

Demystifying Depression

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Introduction

Statistics point out that approximately one out of every six people will have a depression (with varying degrees of seriousness) at least once in their lifetimes. The magnitude of this number is all the more shocking if one confronts it with the general ignorance about the problem. Even people well-informed about other health issues will often be caught totally by surprise by a depression. I know, I was one of them. Since our early school years we get tons of information about healthy eating, on the perils of smoking and heavy drinking, on avoiding sunburn, etc, etc. But mental health, largely because of the prejudice surrounding any kind of mental illness, is to a large extent ignored. This is more of a tragedy if one realises how far-reaching are the implications for a person's life and productivity, and most importantly, how depression could be avoided altogether if only people knew how to recognise the early symptoms.

First of all, forget purely psychological explanations of the illness. Clinical depression is a physical illness which so happens to affect the brain. In this respect, it is fundamentally different from momentary bouts of the blues or melancholy. As you read through this document, please always bear in mind that whenever the term *depression* is used it refers specifically to the physical illness more properly described as [clinical depression](#). One also finds the very same word *depression* used in the context of other mental disorders (such as [manic depression \[1\]](#)) of which this document does not cover. It is **very important** to keep this distinction in mind. As an example, consider the people who suffer from bouts of melancholy all through their lives. They often describe their subjective feeling as that of being *depressed*. However, when one takes a closer look at more objective indicators, they do not show the symptoms of a clinical depression. This document does not apply to them.

There are many reasons why the psychology myth still lingers. At the core, this myth probably stems from the *ghost in the shell* view of human cognition [\[2\]](#). Since many people still believe that there is an immaterial soul separate from the physical body, the thought that the soul can be affected by a physical illness clashes violently with their worldview.

One of the enduring myths about clinical depression is that you can suddenly lift it up simply by convincing a depressed person that life is good and worth living. Likewise, a depressed person will not be magically cured if all their problems are suddenly solved. In fact, it was my experience (and that of many others) that the factors which contributed to the depression were long past and resolved. But they had their physical toll in the brain, and that could not be suddenly undone.

Our use of language compounds the problem. All too often will a perfectly healthy person (brain-wise, of course) say that they feel depressed, when all they have is a momentary case of the blues. It is far from my intention to dictate how people should use language, but this example illustrates my case. Curiously, one of the tell-tale symptoms of a depression is an inability to have strong emotions, including sadness and the blues.

Another important aspect to retain about depression is that it is not an on/off condition. There is a continuum between a perfectly healthy brain and one from a severely depressed person. My estimate is that in a modern society, those who could be classified as perfectly healthy are a

minority. Moreover, just like physical fitness goes through ups and downs throughout a lifetime, the brain health of a typical individual will also fluctuate. It is only when the fluctuation deeps significantly low for an extended period that the diagnosis of a depression is typically made. Elaborating further on this note, the good news is that a very large number of people who strictly speaking are not depressed and have largely satisfactory lives, could still feel better and happier if they took better care of their brains. The advice herein contained is also for them.

At this point you might be wondering about the qualifications of the people providing what could be considered medical advice. You are very right in questioning anything you find on the Internet, even more so should health be the subject. The information contained in this document stems largely from the counselling and the discussions one author had with the professionals who treated them. As far as he is aware, both the model explaining depression and the description of his recovery treatment represent the current *state-of-the-art*. Furthermore, he tried as much as possible to separate between what is largely consensual among the medical community, and what is controversial or just speculation. Read the text carefully: you will see that conjectures are clearly indicated as such.

However, and I cannot stress this enough, **if you have a depression you should be treated by a professional anyway**. You will encounter this advice several times in this document. Do not read it simply as a disclaimer. If I could choose the one thing that people should remember from this document, it would be the importance of being treated by a competent professional. And by competent, I do mean **competent**. In many countries, depressions are sometimes handled by GPs or even psychologists. In my experience, many are not properly qualified. Try to find a good clinical psychiatrist instead. Remember that you are putting your health and well-being in their hands.

You may raise the question of why have I bothered to write such a lengthy description of depression if I advise people to seek professional help anyway. In a sense, you are asking for a *rationale* for this document. Well, I would not have written it if I thought it was irrelevant, dangerous, or simply superfluous. Quite on the contrary: I see good reasons that justify it, as follows.

- The focus of the document is an objective description of clinical depression, explaining the physical illness which progressively takes it toll on the brain. If more people were aware of this fact, they would not be as complacent when the first symptoms appear. Moreover, they would feel less stigmatised and reluctant about seeking professional help.
- By being better informed, people would realise the importance of seeking **competent** help. Many GPs and even psychologists are not properly informed about depression, and they can even inadvertently give their patients plenty of bad advice. Worst of all, the situation can worsen dramatically before the patient even realises what is wrong with the advise they are being told. This happens frequently, believe it or not. The only solution is for people to be better informed and able to spot whether or not their GP is competent enough to treat them.
- The enormous cost of health care in affluent societies often translates into health insurers

pressuring for the cheaper solution of relying solely on antidepressants. In countries where the GP stands as the *gate-keeper* for specialised treatment, people may find it difficult to convince their GP to send them to a specialist. The result is treatment based largely on medication, with little or no coaching.

- Lifestyle plays a large role in the development of depression. Again, by better understanding the problem from an objective perspective, people will more easily assimilate the need to take good care of their sleep and to avoid overloading their brains.

The remainder of this instalment is structured as follows. I will begin by explaining what exactly is a depression and how the problem develops in the first place. Special attention will be given to a description of the most typical symptoms which accompany each stage of the illness. The next step is more personal: it describes the lifestyle changes I had to take to make my brain recover instead of sinking deeper into the illness.

What is Depression?

If I were asked to come up with an alternative wording for what we call depression, I would say it's a problem of *chronic brain overload*. The key is to understand that the brain "just like all the other organs in the body" has a limited processing capacity, and if you constantly exceed it, disease will ensue.

Consider the liver. Most people know that alcohol is broken up by this organ. It is also known that even a healthy liver has a limited throughput measured by the amount of alcohol it can process by unit of time. Should a person constantly overflow their liver with alcohol, as typically happens with alcoholics, the organ has very little chance of recovering from the abuse. Over the course of many years, disease such as cirrhosis is likely to develop [\[3\]](#).

Similar examples could be given for the kidneys, the gall-bladder, and many other organs in the body. Occasional excess (particularly if you are young) is well tolerated, as long as there is enough of a rest period for the organ to recover. The brain is no different.

So, what does the brain process? In short, information. Our cognitive functions are realised by the neurons in the brain, which communicate with each other by means of neurotransmitters. When you perform a task that requires concentration, this requires heavy processing by the neurons in some specific parts of the brain, forcing them to dispense their precious supplies of neurotransmitters to get the job done. And what happens when that supply runs out? Well, evolution has provided us with a system which can compensate in case of an emergency. This is the stress system, and its constant abuse is what leads to a depression.

Note: I will not elaborate into what is actually happening and in which parts of the brain. Rather, I will simply present a model which abstracts from the physical details. Neuroscientists are likely to disapprove of the simplifications, especially concerning the myriad of other involved neurotransmitters which I will not mention. However, I personally think that it is still a valid model for the purpose of understanding the behavioural patterns which cause the illness. For a detailed description of the physiology of depression, the reader is referred to [\[4\]](#).

Normal Neuron Communication: the Role of Serotonin

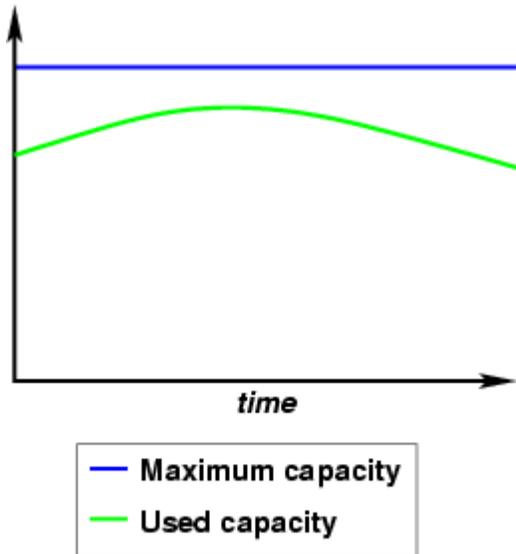


Figure 1: The progression of an individual's *maximum normal capacity* (in effect how large is the supply of serotonin), and the *actual used capacity* (how much serotonin is effectively used), during the course of an extended period. Notice that there are moments when the demand is higher, perhaps because of extra work, but that the maximum capacity is never breached.

Communication between neurons relies on molecules called neurotransmitters. Without going into the details of this process, it suffices to say that for a neuron to transmit information to another neuron, it must release a neurotransmitter in the small gap between the two neurons, called a synapse. More than 300 different neurotransmitters are known to be used in one role or another by the human brain. One of them in particular, *serotonin*, has been identified as playing a major part in the physiology of clinical depression.

Depression affects the area of the brain responsible among others for memory, learning, and tasks that require concentration and organisation [5]. When the neurons in this area are using it, you typically feel good and restful. In this sense, one can say that reliance on serotonin is the hallmark of a healthy brain.

Given that serotonin must be released into the synapse in order for communication to occur, one can imagine that neurons might spend it at a higher rate than they are able to produce it. This does indeed occur, and sleep plays a vital role in replenishing the supply of serotonin. It is also the reason why towards the end of a hard day's work we do feel more tired and sleepy. In a sense, it is your brain warning you that it is time to stop.

It is fundamental to realise that different activities will exhaust your supply of serotonin at different rates. High concentration activities, such as reading, writing, or engaging in intense conversation, are very demanding on the brain. Likewise are activities where learning a new task is involved, or which require planning and organisation. On the other hand, watching some silly things on television is a lot less demanding, while sitting in the park watching the flight of birds is not demanding at all.

It is now time to bring psychology into the picture. You might have been wondering if my description of depression would be a purely mechanical one, without any role for psychology whatsoever. In my experience, psychology (as far as depression is concerned!) is overrated, but that does not mean that it is irrelevant. In the above example, psychology is important when another variable is included: your attitude towards the activity plays a large role in the rates at which serotonin is spent and replenished. Basically, performing an activity with pleasure will be much less demanding than otherwise. This is an important factor in the so-called *burnout* syndrome, one of the primary causes of depression, and one which we will address in the section titled [The Burnout Syndrome](#).

Crucial to my goal of demystifying depression is being able to visualise the problem. Being a scientist, I found that charts and graphs helped a lot in my understanding, and I reckon that even those averse to anything vaguely reminiscent of mathematics will probably benefit from seeing a few pictures illustrating the text.

The Stress System: Adrenaline and Cortisol

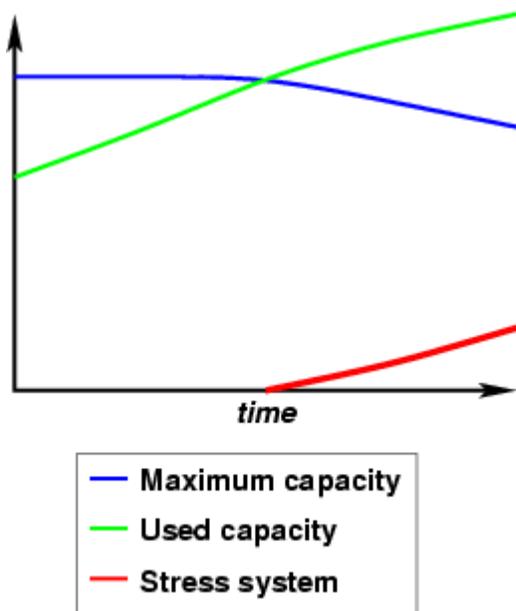


Figure 4: Chronic stress can diminish your maximum

normal capacity.

What would happen if the used capacity in [Figure 1](#) were to approach the maximum limit? Obviously your brain would not just shut down. When this happens, evolution has provided us with an emergency mechanism which can compensate for the lack of serotonin: the stress system.

The stress system relies on two key hormones: *adrenaline* and *cortisol*. In short, adrenaline works in the short term, while cortisol has large momentum and works in the long term. (Adrenaline is also known as *epinephrine* in North America. To be exact, the terms *noradrenaline* and *norepinephrine* are used to refer specifically to the neurotransmitter as opposed to the hormone, since they are different molecules. Moreover, there are many other

neurotransmitters involved: check reference [6] for details. The purists will excuse my exclusive use of the word *adrenaline* throughout the text).

It is important to realise that the stress system can also be activated if your brain perceives danger or any kind of threat. In the first stage, this triggers the release of adrenaline into the bloodstream to prepare the body for action. As a result, your heart beats faster, you begin to sweat, your breath becomes shallower, and your senses become more acute [7]. This is the so-called *fight or flight* response to the stressor event, and was quite adequate during most of our evolution, when these events were quite specific and usually short-term: escaping from a lion, chasing away a rival gang, or facing up to the impudent adolescent trying to woo your mate [8]. Problems with chronic stress arise because in a modern society we cannot escape easily from the stressor, be it an overbearing boss, crowded cities, or traffic jams. Furthermore, no matter how hard we try to delude ourselves with the pretence of civilisation, at heart we are still primates, and consequently, factors such as social status also play an important role as sources of stress. Moreover, primates have evolved the capacity to stress up the body in *anticipation* of a possible danger [9]. Again, this was an advantageous adaptation in the context where it evolved, but nothing but trouble for the modern human.

The effect of the stress hormones on the brain is curious and not what you might expect. The initial surge of adrenaline will make you feel good, though not quite in the same way as with serotonin. The difference is that adrenaline will make you feel euphoric and accelerated, whereas serotonin produces a state which could be described as that of *quiet bliss*. However, as far as the communication between neurons is concerned, adrenaline can compensate for low levels of serotonin. There is, alas, a serious drawback of adrenaline: together with it comes *cortisol*, the *yang* of the stress hormones.

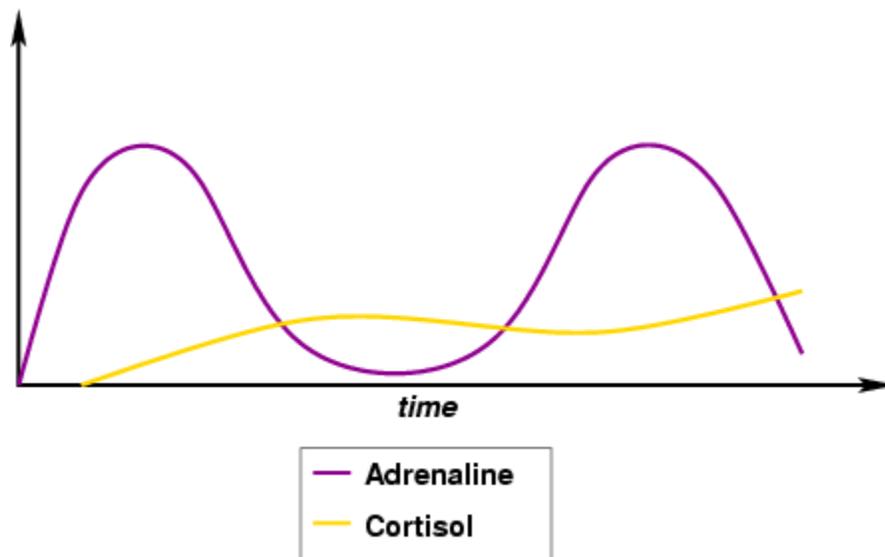


Figure 2: The relationship

between adrenaline and cortisol.

Just as your levels of adrenaline start coming down, so rises the amount of cortisol flowing through your veins. Moreover, cortisol has a much larger momentum than adrenaline, which

means that even though it builds up slowly, it also takes a long time to go back to normal. And should you constantly be engaging in activities which require adrenaline, so will your levels of cortisol slowly increase. In a sense, you can think of cortisol as a measure of the weighted average of your recent levels of adrenaline. I have tried to capture this feature in Figure 2.

Together with the rise of cortisol and the decrease of adrenaline, come the nasty side-effects of the stress hormones. It is at this moment that you feel bad, anxious, and having lots of negative thoughts. And this is perhaps one of the critical features of stress which flies against common sense: you only feel its bad aspects when your body is *stressing down* and progressing towards a more relaxed state. When you are building up on adrenaline, in effect *stressing up*, you might even be feeling good! This explains what is popularly known as the *adrenaline rush* and the consequent *adrenaline crash*.

Having too much cortisol flowing through your veins has another nasty side-effect: the recovery time from any adrenaline surge increases. In a sense, the relation between adrenaline and cortisol goes both ways: the adrenaline curve influences the cortisol curve, and vice-versa. Figure 3 tries to capture this reaction effect by showing the adrenaline response curve for three individuals subjected to the same physical exercise. Notice how the more serious the depression (which translates into higher levels of cortisol, as you will soon understand), the longer it takes for the body to go back to normal.

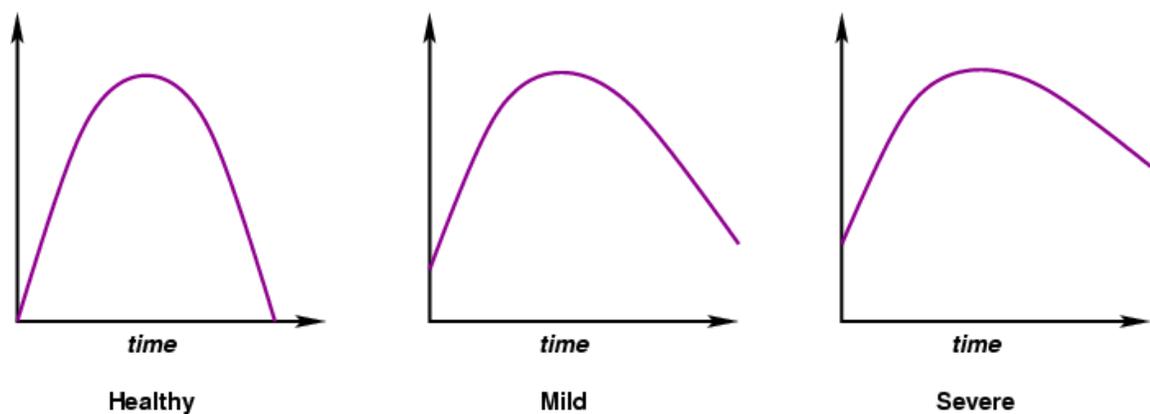


Figure 3: The adrenaline response curve for various degrees of depression.

Now, a healthy brain will never require too much adrenaline, even in emergency situations, and therefore the occasional crashes will be too minute to be noticed. A healthy person will therefore hardly feel stressed, if ever. Moreover, since the measure of how good you feel is related to the total amount of neurotransmitters available, a healthy brain with plenty of serotonin will feel ecstatic if adrenaline is added to the mixture. This can be achieved with aerobic exercise, and explains what is commonly known as the *runner's high*. In a sense, it is as if the brain were overflowed with neurotransmitters. (A depressed person will not experience the *runner's high*. In fact, they should be extremely careful with exercise, as I will explain later in more detail).

To complete the picture of how chronic stress causes depression, there remains one critical factor to be explained: high-levels of stress hormones will over time diminish your brain's ability to produce serotonin. Looking at Figure 4, you can see that chronic stress will diminish your

maximum normal capacity. The exact mechanism by which this happens is still subject to discussion, but the general consensus is that sleep is the key. The reason is that higher levels of stress hormones mean less sleep, which is fundamental for the brain to restore its ability to produce serotonin.

On the speculation front, recent findings have implicated neuron death as the physical underpinning of depression. Furthermore, it seems that the opposite process, termed *neurogenesis*, is crucial for the recovery, and happens naturally in healthy individuals [3,6]. Furthermore, evidence indicates that sleep is fundamental for neurogenesis to take place. If indeed so, then depression would arise because elevated stress levels cause people to sleep less, which then leads the brain to fall behind on its natural regenerative processes.

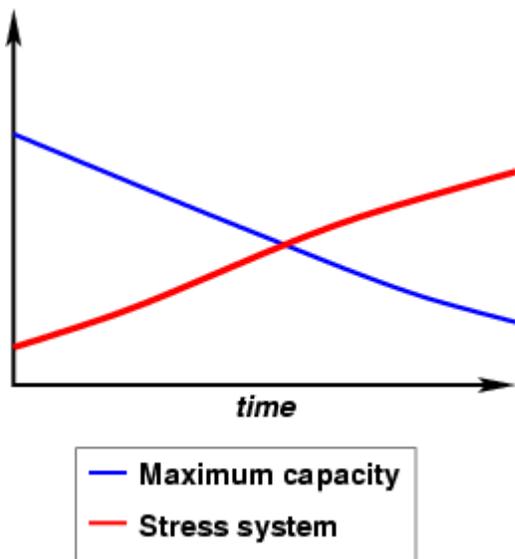


Figure 5: In the last stages of clinical depression, the maximum capacity is virtually nil, and the adrenaline (anxiety) transforms itself into a 'fire'.

At this stage you are in possession of all the ingredients necessary to understand how depression develops. The negative effect of the stress hormones on the maximum normal capacity is the key to comprehend the *buildup* process that makes a depression feed on itself, like a [positive feedback](#) mechanism.

Let us go back to [Figure 4](#). Imagine that you would chronically go over your limits, thus forcing your body to constantly rely on the stress hormones to compensate for the lack of serotonin. On the long term, your maximum capacity would therefore be reduced, making it much more likely that you would have to resort to the stress system to compensate. And thus the feedback begins: your maximum capacity is diminished, forcing you to use the stress system all the time; and because of all the stress hormones flowing through your veins, your brain has no chance of recovering, and your maximum capacity diminishes even further.

This may sound very mechanical, but I would say that it is **the key element** that leads to the development of a full-blown clinical depression. Alas, it is also something that most doctors fail to realise. And if you are still clinging to "psychological" notions about the illness, it is time you put them into perspective. Psychology plays a role in the factors that lead to the initial dip of

your work capacity, but after a certain stage the problem just feeds on itself, and it is crucial to understand that to avoid falling prey of this downward spiral.

Even though the graphs might give the impression that this is a phenomenon that happens very quickly, in reality the process typically takes many years to develop. Moreover, the progressive increase of the levels of stress hormones in your body provide a very good advance warning, if only you know how to read them. I will now provide a basic description of what to expect (and what to do!) at each stage of the process. Beware that different people have different symptoms, so your mileage may vary.

Early stages

In the very early stages, a depression will not feel like a depression at all. The small amounts of stress hormones could in theory be measured—your blood pressure would be slightly higher than otherwise—but in practise it would be difficult "to extract the signal from the noise". Subjectively, you might feel a bit down and tired, especially during those periods when you are *crashing down* from the adrenaline, but most people would still not say that they feel depressed. Also, you would start sleeping a bit less than usual, and not feeling quite as fresh when you wake up.

The problem is not very serious yet, and I think that most people could recover on their own if they were to simply take a long holiday and to make sure that they sleep well. There is some evidence that **if done properly** moderate amounts of aerobic exercise might help at this stage. However, be sure to read the [Role of Sports](#) section before you decide to embark on any exercise routine. In fact, I would rather advise people not to begin exercising than to risk having them over do it and making their condition worse. I know this flies against some commonly held beliefs, but **sports alone can worsen a depression**. If you do not believe now, read carefully both installments of this document and you might understand what I mean.

Elevated stress hormones

As the amount of stress hormones increases, you will start feeling some of their nasty side-effects. This is largely person-dependent, but most people start having problems with their digestive system, headaches, and having more frequent nightmares. Since stress depresses the immune system, people also tend to fall sick with infections more often [\[10\]](#). Only a minority of people suffer from sleep paralysis [\[11\]](#), but it is also a good indicator of elevated stress hormones. An objective measure such as blood pressure should be controlled: it will definitely be higher than normal, and a good doctor would not fail to recognise it. At this stage you are very clearly sleeping less than normal, waking up early in the morning, feeling tired and "lazy" about getting up. Subjectively, you should notice that you do not feel things quite as intensively as you used to: you feel empty, morose, and definitely "depressed" most of the time. Other subjective indicators include loss of appetite and sex-drive, feelings of guilt, lowered self-esteem, and detachment from hobbies or friends [\[12\]](#).

At this stage you should not be complacent about the problem. **The best thing** you can do is to go see your doctor. **Take also into consideration that you** have been putting too much pressure

on your brain. Really do give it a rest: take a long holiday, make sure you sleep well, and be careful not to get any extra responsibilities. Antidepressants are very effective at this stage, especially if combined with minor lifestyle changes. (**And yet another reason why** you should see your doctor!)

Problem aggravates

As the *buildup* towards a depression continues, you get to the point where it is impossible not to notice that there is something definitely wrong. At this point, most people start having serious problems with anxiety, stress, panic attacks, hyperventilation, bouts of psychosis, etc. Your sleep will definitely be a mess, your blood pressure will be high, and your ability to focus at work seriously compromised.

One should definitely seek professional help at this stage. In particular, do not make the assumption that your GP will be qualified to treat you. They may, or they may not. Unfortunately, many doctors still do not quite understand what is going on. My experience in this area was quite bad: I spent more than one year jumping from doctor to doctor, with the problem constantly aggravating, and getting all kinds of bad advice. In short, **you need to stop.** Your maximum capacity will probably be so low that you cannot even work full time. Also, specifically ask your doctor for antidepressants. In the country where I live, the Netherlands, this is bit of a taboo subject, so depending on where you live, you might need to convince your doctor not to be stingy and stubborn. Should they suggest that you start exercising, **just ignore that advice.** It is a very good indicator that they do not have a clue of what is going on. Also, you will need to make changes to your lifestyle. The [Recovery Guide](#) section describes one author's personal experience in that regard.

Last stages

In the last stages, the maximum capacity is practically nil, and the level of stress hormones so high that people cease to be able to function. The stage of a clinical depression is very difficult to describe in words, but I will do my best. The anxiety transforms itself into a "fire" which constantly burns inside your head; you will feel desperate, much more than you ever felt in your life, as if you could never be happy again; and you will definitely be suicidal, to the point of actually planning suicide or even attempting it (with success in many cases, tragically). During this stage, people can barely sleep, if at all.

To an outsider, the fact that a clinically depressed person is pretty much confined to bed is often misinterpreted. People often think that a clinical depression is a simply a state of apathy. Quite on the contrary: remember that the blood pressure and heart rate of a depressed person are extremely high. Rather than apathy, depression is an overwhelming fire which will not subside and burns you from the inside.

Unfortunately, it is only at this stage that many people finally concede that they need professional help to treat them. Needless to say, you will need to make drastic changes to your lifestyle if you want to recover. You should also be very patient: it will take a long time before things go back to normal. **Most important of all, a clinical psychiatrist is the proper specialist**

to accompany you during this period.

Speculation on the Physiology of Depression

This section aims to provide a picture of what is actually happening (physiology-wise) in the brain of a depressed individual. It is highly speculative and quite likely just plain wrong, though we tried as much as possible to base the theory on solid scientific findings.

The reader will remember that up until now we have only presented a model which abstracts from the possible physical underpinnings of depression. This model has the obvious advantage of being shielded from our current relative lack of knowledge concerning the actual physiology of depression. Therefore, even if the conjectures presented in this section turn out to be completely wrong, the abstract model still survives.

The assumptions leading to the construction of the speculative physical model are as follows:

- Neuron death in the hippocampus has been implicated in depression [\[13\]](#)
- Neurogenesis (the birth of new neurons) seems to be necessary for recovery [\[14\]](#)
- Neurogenesis happens continuously in the healthy adult brain
- Antidepressants require about 3 weeks to have an effect
- Stress diminishes neurogenesis
- People under stress sleep less than usual
- Sleep is essential for recovery
- During the recovery phase people sleep more than normal
- Ageing mimics several aspects of depression
- Need for sleep diminishes with age

With these assumptions in mind, and analysing the abstract model described in the previous sections, the jump to a physical explanation of depression is relatively straightforward:

- **Neuron death and birth happens continuously in the adult brain**

At least certain parts of the brain continuously renew themselves. Sleep seems to be fundamental for this renewal process---perhaps neurogenesis happens during sleep.

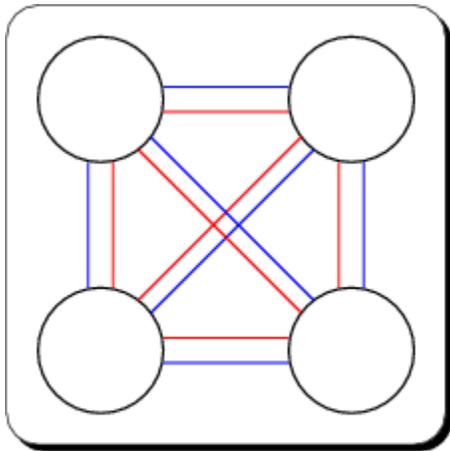
- **Stress affects sleep, and by consequence, neurogenesis**

There is plenty of speculation concerning the exact mechanism by which stress causes neuron death. Our own conjecture is based on the fact that when under stress, people sleep less than normal. Therefore, rather than directly killing neurons, stress might simply cause the brain to fall

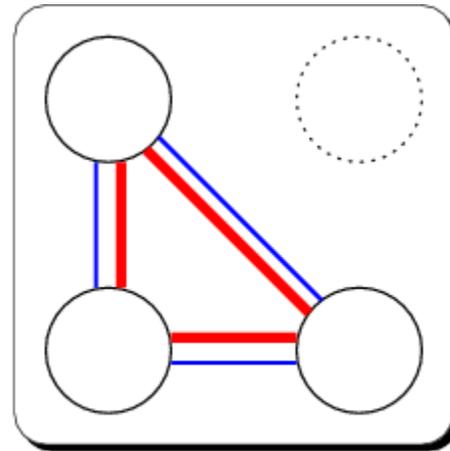
behind on its normal regenerative process.

- **Fewer neurons means more reliance on emergency mechanisms (the stress system)**

Chronic stress will mean fewer neurons to take care of the same tasks. Since each neuron's supply of serotonin is finite, having fewer neurons means having to compensate more often by resorting to the stress system (see the adjoining figure). Over a long period this can lead to the brain getting stuck in the downwards spiral described in the previous sections.



Healthy



Depressed

Fewer

neurons to perform the same tasks means that each one will have to rely more on the stress system to compensate.

- **Recovery means extra neuron growth**

It is a fact that during recovery people sleep more than the proverbial 7-8 hours. If sleep is indeed fundamental for neurogenesis, this is just what one should expect. Also, the fact that antidepressants require about 3 weeks to take an effect matches neatly with neurogenesis taking also approximately 3 weeks to occur.

- **Increase in activity fundamental during recovery**

Some studies show how stimulating environments help with neurogenesis [\[15\]](#). The reason might be similar to recovery from an injured limb: one has to gradually *push the brain* into continuing its recovery. This explains the affect that the level of activity has on sleep during the recovery period: too much activity means resorting too much to the stress system and therefore less sleep; but too little activity also means lesser need for recovery, and therefore also less sleep.

- **Ageing brings about smaller hippocampus and therefore less need for sleep**

If there is a natural decrease in the size of the hippocampus with age, then one should also expect a reduced need for neurogenesis and therefore a reduced need for sleep.

The Recovery Process

Depending on your age, your general health status, how serious the depression was, and how well the recovery progresses, it typically takes between two months and two years before you can be fully recovered. Do not despair, however, because this certainly does not mean that during all this period you will feel as bad as in the beginning. The first few months are the hardest, but after that things will slowly improve, and little by little you will get your happiness and normality back. Moreover, remember that you only feel the nasty aspects of a depression when you go over your limits: you just have to be patient and to realise that your limits will indeed be very short during an extended period.

In the buildup towards a depression, you probably spent years sleeping less than normal. During the critical stage of a clinical depression, you probably will not be sleeping much if at all. Since it is during sleep that the brain recovers, it should not come as a surprise that the huge sleep deficit must be compensated for with unusual amounts of sleep. This does indeed happen. It can take several weeks or months for the body to crash down, but when it does, you will feel as tired as you have never felt in your life. And you will start sleeping like you have not slept since you were a baby: it is not unusual for people to spend several weeks sleeping 10, 12, or even 14 hours a day. Do not fight against it!

Your sleep will slowly go back to normal after this period. However, during the entire recovery you will still sleep a bit more than the proverbial 7-8 hours. Again, it is crucial that you do not fight against it. Furthermore, try as much as possible not to cut your sleep short: it is better to wake up naturally rather than with an alarm clock. It is mainly for this reason that I strongly suggest that you go to bed early every night.

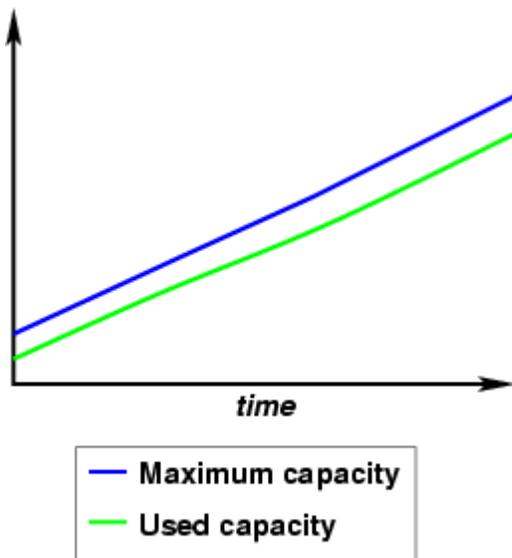


Figure 6: The relationship between daily activity and normal capacity in recovery.

Figure 6 shows how the recovery should progress as far as your maximum capacity is concerned: from an initial state of practically nought, it will slowly start increasing. Also notice that the

amount of activity that you perform during the day must also slowly rise. You need to push your brain a little so it continues recovering. As an analogy, think of physiotherapy on an injured limb: one needs to slowly and progressively increase its activity, always careful not to go over the limit. The same thing happens with the brain.

When you go to sleep at night, you should feel sufficiently tired, but not anxious. If you do not sleep much, and feel stressed and unrested when you wake up, you have probably done too much activity in the day before. However, do not fall for the opposite trap of doing too little. You have to push your brain a bit, remember.

As the recovery progresses, you will feel not only that you can perform more concentration intensive activities and during longer periods, but also that your subjective mood improves. At some point you will be able to start working again, only for a couple of hours each day in the beginning, but increasingly more until you can work full time again. Finally, your mood should start approaching normality towards the later stages of the recovery: you should regain the feelings of *fullness*, vibrancy, and what is sometimes called the *elan vital*.

Concerning physical activity, you will notice that the amount of time required for the body to go back to normal slowly becomes shorter and shorter, as illustrated by [Figure 3](#). You will also feel that you can do more intense physical activity (such as walking faster) without your heart racing abnormally. This means that towards the end you will be able to increase the amount of physical activity, and even to start doing some gentle sports. Just be careful not to start too early: if it affects your sleep, then cut down on the amount of sports. Also, be sure to read the [Role of Sports](#) section before you decide to start exercising again.

One last note: towards the final period of recovery, small amounts of adrenaline will make you feel really good, as if you were "as good as new". Do make sure that you are not fooled by this. Have your doctor measure your blood pressure to make sure it is really normal. Also, spend a few days trying to *crash down*: avoid major intellectual activities or any physical exercise. If you do not get the nasty side effects of a *crash down*, then the feeling good was genuine and there was not too much adrenaline on your system. At last, remember that you are supposed to continue taking your medication for a while even after you think you are cured. Beware that if you stop the treatment before you have reached your maximum normal capacity, there is the danger of a relapse some years down the road.

Recovery Guide

I saw "Sideways" a few weeks ago. If you have not seen it yet, give it a try: it is a good film and tells an interesting story. For the purpose of this discussion, the relevance comes from the fact that one of the main characters had been chronically depressed for a few years. While watching the film I could not help but to think that he would probably continue depressed for many more years (happy ending notwithstanding), since depression-wise his lifestyle was appalling!

The point of this digression is that plenty of people with depression are not being properly treated. Antidepressants revolutionised medicine's approach to the treatment of depression, and even though they are generally effective and an indispensable tool, sole reliance on drugs

neglects valuable lifestyle advice. This is an especially important consideration for the more severe depressions, where drugs alone may not suffice to bring the illness into remission.

In the following sections I will describe the lifestyle changes I had to follow to recover from my depression. Before you proceed, take heed of two very important observations:

- You must be mad if you are relying on the Internet as a substitute for a doctor. **If you have a depression you should be treated by a specialist! Only they will be able to provide you with the coaching most appropriate for your case.**
- The advice was meant for people with severe depressions, and is overkill for a mildly depressed individual. If you had a mild depression in the past, you are therefore likely to find this guide to be too strict. Concerning mild depressions, you are absolutely right.

In order to recover from a depression, one must first understand the problem. If I have been successful in carrying my message across, by now you should have understood the critical aspects: avoiding raising your adrenaline levels, and make sure you sleep well and a lot. In practise, achieving these goals can be much more difficult than it seems. It takes some time before a person learns how to properly listen to their bodies; moreover, it is easy to fall victim of the *adrenaline trap*, since people get fooled by the immediate positive reward (the adrenaline rush), but fail to associate it with the delayed negative effect (the adrenaline crash).

The following three sections cover the different aspects of the lifestyle changes. The first category deals with general advice which one should always have present. It was for me the hardest to assimilate, especially since I had to overthrow some long held misconceptions about the nature of physical exercise. (And one which I am sure will raise controversy amongst the audience). The next section deals with the daily routine. Even though more flexible in nature, I quickly realised that there were good reasons behind my counsellor's insistence that I followed its guidelines. At last, the third section focuses on tips for good sleep. These are by no means specific to a clinical depression, but especially important for someone with the illness.

General Lifestyle Advice

These are just the general tips that one should have **always** present going through the day. It might take a while to get used to them, but in time they will become second nature. Moreover, remember that depression is not an on/off condition: this same advice is also useful for healthy people who wish to remain that way. Obviously, a healthy person does not need to follow them very strictly, but they remain nevertheless good lifestyle advice.

- **Avoid excitement like the plague!**

This is perhaps the most important. Excitement means adrenaline, and by now you must have realised how important it is to cut down on the release of this hormone. Beware that activities which might make you feel temporarily good are often exciting and laden with adrenaline, and will thus make you feel worse afterwards!

This particular example also illustrates how plenty of so-called professionals will often be totally

clueless about depression and likely to provide their patients with bad advice. I refer in particular to many naive psychologists who base their counselling on platitudes such as *you must do whatever makes you feel good* (obviously reminiscent of the myth of psychology). It is true that pleasure is very important, and finding activities which make you feel good is fundamental. **However**, care should be taken that this subjective *feeling good* is not caused simply by an adrenaline rush. A good professional will be able to tell the difference, and with time so will you.

- **Do not hurry**

Hurry means adrenaline: see above example. In practise, it may be difficult to avoid hurrying, but you can do your best to plan your activities in such a way as minimise the chances of it happening. If you need to catch a bus or a train, don't do it at the last minute; it is better to wait five minutes than to rush. Switch off the telephone: it avoids running towards it; make use of voice-mail instead. Also, do not be afraid to let the world turn without you for a while!

- **Beware of sports**

This was probably the hardest one for me to understand. Sports made me feel good, and I thought I could "sport my way" out of the depression. Now I know better. The problem is that sports do indeed give you an immediate good feeling, and we interpret this short-term positive response as if sports improved the depression. However, that good feeling is caused mainly by adrenaline, which is just an illusion. Moreover, since the crashing down can take a long time, people fail to associate that delayed negative response with the physical activity they had some days before. And thus the myth endures. (There are however circumstances in which sports can indeed help with depression. Please read the section titled [The role of Sports](#) for details).

- **Listen to your body, not to your brain**

The rationale is of course that adrenaline can make your brain feel good, even as it revs up the body. In practise, most people have difficulties in learning to read what their bodies are telling them: in the first stage, help from a good physiotherapist might be required.

- **Rest after every activity**

Rest is important for the adrenaline levels to come down. However, remember that it is when your body is stressing down that you feel the nasty side effects of stress. Therefore, in the early stages it will be very difficult to rest: in serious cases, people will have such anxiety crises that they will want to devour their own flesh. In spite of this, you must resist the temptation to get up and do sports or physical activity! The withdrawal symptoms are very tough to endure, but you must go through this stage if you are to cleanse your body from all the adrenaline.

Thankfully, after this critical initial stage you will not have anxiety crises anymore when you start resting. In any case, do make sure that you rest a few times during the day, especially after lunch (the good old *siesta*), and after any physical activity.

If you are thinking that the kind of language I am using is reminiscent of that used to refer to drug addiction, then you are right on spot. Adrenaline might be a natural drug produced by the

brain, but the effects of its excessive use are not unlike those of cocaine or heroin. I cannot make more precise comparisons, but perhaps someone in the audience who has the experience of both depression and drug addiction will be kind enough to report on the similarities/differences.

- **Do not perform multiple activities simultaneously**

Be especially aware that your whole life you might have been doing this, so it will take time before you realise all the parallel tasks that you have been imposing on your brain! A few examples to get you started: listening to music while doing housework, having a television on in the background, and reading the newspaper while having breakfast.

Multitasking is very demanding on the brain. Do not think that since you are doing two things simultaneously, you will be finished quicker and therefore stress your brain a bit less. Quite on the contrary. Consider $E(a)$, $E(b)$, $E(a+b)$ to be respectively the amount of effort required to perform activities a , b , and a plus b simultaneously. Bear in mind that $E(a+b) > E(a) + E(b)$.

- **Practise relaxation exercises**

Yes, I am referring to stuff like meditation and yoga. They actually work, despite all the silly new-age nonsense that surrounds them. If you cannot stand the airy-fairy aspects, try to find a good expert who does not preach them.

Personally, I found that one of the most relaxing things you can do is to lie in the sunshine. This might not be an option if it is winter and/or you happen to live in a cold country, but if you can, do it as much as is safely possible. (But take into account the usual advice concerning the dangers of catching too much sun, obviously! Like in all things, moderation is the key).

Make a conscious effort to do things with pleasure

This could take a fair amount of brainwashing, but the idea is that before each activity, no matter how small, you think *I love doing this*. For best results, say it loudly. Also, only do things when you really feel pleasure in doing them, and do them only for as long as that pleasure remains. Should you lose interest or feel tired, then stop.

Take appropriate medication

If your gut reaction is that antidepressants are evil, consider informing yourself properly. The truth is that modern drugs are quite effective and generally safe (I am referring in particular to SSRIs and more recent classes [\[16\]](#)). They do have side-effects, but these are usually mild and quite bearable compared with the illness itself. For best results, have a clinical psychiatrist prescribe them to you: they are generally well informed of the different side-effects and can choose the drug best suited to your case. Also, remember that antidepressants usually require around three weeks before they have an effect. Three weeks are an eternity for someone with a depression, but do not stop taking them just because you do not see an immediate result.

Daily Routine

I will now make a brief description of the typical daily routine. This advice assumes that the

person is in a serious condition, but there are still a few good pointers to extract even for mildly depressed individuals. Also, as the condition improves, one does not need to be as rigorous as in the early stages.

- **Take your time to do the morning activities**

You surely do not want to rev up your body immediately after waking up! Take your time to get up, to shower, to get dressed, and to breakfast. If it takes you less than one hour and a half to perform these activities, then you are doing them too quickly.

- **Take a walk in the morning**

The idea is to have a *qualitative walk*. Pay attention to the colours around you, to the smells, the sounds, the shapes, the people, etc. This will help to diffuse your thoughts, and to avoid the obsessive thinking that accompanies depression. Also, since you must limit physical activity, walking every morning is important for your body to burn excess sugar. Walk for about half an hour, and do not forget: lie down for another half an hour afterwards! (Remember [Figure 3](#): your body will take longer than usual to get back to normal).

- **Find an activity that gives you pleasure**

Remember that depression affects the part of the brain responsible for high concentration activities, planning, and organisation. For this reason, you must find an activity which does not demand too much of these abilities. This could prove difficult, as often people who have depressions are those whose hobbies are concentration-intensive. Forget reading, writing, and the Internet. What you need is something like gardening, painting, or bird-watching. Just make sure it is not physically demanding either!

Towards later stages, you will be able to watch some things on television. Just avoid excitement. In fact, you should probably stay way from cinema altogether, not to mention the news! Instead, watch some documentaries or silly sitcoms.

- **Eat properly and avoid heavy meals**

Digestion is also quite demanding on your body, and therefore it is better to have more meals rather than bigger meals. Also, a depression is really a bad time to be thinking of diets. Eat well and make sure you get all your nutrients.

Some people also swear by the importance of drinking water regularly during the day. The rationale is that dehydration is a stressor event, thus triggering the physiological reaction we aim to avoid.

- **Have a *siesta***

Even if you cannot sleep, it is important that you lie down for a while until your body is (relatively) rested. We all have a natural dip after lunch, and it is a pity that some modern societies have lost the *siesta* habit.

Tips for Good Sleep

To conclude, I will present just a few tips on how to get a good night's sleep. These are especially important during a depression, but again, they also apply to anyone.

- **No activities before going to sleep**

You must avoid at all cost any adrenaline coming into your system before sleep time. Be especially careful of anything exciting or stressful. Yes, this includes most of television and even reading! Avoid also any physical exercise before going to sleep. Always have in mind that a person with a depression will need longer than normal for the body to recover from any physical effort. Even healthy individuals should avoid doing sports at least a couple of hours before going to bed.

- **Follow a steady sleep routine**

Try going to bed always at the same time everyday. We all know how working in shifts and jet-lag affect sleep: do not emulate them by going to bed at random times each day!

- **Give your body time to crash down**

You cannot fall asleep while there is too much adrenaline running through your veins. It can take a while (even hours) before you crash down, and often people lie awake in bed waiting for sleep to come. The problem is that after a while it is very easy to start obsessing about not sleeping, which is a sure way of keeping yourself awake.

The idea is to only get ready for sleep once you have crashed down and feel tired. Before you actually get into bed, just lie there for a while (even with your clothes on), until you feel rested and tired.

- **Go to bed early**

There are several reasons why this is a good practise: foremost to be able to wake naturally rather than with an alarm clock; but also to avoid being out of synch with the solar cycle, and to give your body time to crash down.

- **Make your bedroom your sanctuary**

Do not have an office in the same room as where you sleep. Dedicate one room simply for sleeping, and make it as uncluttered as possible.

The Controversy about Antidepressants

This is largely country-dependent: in some countries their use is widespread and generates little discussion; in others, many factors contribute to making them practically taboo words. The country where I live, the Netherlands, tends towards the taboo end of the spectrum. The reason has a lot to do with the prevalent (and backwards if you ask me) Calvinist mentality. I know that in other places, such as most of North America and Southern Europe they are much more readily

accepted. Your mileage may vary.

The controversy is typically framed in the following ways: doctors nowadays over-prescribe antidepressants, instead of following the psychotherapy route; antidepressants are just a ploy from the evil pharmaceutical multinationals; our societies are drifting towards a "Brave New World" scenario where drugs are used to keep the populace happy and unable to rebel. Well, my personal opinion is that there is some substance to some of these worries, but they are largely exaggerated and fail to acknowledge one very important fact: antidepressants are very effective in treating clinical depression. This is not a matter of opinion: it has been demonstrated in several double-blind clinical trials.

First, on the issue of over-prescription. I would say that they are both over-prescribed and under-prescribed. The problem is that most doctors do not understand depression well, and will prescribe drugs to people whose brains are healthy, and fail to provide them to people who could actually benefit from them. Take people who are mourning, for example. In most cases, these people do not have a depression. Grief is something perfectly normal, and its onset is all too sudden to cause a depression (remember that a depression typically takes *years* to develop). Likewise, consider giving antidepressants to very young people: the brain of a child or even a teenager has such a fantastic ability to repair itself that it takes quite a pounding for a depression to develop. In these cases, antidepressants and all their unavoidable side effects are more likely to hurt than to help. On the other hand, there are people who have minor problems with stress and anxiety, or whose blood pressure is above normal for no apparent reason. They are often simply told that they should watch out for salt in their diets, or to take up yoga or meditation. This advice might help, but only to a certain degree. I suspect that a course of an antidepressant would have a stronger and more lasting effect.

Moving on to the subject of side-effects. Modern antidepressants are generally well-tolerated and safe to use. They do have side-effects, which depending on the drug and the person can be significant enough that people discontinue taking the medication. However, this is yet another issue where proper handling by a competent professional will make a huge difference. What one often finds is that people are given the wrong drug for their case. Imagine for example an overweight patient being given an antidepressant which increases appetite, or someone who has a satisfactory sex life and is given a drug which upsets their libido. What is required is matching the profile of the patient with the expected side-effects of the drug. Granted, there is plenty of variation among individuals, but the overall pattern is still strong enough that we can categorically say what will be the most likely side-effects of a given antidepressant. A straightforward discussion with a good professional will go a long way towards finding a drug tuned to your particular case, thus minimising the negative side-effects and decreasing the chances of premature discontinuation.

Finally on to the subject of psychotherapy. As someone who had a depression, I can assure you that there is nothing more patronising and irritating than people who bring up the "psychological help". A depressed person will definitely need professional help, but mostly for a proper explanation of the problem, to learn relaxation techniques, to know how to listen to their bodies, and to be coached in the lifestyle changes required for giving their brains a chance to recover. Once they are recovered, perhaps some therapy might be needed to make sure that whatever

behavioural patterns which contributed to the development of the illness will not recur. However, and I cannot stress this enough, therapy is not a substitute for medication, and "psychological help" is a misunderstanding.

Suicide

Suicide is an unavoidable part of depression, and one which better than no other embodies all the prejudice, the misunderstandings, and the narrow-minded attitudes towards the illness. How often does not one hear pompous proclamations about the cowardice of suicide? Or the patronising and delusive belief that with the proper arguments one can convince a depressed person that life is worth living?

Here I speak only of suicide in the context of a clinical depression. Obviously, non-depressed people can also commit suicide (think of a suddenly dispossessed rich man, or a politician irreparably stained by scandal), but the point I will try to carry across is that suicide associated with depression is a different beast altogether. Again, forget psychology and try to understand the problem from a physiological perspective.

Remember that a depression affects the part of the brain responsible, among other tasks, for planning. During the critical stage of a depression, the brain is in such a condition that a person cannot even visualise a future without the despair and the suffering. They cannot even plan their way out of bed, for that matter. And remember that the reason is entirely endogenous and physiological: there is no amount of well-intentioned arguments which will change that [\[17\]](#). Also, do not think that you can imagine what it feels like. You cannot. I have been there and I can no longer imagine it.

Bear also in mind that during the critical stage of a depression, people experience anxiety crises of such magnitude that they often resort to self-mutilation to try to quench the suffering. Again, do not think that you can imagine what it feels like. It is most likely that you cannot. An anxiety crisis alone can drive a person to commit suicide.

"Suicide is a permanent solution to a temporary problem". There is much wisdom to this sentence, and it is probably the best advice you can give a depressed person. Unfortunately, during that critical stage is difficult for them to visualise the temporary nature of the problem, and suicide is not uncommon. If you have a friend or a loved one going through that stage of a depression, do take the possibility seriously and do what you can to prevent it from happening. In particular, make sure they are being handled by a competent professional. Fortunately, especially if people are young, this stage will not last very long, typically just a few days or weeks.

To conclude, if you never had a depression, and should you feel inclined to make grandiose pronouncements on suicide, bear in mind that you have no clue whatsoever of what you are talking about.

The Role of Sports

The role played by sports and physical exercise in depression is far more complex than either the *sports good* and *sports bad* mantras would lead one to assume. Moreover, I would say that this is one area where our current understanding of depression is sorely incomplete. Consequently, beware that much of the material in this section is conjectural. I am well aware that most people's gut reaction will be to dismiss my conjectures as pure rubbish, since "everyone knows that sports are good for you". A couple of years ago I would have whole-heartedly agreed with them, but I have learnt otherwise in the meantime. Furthermore, read carefully and you will see that I do not deny that sports can be good for you. I simply add a poignant *however* to the issue of sports and depression.

This issue is complex enough to warrant a number of subsections. I will first make a distinction between the temporary improvement of mood brought by sports, versus the long-term actual improvement of the depression. Second, I will put forth the tentative mechanism of why moderate amounts of exercise can help to recover from depression. Third, I will describe the caveats of doing exercise to recover from a depression. At last, I will describe a real-world example of how sports can be used to make people be more active during a depression, with the drawback that recovery takes longer.

Feeling Good vs. Actual Improvement

Sports alone can lift up a depression, says one of the most common pieces of advice about the illness. Unfortunately, this statement is grossly incomplete, often tragically so. If you have properly understood the roles played by adrenaline and cortisol (take a look again at the section on [The Stress System](#) to refresh your memory), you already have a glimpse of why this is such misleading advice. Exercise can indeed momentarily *lift up* the subjective feeling of a depressed person, but that is all caused by adrenaline. It is therefore critical to make the distinction between the momentary mood improvement caused by exercise (which is undisputed), and whether it translates into an actual improvement of the underlying depression.

Please refer back to [The Stress System](#). There I have speculated on recent findings which indicate that a process known as *neurogenesis* ("neuron birth") is implicated in recovery from depression. This process takes about three weeks to occur, which also happens to be the average time required for antidepressants to have an effect. This coincidence has led some to hypothesise that antidepressants work by stimulating neurogenesis [\[18\]](#). The point of this digression is to emphasise that anything which has a positive effect on recovery from depression is likely to require the same three weeks to work. One should therefore be a bit suspicious of any cure which seems to work instantly, as is the case of exercise.

Now the question is: does exercise also have a long-term positive effect on depression, or is it all a short-term illusion?

Why Moderate Exercise May Sometimes Help

I will now speculate on two hypotheses why **moderate** amounts of aerobic exercise seem to help

mildly depressed or healthy individuals. (To be more precise, what is usually prescribed is a moderate aerobic exercise lasting for about 45 minutes, and taking place 3/4 times per week. By **moderate** it is implied that the heart rate never rises past 100-120 beats per minute, depending on the age).

To understand the first hypothesis, you must first take a look at what aerobic exercise really is. If you consider the body's response to exercise, it looks exactly like the effects of an extreme, short-lived stressor: heart rate goes up, senses become sharper, sweat is intense, etc. How can an intense stress prevent stress? The answer may lie in a phenomenon called *hormesis* [19]. In brief, short-lived stressors might trigger the repair mechanisms of the body to overcompensate.

This phenomenon has also been reported in other contexts. We all know about the health damage caused by radiation. However, people subjected to artificial zero radiation environments will get sick. Since our bodies have evolved in an environment with naturally occurring low-levels of radiation, our cellular repair mechanisms are used to that soft but constant radiation damage.

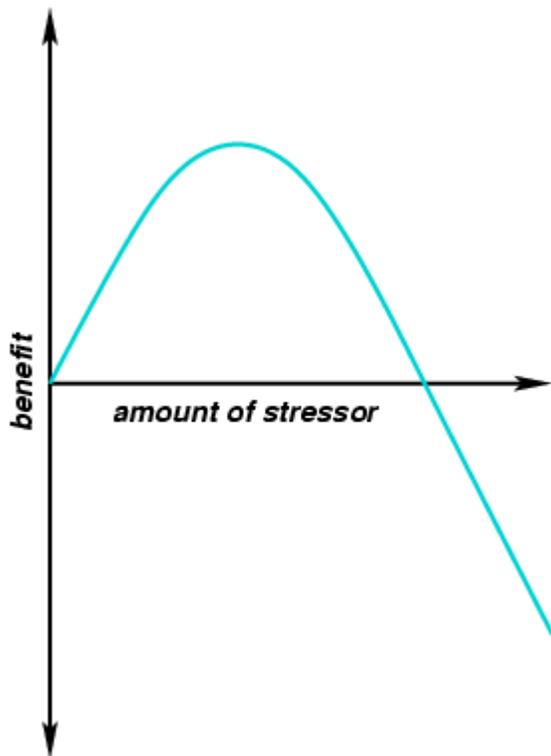
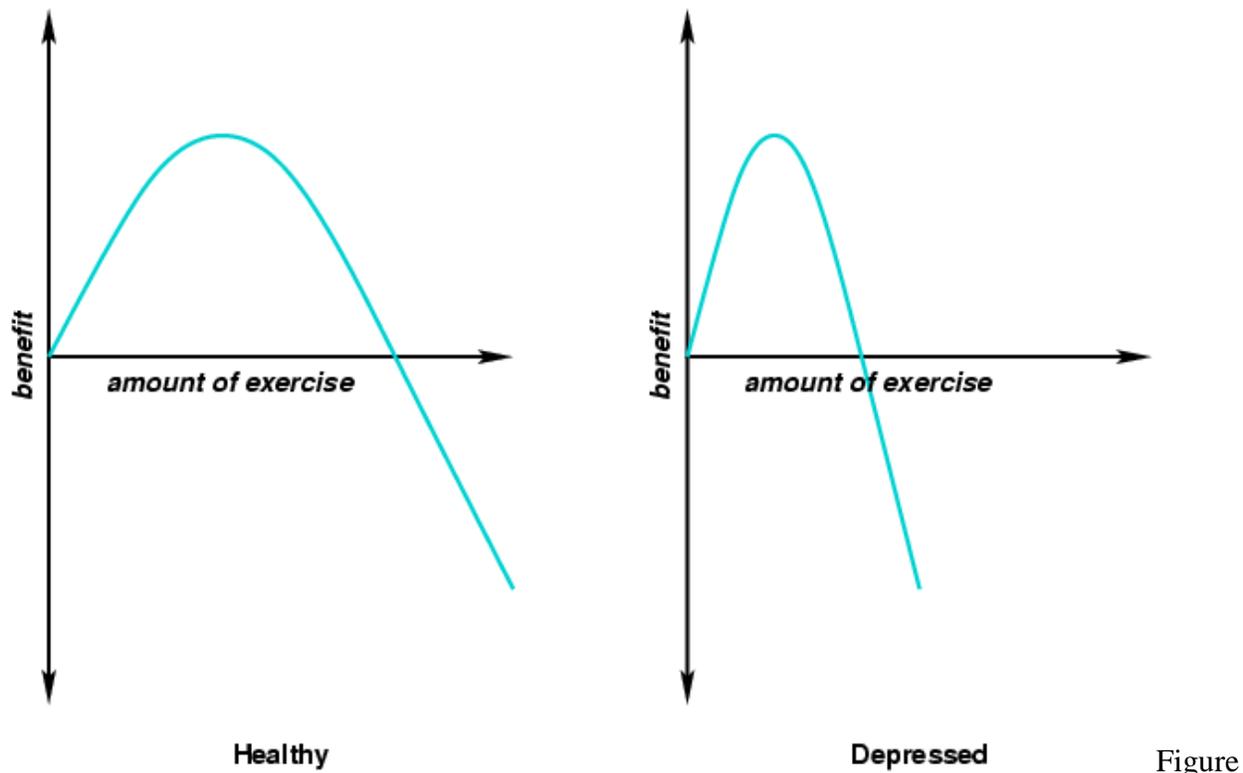


Figure 7: The hormetic response curve. Note how small amounts of the stressor event have a positive effect, but which decreases rapidly as the amount increases. Large amounts will actually have a negative effect on the body. (The stressor event can be exercise, radiation, or any other agent for which there is a hormetic response).

Figure 7 illustrates the benefit one can expect from exercise. The most important thing to realise is that even though a bit of exercise helps a bit, that does not translate into a lot exercise helping a lot. Quite on the contrary.

At this point you might be wondering about the location of two very important points in the graph: the first is the amount of exercise which provides the highest benefit; the second is the amount where the transition from positive to negative effect happens. Well, the truth is that these points are not fixed and depend (among other factors) on how serious the depression is. To understand why, you must take a look at [Figure 3](#), and remember that the more serious the depression, the longer it takes for the body to recover from any influx of adrenaline. For a person with a serious depression, even exercise which a healthy individual would describe as "moderate" will require a long recovery time. So long in fact that it would have a negative effect on sleep. In a sense, the more depressed you are, the more compressed on the x-axis is the graph in Figure 7.



8: The hormetic response curve for a severely depressed individual and for a healthy one.

You may now begin to understand why I advise caution in regard with depression and exercise. For a severely depressed individual, the graph is so skewed towards the left that any exercise beyond a 30 minute gentle walk in the mornings is discouraged. As the recovery progresses, the graph expands on the x-axis (see Figure 8), meaning that people are able to safely do more physical activity and for longer. In the case of a healthy individual or one with a mild depression, the graph is significantly expanded on the x-axis, meaning that moderate exercise as a way of treating depression is a viable option. (Again, moderation is the key!)

The second hypothesis is more straightforward. Regular exercise improves the condition of the cardiovascular system, thus making it less likely to go into *emergency mode* whenever physical

requirements increase, and therefore reducing the amount of adrenaline that needs to be put into the system. However, and in similarity with hormesis, the advantages from exercise probably only outweigh its disadvantages for healthy individuals or **mildly** depressed ones.

At last, a word of advice. **If you think you have a depression, you should seek professional help. It might be tempting for some people to try to exercise their way out of a depression,** but chances are you might actually be making your condition worse. See next section for details.

Caveats of Treating Depression with Exercise

Looking back on [Figure 2](#) from [The Stress System](#), some people might suggest that a person with a severe depression could avoid the *crashing down* simply by exercising every single day. In a sense, as soon as your body begins to crash, you simply do more exercise to rev it up again. You could therefore reap the positive temporary effects of exercise, and hopefully avoid the negative side. This routine "sort of" works, but is also extremely dangerous, as I will proceed to explain.

The major problem is that having too many stress hormones flowing through veins has a negative effect on sleep. And sleep is crucial for recovery. So people with more severe depressions who exercise every day will not sleep as much as they should, and the recovery will therefore take longer (see [next section](#) for a real world example). More seriously, if the amount of exercise is too high, they might even regress. Even more seriously, if the underlying depression worsens, people might be tempted to increase the amount of exercise to compensate, which will quickly lead them into a very dangerous downwards spiral. In a sense, advising a seriously depressed person to exercise is like telling a drunken individual that the best way to avoid a hangover is to keep drinking; or advising a heroin addict that the best way to avoid the withdrawal symptoms is to keep injecting the drug.

This is unfortunately not widely known, but even healthy individuals who exercise too much can develop the symptoms of a depression. This is sometimes referred to as the *athletic overtraining syndrome* [\[20\]](#), and by now you should have understood the basic mechanism of why it arises.

A Real World Example

At last I will provide you a real world example which illustrates the caveats of doing sports during depression. Some companies here in the Netherlands rely on a sports-intensive routine to put people back to work sooner. In basic terms, the routine involves running every single morning for a period between one hour and one hour and a half. The running is performed under controlled conditions, to prevent the heart rate from ever going over 130 beats per minute. If you understood the role of sports in depression, you will also realise just how this scheme works: it basically gets their brains running on adrenaline. This is not entirely harmless, as during the recovery period the people will have elevated heart rate and stress hormones flowing through their veins. Also, with all that adrenaline in their systems, they will not sleep as much as they could, which makes a full recovery last much longer, *up to three years*. The advantage of this scheme? Well, they do begin working (part-time of course) much sooner than otherwise.

At this point you might be wondering how they do not realise what is really happening. Remember that adrenaline is an insidious hormone, which makes one feel good even as it revs up

the body, and this scheme requires them to exercise *every single day without exception*. Obviously, the idea is to keep them from crashing down from all that adrenaline, and therefore to prevent them from realising their true status. Also, there is widespread ignorance about depression among dutch GPs, which makes it all the more unlikely that someone will realise that there is something fishy going on. Personally, I find this scheme to be utterly mad. But then, I am not a Calvinist.

Should you be thinking that this scheme is also a perfectly viable alternative way of curing a depressionâ€”one which takes longer, is potentially harmful to the general health, **but** does allow one to become active sooner rather than laterâ€”I would even be tempted to agree with you. **However**, I still think that the ultimate choice should reside with each individual person. It is their health we are talking about, after all. These people should be properly informed of all possible alternatives and the implications of each one. This is currently not happening.

Depression and Ageing

You do not see 60-year olds having the same lifestyle as 20-year olds. Even a 40 or a 30-year old probably would not be able to accommodate for a long time all the intense living and partying of their youth. We naturally accept that our physical abilities decrease slowly with age, and our brains are no different. Mind you, in this context I will speak only of the brain's endurance, not of the general cognitive abilities. Therefore, do not interpret the graph in Figure 9 as "getting dumber with age". (Though it is most likely that cognitive abilities also decrease with age. Luckily, the added experience can in large part compensate for that).

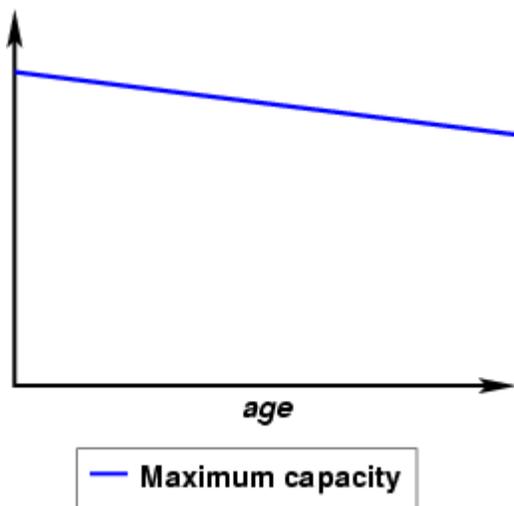


Figure 9: The maximum normal capacity naturally decreases with age.

Bear in mind that I am largely speculating here, but I would not be surprised if the reason why depression tends to strike first towards the mid 20s (and this is a fact) is related to a dip in the maximum normal capacity which happens after adolescence. Many people simply fail to accommodate for the necessary changes in their lifestyle, and thus find themselves constantly going over their (now slightly diminished) limits.

Still on the speculation front, consider the fact that people tend to sleep less as they get older. Could it be related with the graph in Figure 9? If sleep is indeed fundamental for the brain to repair itself, and if age cuts down the requirements for the maximum normal capacity, it is not too far-fetched to imagine that people would therefore require less sleep as they get older.

Speculations aside, do not look with gloom at the graph. Ageing is not a death sentence as far as feeling well is concerned. People do generally accommodate by making changes to their lifestyle, and remember that depression only arises should you constantly go over your limits. Furthermore, in percentage terms, the natural decrease might not even be large. (Unfortunately, our current understanding of depression does not yet allow us to make precise quantifications. See the section [Quantifying Depression](#) for details).

The Genetic Link

I have not brought up the genetic link up till now, but it is without doubt one of the primary risk factors. Depression seems to run in families, and even after the environmental effects are taken into account, the genetic link is still clearly there [21]. Some studies have shown that approximately one out of every three people have a genetic predisposition to develop a depression. However, like in many other cases, the interplay between genes and environment is also relevant for depression: only about half of those with the genetic predisposition will actually develop the illness. In any case, should you have cases of depression among close blood relatives, do take it as a warning that you too might be at risk.

Note: A person is most closely related to their siblings, their parents, and their children. In either case, you share with them approximately 50% of your genes (for which there is variance among the breeding population). Grandparents, grandchildren, aunts, uncles, nephews, and nieces are next: the shared portion is approximately 25%. In these cases, the conditional probability of having a depression knowing that your relative had a depression is higher than the above mentioned absolute probability of about one third. For relatives farther beyond the genetic proximity measure (cousins, etc), the conditional probability approaches the absolute probability for the general population, and is therefore not quite as relevant as an indicator.

Is Depression on the Rise?

Is the incidence of depression really on the rise? Statistics seem to point that way [22], and considering the risk factors, that should not be altogether surprising. The truth is that many modern hobbies are actually very demanding on the brain. Should a person pull long hours at work and then come home to face an equally demanding hobby, there is a very good chance that they are pushing the brain past its limit.

This is likely to strike a chord with the Kuro5hin crowd: surfing the web and blogging should be seen as work as far as the brain is concerned. In a similar note, *information overload* is not just a fancy buzzword: it is a factor contributing to the development of depression. The list is long: mobile phones, news tickers, instant messaging, etc. We seem to be very good at devising ways to overload our brains.

On a more positive note, if one considers the current understanding of the problem, plus the available means to treat it, making serious clinical depression a thing of the past is well within our reach. What is required? Just getting the message across! Sadly, it may prove difficult to overcome centuries of prejudice surrounding mental illness.

Quantifying Depression

You will certainly have noticed the lack of scale in all the graphs herein shown. The truth is that research into depression has not yet reached the quantification stage. This is a pity, as much of the prejudice (especially in getting official recognition for the problem) could be avoided if there were tests which could estimate the seriousness of a depression. Which is not to say that such tests are not possible. In fact, in this section I intend to propose the means by which they could be developed.

At this point you might be thinking that blood pressure already provides a fine estimation. This is only partially true. Foremost, several factors other than stress levels have an effect on blood pressure. Furthermore, blood pressure is a static measure, unable to differentiate between the state of *deep depression / low activity* and the state of *mild depression / high activity*. This is an especially crucial distinction in the recovery phase of a depression. (Blood pressure is more reliable during the buildup phase towards a depression precisely because the activity variable tends to be always high, as people struggle to maintain a normal lifestyle).

My suggested test also relies on blood pressure, but adds a dynamic measure of that variable. In short, the idea is to build a graph showing how blood pressure progresses with time as the test subject performs a high-concentration activity. Figure 10 shows what one would be likely to expect from a healthy individual, a mildly depressed one, and one more deeply depressed.

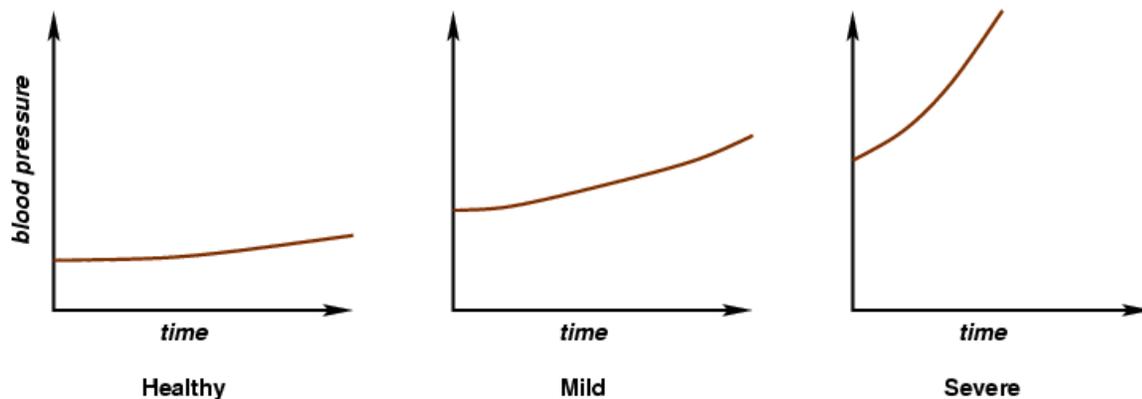


Figure 10: The blood pressure response curve for three individuals with varying degrees of a depression.

Note that a depressed individual will typically not only have a higher blood pressure at rest, but more importantly, a steeper response curve. This could be the basis for developing an objective test of the seriousness of a depression. It would also be extremely valuable for tracking the progress of the illness.

The test activity is an open question. I would suggest a test which would require both high concentration and short-term memory. In my personal experience, I noticed that the simple game *Concentration* (the one where you are supposed to pick pairs of cards out of a large set of unturned cards [\[23\]](#)) provokes an almost immediate response. It might be a good candidate for the test.

Obviously, there is a fair amount of noise which makes a precise measurement harder. How well the test subject slept the night before is one variable hard to control. Likewise for the degree to which they are enjoying the activity. Furthermore, other variables such as current medication and time of day would also interfere.

Another advantage of an objective test would be an estimation of how much time would be required until the test subject could be considered cured. I realise that there are several factors interfering with the progress of the illness, but given a large population of test subjects, one could compensate for factors such as age. It is only a matter of statistics, after all. In any case, a rough estimation is a lot better than no estimation at all.

At last, one small note of hope: there is research underway which uses imaging techniques such as fMRI to look directly into the brain and see the changes caused by depression [\[24\]](#). Unfortunately, it might take quite a long time before such research is put into practical use. The test I proposed is low-tech, potentially a lot cheaper, and could be developed immediately.

Happiness

This section is dedicated to my nihilist friends who thought I have been exaggerating by equating a healthy brain with happiness. In truth, having a healthy brain and no symptoms of a physical depression does not mean your life will be a carnival of constant bliss. There are people who are unhappy their entire lives and yet never develop a depression. They have a general discontent with life, a permanent feeling that the present is not satisfactory enough, and frequent bouts of the blues. However, given that their brains are healthy, they are capable of feeling happiness when circumstances are favourable. In comparison, a clinically depressed person will not feel happy even if all their problems were magically resolved. If you have not done so before, you will now understand how critical it is to make a distinction between the psychological feeling which could be described as "depressed", and the physical illness which affects the brain—clinical depression. Many a prejudice would be overcome if healthy individuals could be made to experience, even if just for just five minutes, what the fire and the desperation of depression feel like.

Facing the Prejudice

Most of the advice contained in both instalments of this document is based on one very important assumption: society will give you the means to recover. Unfortunately, this is still far from being the case. A seriously depressed person **cannot** constantly go over their limits if their brains are to be given any chance of recovering. Take the practical example of restarting work: one has to build up the activity slowly, in accordance with the increase of the maximum capacity of the brain (remember [Figure 6](#) from [The Recovery Process](#)). Obviously, this requires some sort of

official recognition of the particularities of depression. In theory, this is part of the law and recognised in most civilised countries. In practise, things can be very different.

Do not assume that because you live in an otherwise tolerant and socially-minded society, depression will also be well understood. Bear in mind that other factors come into play, most importantly the fact that cure takes **a long time**, which means it is also very expensive for an employer. Also, the overall stance towards mental illness might be biased by the prevailing religious substrate, influencing attitudes even of non-religious people: take the example of Calvinism here in the Netherlands. All in all, when depression is the subject, do not be surprised when society shows its ugly side. The good old advice of stashing away some six-months worth of salary for a rainy day is very much applicable in the case of depression: you will need it.

Interestingly enough, I see no reasonâ€”other than prejudice and bad willâ€”why the state of affairs should remain like this. Take again a look at the section on [Quantifying Depression](#): it is well within our means to devise reliable objective tests to assess the seriousness of a depression and/or to determine when a person is again fit enough to work. Depression itself provides more than enough misery. It is inhumane and cruel that the problem should be compounded by lack of recognition.

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Conclusion

The moral of the story is fairly straightforward: depression is a physical illness which should be taken seriously and be treated as soon as the first symptoms arise. Like most other ailments, it feeds on ignorance and complacency, which is all the more tragic if one considers that we have the medical knowledge and the means to make it a thing of the past. Humanity has been tormented too much already.

Next page: [References](#), Previous page: [Facing the Prejudice](#), Top: [Demystifying Depression](#)
Next page: [List of Figures](#), Previous page: [Conclusion](#), Top: [Demystifying Depression](#)

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