makes sense now?

In summary, when alternative courses of action seem equally attractive before considering their costs:

Choose actions for their efficiency.

5.5.4 Compare units of effort

E.g. Austin has legally formed his garden design business but has no customers. Getting customers is his top priority, but what activities should he focus on? At first he lists some possibilities, such as placing

advertisements, doing leaflets, having a website, and asking everyone he knows to help him find customers. Some of these seem more likely to work than others, but then he realizes that they will not take equal amounts of time. He can hardly compare placing advertisements, which will take only a few hours, with speaking to everyone he knows, which will take days or even weeks to do properly. He also wants to spend more time with people more likely to be helpful. To make the comparisons fair, he divides his best guess of sales from each activity by his best guess of the hours needed.

The fact that some courses of action are much more costly than others is a problem when we want to compare them.

It is much easier and better to compare the predicted results of equal units of effort. For example, that might be an hour's work, a week's work, or £100 spent.

In principle what we really want to do is compare bundles of actions but doing this without some initial, simplifying work can be overwhelming.

One simplifying step is to calculate the benefits of comparable units of investment in alternative activities, identify those that seem to give the most result for effort put in, then make bundles with these that use available resources fully (or nearly fully, because we want to leave some slack).

In summary, activities usually cannot be compared directly if they involve different levels of investment, so:

When activities are to be compared, look at the results expected from comparable units of investment.

5.5.5 Refine put-downs and pick-ups

E.g. Talulah has started learning to play the alto saxophone. She aims to practise every day but is finding it

hard. Her tiny flat seems too small for a permanent practice space. Instead, she gets her sax out of its case, which is under her bed, puts up her music stand, and gets her music books out. It all feels like a lot of wasted time.

She decides she must make this easier. She realizes she just has space for a sax stand in the corner of her room and can prop the music books on a shelf permanently instead of using the music stand. She buys a sax stand and now all she has to do when she wants to practise is pick up her sax and start. Ending a session is almost as easy but she keeps up her good habit of cleaning her sax each time.

The overhead of getting set up and packing away motivates us to seek long periods of uninterrupted time for some tasks, and we may never get started as a result.

Sometimes the overhead of getting set up or packed away is mental rather than physical. We must remember where we got to and reload all the details that need to be freshly in mind for us to make progress.

This is easier if we have broken the work into small, relatively self-contained chunks that can be done in short periods of time. Once one of these tasks is done many of its details can be forgotten.

It is also easier if we have documentation (paper or on a screen) that compactly provides the information needed to continue work. This will include the plan for sub-tasks and all the details that need to be readily available to continue the work.

Another method that can help is to spend time developing long term memories to support the task. This can be done by RETRIEVAL PRACTICE.

In summary, the overhead of getting set up and packing away can limit opportunities for working on a task, so:

Reduce the work needed to get set up and packed away.

5.5.6 Predict and use primetime

E.g. Peter and Jane have a garden that needs quite a lot of work to keep it tidy. They are not keen gardeners but cannot afford to pay someone to do it for them. They have time to work in the garden at the weekend but have learned that on Saturdays they feel too tired from the week to do much. Sundays are much better, so they usually plan to work in the garden on Sundays. They check the weather forecasts to decide if they will do the work in the morning or afternoon.

Some tasks are easiest to do at particular times because of our state changes and external conditions.

Often these suitable periods are predictable and it makes sense to anticipate them and plan to use them. So:

Identify ideal times to do tasks and plan to use them.

5.5.7 Retrieval practice

This pattern supports MAKE AND LEARN A BETTER APPROACH and RELEARN YOUR RATIONALE.

E.g. Peter is walking into his local town centre and thinking about what he will do when he gets there. He plans his tour around the town centre and practises recalling his plan, thinking of the shops he will visit and the things he will look at and try to buy. When he arrives in town, he easily carries out his plan, not needing to refer to the list his wife wrote for him.

There are many situations where being able to recall many things fluently is helpful.

In particular, it is easier to get on with a series of relatively small tasks, or sub-tasks, if they are well-learned and come to mind easily. It feels like we flow from one to the next without dithering.

It is also helpful with creative work, especially as your creations get large and complex. For example, writing text, music, computer code, and designing a bridge or building are all tasks that often get disproportionately harder as they get bigger.

One reason for this is that we start to forget what we have created, so to help ourselves make progress it is useful to memorize our own creations, deliberately, and for that the most effective approach is retrieval practice.

Retrieval practice is a very powerful way to build memories (Karpicke & Blunt, 2011, and Roediger and Butler, 2011).

Retrieval practice involves trying to recall things. You might just cover something with your hand or close your eyes and try to recall details. You might have some clever software that achieves a similar result. You might plan your coverage so that it is efficient. I personally find it helpful to count the thoughts I can recall. The counting helps keep me focused, reassures me that I have done some useful work, and gives me information about how much work I have done to build my memories. (I used retrieval practice when writing this publication.)

In summary, memory fluency is useful in many situations, so:

Practise recalling memories to make them stronger and longer lasting.

5.6 Diagnose and correct mistaken pauses

The following patterns are for situations where we have paused in carrying out a plan, perhaps for no good reason.

Typically, we are feeling that our motivation is low.

5.6.1 *Improve progress data*

E.g. Two years ago Carlos migrated to Germany and now works as a book-keeper in a small engineering company just outside Munich. He quickly learned enough of the German language to get by from day to day but his strong Spanish accent often leaves colleagues confused. He decides to try to develop a more accurate German accent and starts to practise using a website. One of his work colleagues has become a friend and Carlos tells her what he is trying to do. She suggests he tackle the problem systematically so he starts to log his time spent practising and every week saves a recording of himself reading a standard page of German text in his best German accent.

As the weeks go by Carlos is pleased to keep to his programme and sees that the hours of practice are piling up. However, he is less pleased with his rate of progress. The more he learns the more dissatisfied he is with his accent as he practises. It is only when he listens to the recordings from early on compared with his more recent efforts that he can hear the huge improvements he is making. He plays his friend some recordings and she encourages him. She says he has been noticeably better at work but she had already forgotten how difficult his accent was before he started working to improve it. The evidence collected by Carlos has become more and more convincing as his expectations for evidence have risen.

Our expectations for evidence of progress tend to increase over time when we are following a course of action and this can

make us dissatisfied with our progress and even give up incorrectly.

The way our expectations of evidence rise over time follows a predictable, logical pattern.

Before we start to act we tend to require only a strong enough rationale for the action. Once we start the action we begin to expect to see evidence of something happening. However, we are pleased with any evidence that we are doing what we intended and that it is producing some kind of effect. Ideally, that effect is what we were hoping for, or seems like positive progress anyway, even if it is not directly beneficial. Often, we have given little thought to this in advance so it is encouraging to see any effects that are not negative.

E.g. A person who starts working out in a gym may be encouraged by counting how much work they have done, the fatigue they feel at the end of each session, and by the fact that their muscles look a little bigger at the end of sessions due to the 'pump' effect. Evidence of increased fitness is not needed immediately and it would be unreasonable to expect it.

As we continue we get more demanding because we learn more about what happens and start to focus more on whether the effects lead to the beneficial outcomes we wanted (or others that we find desirable).

E.g. As the person continues to work out at the gym they may start to look for evidence that they have become stronger and perhaps more powerful, and perhaps also that they look more athletic even a few hours after a session (though this might be because of changed posture).

If there are no beneficial outcomes despite evidence of things happening then

the person will start to question whether it is worth carrying on.

It may also be that the outcomes, once seen, are not those that satisfy the person's current needs. Perhaps the benefits are different from those expected, or perhaps their view of what they want has changed while they have been working on the action. Again, willingness to continue will drop.

E.g. Suppose the gym goer is a young man who starts the project with the idea of becoming more attractive to women. He has no girlfriend and is lonely. After several months he is indeed a bit more athletic looking and has a girlfriend. However, she is not particularly keen for him to be muscular and has started to comment that he is always in the gym and does not have time to see her. The gym work has made him more athletic looking but now that seems less important than it did and the time taken is more important than it was. Things have changed over time, making his gym programme less relevant.

At the final stage the question is whether the benefits achieved are worth the effort. We begin to look for evidence of efficiency, not just effectiveness. In theory we might be able to consider efficiency as soon as we can establish effectiveness, but in practice the first signs of effectiveness will often appear before we have raised the efficiency of our actions to near the best possible.

E.g. The gym goer might start to wonder if 5 hours of workouts a week plus hours more of fatigue and restricted eating are worth the slight increase in visible athleticism and the modest increase in strength. However, enthusiasm may continue while it looks likely that improved exercise plans,

exercise form, and diet can improve the mix of effort and results.

As a result of this progression, increasing expectations can lead us to become unhappy with results even though they are actually improving, or just because we lack the data, even though the rationale is still good. It is very important to have evidence and for that evidence to meet our rising expectations.

In summary, as we proceed with an action it is usually reasonable to expect increasing evidence that the action is working and worthwhile, so:

Plan to gather, summarize (e.g. graph), and consider increasingly good evidence of the outcomes and efficiency of courses of action.

5.6.2 Relearn your rationale

E.g. John's job is physically tough, smelly, requires protective clothing, is often cold and uncomfortable, and can be dangerous. He has to get up at 6 am for the early start and when he gets home he is exhausted and needs a shower. This winter he is finding it particularly tough, especially as he and his wife have a young child. John struggles to get up in the mornings and often wonders why he sticks at it. Then, one afternoon, his wife tells him she is pregnant again. John is still tired from the day's work but is happy at the news. It reminds him why he works as hard as he does: he does it to support his family and give them all they need. John takes some photos of his wife and their toddler and resolves to look at them on his phone whenever he is feeling down about work.

Rationales can be forgotten over time or when circumstances change.

The easiest rationale problem to deal with is where we have simply forgotten some of the rationale. Spend some time

remembering as much of it as you can and filling in the gaps. This might give you a strong rationale and lead to action, or might show that the action is not worth doing.

In summary, rationales can be forgotten, so:

Relearn a forgotten rationale.

This pattern is supported by RETRIEVAL PRACTICE.

5.6.3 Predict fluctuations in strength of rationale

E.g. Marjorie has a sore throat and a cough so she goes to see her doctor, who explains that she has a bacterial infection and prescribes an antibiotic. After another week the worst has passed and a few days later Marjorie is feeling normal again but has not finished the course of antibiotics her doctor prescribed. There are still enough for four more days. Marjorie does not like taking medicines but remembers her doctor's strict instructions to finish the course even if she feels fine. Her low motivation to continue at that point was predictable and the doctor's advice was given specifically for this moment.

The strength of the rationale for continuing with some course of action may change over time, and this may be predictable to some extent.

Some fluctuations in the strength of the case for an action are predictable and should be considered as part of the initial decision to start the action.

The weakening rationale may be the result of predictable indications that, if not processed properly, will cause reduced motivation. In this case, the initial rationale should anticipate this problem and include it in the initial rationale. A proper consideration later on may then be

unnecessary. We already know what the indications mean and can discount them.

In other cases, the weaker case is no illusion and the proper response is to drop the course of action or switch to an easier version of it. For example, if going to the gym seems like a bad idea in February then the fall-back might be an easier routine or exercise done at home or by walking or running outside.

Other fluctuations are unpredictable and a proper evaluation is needed. This may result in stopping the course of action or carrying on.

In summary, the strength of rationale for a course of action may rise and fall, causing problems for continued action, so:

Try to predict fluctuations in the case for continuing and prepare accordingly.

5.6.4 Tolerate performance variations

E.g. Gary is dieting and has decided to stick to 1,800 calories on Wednesdays and Thursdays. At 3 pm on a Wednesday he is feeling very tired, stressed, and hungry thanks to an unusually gruelling crisis at work. After wrestling with his feelings, he eats a large chocolate bar and feels better physically but disappointed that this takes his calorie total for the day to 2,100 with dinner still to come. Many people in this situation would decide that the rule has been broken so might as well be ignored for the rest of the day¹². However, Gary knows that occasional lapses in unusual situations do not invalidate his diet or his adherence. He forgives himself and resolves to have a very light evening meal to limit the damage.

¹² See Soman and Cheema (2004) and Herman and Polivy (1980).

Sometimes behaviours we wish to maintain are harder at some times than others because of changes in our state.

Ongoing behaviours (including abstinence and restrictions) are often harder to do on some occasions than others because our state changes over time. For example, we might feel particularly tired or emotional. Our low state makes the cost-benefit combination of adherence worse than usual and leaves us feeling less willing to comply. It can be rational to break adherence from time to time, recognizing that this does not invalidate the overall plan – it just means that some flexibility and tolerance of occasional failure is necessary.

A slightly better approach is to design the 'rules' of the behaviour to take into account state variations. Allow variations in adherence but monitor their overall effect.

E.g. Occasionally breaking a diet in a small way will not undermine it seriously but routinely breaking it because you feel miserably will.

In summary, our ability and willingness to perform (or abstain from) behaviours can vary over time due to changes in our state, so:

Design behaviour rules to cope with your state variations, using flexibility and monitoring of the overall effect of weaker performance.

5.6.5 Change states deliberately

E.g. Bob is staying with his elderly aunt for a few days in winter. His aunt's house has poor heating and insulation, and one morning it is particularly cold outside and in his bedroom. He does not feel like getting out of bed and stays curled up under the duvet, trying to keep his feet warm. However, he can reach the fresh T shirt he will wear so he stretches out and pulls it under

the duvet to get it warm. He also starts to move his body to make himself feel more awake. He repeatedly clenches his fists and wiggles his feet, eventually stretching out his legs. After a couple of minutes his T shirt is warmed and he puts it on under the duvet. By now he feels more awake and protected by the T shirt so he gets out of bed and dresses quickly.

Sometimes our state is not conducive to action we want to perform but we can change our state to make action easier and more appealing.

Changing state might take a few minutes or involve more than one stage. Some obvious examples are:

- Warming up before exercising
- Doing an easy mental puzzle before studying
- Lying down to rest before doing something that involves standing for half an hour or more
- Having a quiet period before bedtime, with no screens to help get to sleep¹³
- Using a 'sunrise simulation' alarm clock that gradually increases the light level to help us feel more wakeful in the morning
- Thinking calming thoughts for several minutes to get over an emotional shock so that we can get back to work.

The need for state changing like this might be predictable so it can become part of a daily routine.

In summary, sometimes you do not have to stay in your current state if it is incompatible with an action you usually want to take, so:

¹³ Computers today also have a 'night light' setting that alters screen colours to reduce the blue that tends to keep us up too late. This can be scheduled to come on at a particular time.

Change your state gradually to one that is more conducive to the desired action.

5.6.6 Defer reactions to unprocessed indications

E.g. Desdemona started learning to play the acoustic guitar, following a course provided by a website. For the first two weeks she did daily sessions and seemed to be making some progress. She was enjoying the experience and spent half an hour each day, on average, learning to play. However, then she caught a viral infection and started to cough painfully. She felt tired and sometimes had a headache. Her symptoms got worse for three days and then began to improve. On the first day of feeling unwell she tried to play guitar but kept having to stop and cough. After 15 minutes she gave up the session. For several days after that she did not try to play guitar.

On the 10th day she was feeling mostly recovered and thought about trying guitar again. Initially she did not like the thought of playing and considered giving up and never restarting her sessions. The last time she tried it was horrible and she had not been doing the sessions. In her mind, these were signs that she did not enjoy the sessions, was not making progress, and wanted to stop.

Then she remembered that the only reason for these negative indications was her illness. These indications were not reliable feedback on guitar playing and did not count. She picked up her tablet computer and her guitar and started a new session.

Encouraging and discouraging indications that are not thought about carefully can be misleading.

It is not always practical to process indications fully all the time but their potentially misleading effect can be reduced by noticing the indications and the risk of being misled. In the above example Desdemona avoids prematurely giving up on learning to play the guitar by discounting the evidence of experience during her illness.

Typical indications that may be unreliable include:

- Failure to take an action you intended. This might happen because of an obstacle that is unusual, temporary, or can be removed.
- Repeatedly failing to do something you try to do. This may be because the task is inherently difficult, or because of something that is making the task more difficult, such as illness, that is temporary, unusual, or can be removed.
- Feeling bad when you think of doing something. Your feelings may be generated by something irrelevant, like being unwell or something not directly related to the task, such as where it is being done or who is with you.
- Discovering a drawback with a plan or an advantage of an alternative. This may not be enough to change which is best.

In summary, indications of whether a course of action is good or bad can be unreliable if not considered properly, so:

Regard such indications as unreliable, notice how they might be unreliable, and do not be influenced too much by them before considering the new evidence properly.

5.6.7 Process indications thoroughly

E.g. Ella is studying for a degree in astrophysics and is in the first term of her first year. However, already she is

having doubts and wondering if she should have chosen philosophy instead. Two of the modules she is taking seem to be going very, very slowly and a third is just covering mathematics she learned at school. The remaining module is quite interesting but is more about history than astrophysics and she still hasn't even touched a telescope or had access to telescope images online. At the same time, two of the new friends she has made are studying philosophy and they often talk about interesting questions raised by their course.

Rather than wallow unhappily, Ella decides to review her options thoroughly using all the new information she has gained since she made her application to study a year earlier. She writes out the main reasons she had for choosing astrophysics back then, such as her wish to do research, her interest in space, and her good maths skills. These remain true and philosophy has nothing to offer her in these areas.

She then adds the new information and thinks about it more carefully. She soon realizes that the module reviewing school mathematics is just there because some students did not take Further Maths, so this problem will soon go away. The two modules that seemed to be so slow are a worry, so she looks ahead at course notes and slides for later in the term and next term. It is soon clear that these modules are just laying a very clear and solid foundation for some advanced ideas that otherwise would be hard to take in. She also checks the specification for the philosophy course offered by her university and discovers that, in addition to those interesting questions, there is a massive amount of tedious historical and religious

material that she would not be interested in at all. Her original choice of astrophysics stands and Ella returns to her studies with renewed enthusiasm.

Encouraging or discouraging indications can build up over time without being properly considered. They may be misleading.

A proper consideration involves going back over all the evidence and considering the factors that might make new indications more or less important as evidence. Often, the combined effect of indications should be more or less than was felt when they arrived.

The example above involved a decision that needed to be reviewed. In a business situation, this might involve re-running a prediction model to consolidate the effects of several small changes. The Deepwater Horizon disaster was the result of failing to do this. Several decisions were taken that reduced the risk of damaging the oil well but increased the risk of a dangerous blowout at the rig. Each decision, individually, was within regulations and seemed reasonable but the cumulative impact was not considered. Eventually a blowout killed 11 people, destroyed the rig, destroyed the well, and caused oil to spill into the Gulf for almost 3 months.

In other situations it might be that unprocessed indications are having a needlessly damaging effect on mood.

E.g. Andy and Dave were consulting engineers at the same company until they were both made redundant because of the company's financial problems during a recession. Both were 56 years old and had been working almost continuously since leaving university over 30 years ago. Both had families but their financial reserves meant they did not need new jobs immediately. Both men were

initially shocked to be laid off but Dave struggled much more than Andy.

Dave's shock turned into a gloomy mood and a lack of energy and willingness to do things. His wife would suggest going for a walk, doing something around the house, or looking through job advertisements but Dave just didn't want to do anything. After a few weeks of this his career and money worries were joined by worries about his lack of motivation and mental health generally. He started to play computer games and was struggling with a growing compulsion to bet money online.

In contrast, Andy realized within a few days that he was feeling down because he lacked the daily buzz of achieving things at work. He had come to depend on the boosts from solving each day's problems at work, whether it was a client's engineering problem, a delicate email, or an over-full diary. Now, at home with nothing important being thrust on him, he lacked that constant feeling of little successes. Crucially, Andy realized that his lack of feeling successful was because of lack of important problems he could solve, not because he had suddenly become a less capable person. Thinking ahead, he realized that his search for a new job might be a much less rewarding experience than typical days at work. In the middle of a recession and at the age of 56, he could imagine spending a lot of time looking at advertisements for unsuitable jobs, writing applications that got rejected, and going to the occasional interview only to get rejected despite making an effort. This radical shift in the frequency of successes would need a major psychological adjustment.

After talking things over with his wife, he settled on a new weekly timetable and some projects. These included redecorating tasks around their home, learning about some exciting new engineering topics, and job searching. He divided these into smaller tasks he could complete and get some satisfaction from. There was no telling how long it would take to get another job so he planned to log all his efforts and take satisfaction from these rather than simply be gloomy about his results. With reasonable expectations in place and new sources of achievement feedback, Andy found his time at home easier and even began to enjoy his new freedom and time with his wife.

In summary, indications can be unreliable, so:

Consolidate all evidence (new and old), consider the context, and interpret the evidence carefully to understand what it means. If relevant, revisit decisions/plans thoroughly.

5.6.8 Evaluate incomplete plans

E.g. Rachel lives in Dover and has just been offered an excellent job in Wolverhampton, over 200 miles away. She must let the employer know if she accepts the offer in the next two days. Rachel begins to think about how her life would change if she relocated. She is single and willing to relocate. Her best friend from Dover recently moved to Wolverhampton to work so Rachel thinks she would at least know someone and that could be the start of a new social circle. The problem is that Rachel has not identified anywhere suitable to live. There are no rooms or flats being advertised right now. Her friend is living with an aunt. Without a specific place to live that part of Rachel's plan remains incomplete.

She considers how likely it is that she can solve the accommodation problem in time to start the new job. Her friend confirms that there isn't enough space with her aunt for Rachel to stay for more than a few days, sleeping on the floor. However, looking at property listings online she can see that suitable rooms have been advertised in the recent past. She calls two agents in Wolverhampton who assure her that finding somewhere suitable should not be difficult and will take less than 3 weeks. She has over a month to sort this out. Rachel decides to accept the job, confident that she will solve the accommodation problem later.

Sometimes we cannot develop a complete plan up front.

Although developing a complete plan provides the most attractive option for action, there are times when we are stuck and cannot work out a satisfactory way to do some part of the action. Recognize this and pinpoint what you are stuck on. Do not give up on an idea just because you cannot see how to do it straight away.

Consider the chances of finding a satisfactory approach in future. Consider how other people get on and your usual success in the relevant area. Consider the inherent difficulty of what you are thinking of doing.

In summary, sometimes we cannot solve all the problems immediately, so:

Evaluate the chance of solving outstanding problems and developing a complete plan in future.

6. Conclusions

The basis of motivation is rational and the general solutions to motivation problems are to (1) develop a better plan with a more robust rationale, usually after

gaining more information, and (2) improve our planning and plan-evaluation abilities. However, the large number of different planning and resulting motivational problems is itself challenging.

The effect of uncertainty is usually to make planning harder by overwhelming our thinking with possibilities, making the consequences of our actions less certain, and leaving us with no clear best course of action. We often do not know how to do things or what the effects of courses of action might, ultimately, be.

The skills and knowledge needed to overcome all the potential problems are wide ranging. In this publication some tools have been presented in the form of a pattern language, which links problems and their solutions. There is a secondary mapping of problems to patterns in a different way to provide another opportunity at diagnosis.

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