

## CHAPTER 25

# Mindfulness as a Potential Tool for Productivity

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## A Definition of Mindfulness

No day passes without seeing mindfulness mentioned in popular blogs as *the* solution for productivity. Many large companies offer mindfulness classes. Why would mindfulness be useful for productivity? Before discussing that question, it is important to first define mindfulness. Traditionally it has been defined by the originator of the mindfulness movement Jon Kabat-Zinn as “paying attention in a particular way, in the present moment, nonjudgmentally” [5]. A common way you could go about this is by bringing your attention to your breath and then gently monitoring whether it is still there. Before you know it, you will realize that your attention has wandered to a different location. Once you notice your attention has wandered (which can occur after two minutes but also after half an hour!), you are to simply drop the thought and return to the breath. This is the way in which you pay attention, and it is in the present moment because you do not linger on the past nor anticipate the future. This way of paying attention also has a quality of nonjudgmentalness because when you realize you have been distracted, you are not to get frustrated with yourself and blame yourself for being a terrible mindfulness practitioner, but instead you can realize that this is the natural thing the mind does and then start again by paying attention to the breath. You can say that you try to become friends with your mind, monitoring what it does with a sense of chuckle and amusement (one traditional Buddhist way of phrasing that is “be like an old man, watching a child play”). Mindfulness tends to be practiced in sessions ranging from three minutes to one hour.

Mindfulness is a secular contemplative practice that was developed by Jon Kabat-Zinn on the basis of (mostly) Buddhist meditation techniques. It is only one of many meditative techniques that vary among others in the object of the meditation (which is not limited to the breath but could be anything, including code on a computer screen), the width of the attentional focus, and the desired outcome [7]. While mindfulness is typically used by people to make themselves feel better and less stressed, the traditional goal of mindfulness is to make the mind more pliable such that it is less overpowered by the negative emotions of greed, hatred, and delusion (the three main negative emotions in the Buddhist context). A mindful state is thus traditionally not a goal in itself but rather a means to live one's life more ethically and to become a more kind and compassionate human being.

## Mindfulness for Productivity?

Mindfulness is widely used in hospitals to reduce stress and support healing. It has also been touted as a solution for employees to allow them to maintain well-being in a very stressful environment. The idea is that you learn to relax by bringing your attention to your breath and not taking your thoughts so seriously. Some preliminary evidence for mindfulness' effect on stress reduction was given by a seminal study [3], which showed that employees of a biotech firm, when given a mindfulness intervention, felt less stressed and showed an improved immune response.

In addition, it is generally thought that mindfulness helps to counteract distraction and mindlessness and thereby allow one to concentrate for longer periods of time without interruption. For this claim there is much less evidence, as will be discussed in the next section. While the practice of mindfulness can be considered to be a training of attention, this is not the main point of mindfulness. Moreover, it is not clear that the small amounts of attention training in mindfulness are in fact sufficient to actually substantially improve concentration. This chapter will therefore critically evaluate the cognitive benefits of mindfulness, discuss the benefits of mindfulness for emotional resilience, and then suggest how mindfulness may be specifically applied in the context of software engineering.

## Cognitive Benefits of Mindfulness

There has been an increasing amount of laboratory research investigating the cognitive benefits of mindfulness. Overall the benefits are modest, as indicated by a meta-analysis [11]. One important reason for this is that most likely a large amount of practice is needed before cognitive functions are improved. Nevertheless, to understand whether and how mindfulness could potentially be beneficial for software productivity, it is useful to review exactly where cognitive benefits have been observed with respect to attention, distraction, and memory.

First and foremost, mindfulness has been studied in the context of attention training. This is logical, because attention features prominently in the definition of mindfulness as paying attention in a particular way, nonjudgmentally. Scientifically speaking, attention can be subdivided into different faculties, each measured with its own task. Perhaps the most convincing attentional effects have been observed in the domain of sustained attention: the ability to maintain attention on a stimulus for a relatively long duration. A seminal study of practitioners on a three-month retreat showed that while normally people's attention declines over the course of a task, this effect had virtually gone away after 1.5 months of intense practice and stayed like that even after the retreat had ended [8]. Of course, a three-month training is not something that is feasible for the average software engineer.

Other aspects of attention that have been reported to change with mindfulness practice are the ability to orient it to the desired location, the ability to engage it at the right time, and the ability to deal with conflicting inputs. All three aspects have been measured in a single cognitive task: the attention network task. In different meditator populations, improvements in all three components have been observed, although the conflict monitoring effect is the most frequently and consistently reported [13]. A final attentional capacity is the ability to allocate it flexibly to rapidly changing stimuli. It has been observed that attention becomes more flexible after an intensive three-month meditation retreat [12]. For this effect, it does matter what kind of meditation you practice, since we found that this occurred only when practitioners engaged in meditation practices that involve a general monitoring of the environment, without a single specific focus such as the breath [15].

Another aspect of attention that can be measured is the tendency to get distracted, which is quantified by asking people at random moments during a boring task whether they are in fact doing the task or instead are distracted (see Chapter 14 for more details

about these tasks). Mrazek and colleagues [10] observed that participants in such a task reported fewer attentional lapses after a short mindfulness induction compared to a relaxation induction. Moreover, improvements in test scores on measures such as working memory capacity seemed to depend on an individual's tendency to get distracted. Given that mindfulness involves a constant monitoring of one's distraction, this makes a lot of sense.

A third cognitive skill is memory. Several studies have demonstrated that working memory—the ability to keep recent information active in mind and manipulate it—is improved by mindfulness [14]. Working memory in software engineering is crucial for tasks such as visualizing the impact of a particular control structure on the software architecture or keeping in mind the complete design for a complex program. It is likely that the mindfulness-related improvements in working memory arise from the reduction in distraction that has been reported to be an effect of mindfulness. Compared to working memory, much less is known about the effects of mindfulness on long-term memory—the ability to store and retrieve information more permanently. This memory skill is crucial in software engineering for being able to remember the relevant commands in a programming language, for example, and to remember how a software architecture changes over time. In this domain of long-term memory there have been few studies. One of those studies demonstrates an improvement in recognition memory, which is the ability to remember you have seen something before, after a very brief mindfulness induction [1].

## Mindfulness and Emotional Intelligence

It has also been suggested that mindfulness can enhance emotional intelligence, which may be helpful for managers or teams working together. Emotional intelligence is a fairly fuzzy concept. The term was coined by Peter Salavoy and John Mayer and subsequently popularized by Daniel Goleman. It refers to the ability to recognize, understand, and manage your own and others' emotions. It is easy to see that spending some time watching your thoughts and emotions when you are practicing mindfulness could help you to enhance this ability. What is crucial about mindfulness is that the intention is to cultivate a very friendly and nonjudging attitude toward your thoughts and emotions, which is an effective way to manage these emotions. Our normal way of managing our emotions is to try to either suppress or enhance them, and most of the time this results in the emotion spinning out of control. The mindfulness practitioner learns that by

simply observing the thoughts and emotions, these emotions will simply disappear by themselves when not fed by attention.

In the context of software productivity, a crucial emotional intelligence skill is *resilience*, the ability to deal with setbacks. Resilience relies crucially on recognizing that while your emotions may seem intense, they too are fleeting. When you are criticized, this may feel like a disaster, but with the perspective of impermanence gleaned from mindfulness, you realize that the emotional impact is just temporary. Not being too caught up in catastrophizing emotions is a crucial component of cognitive resilience, and is likely to benefit productivity.

Furthermore, much of programming work these days involves significant team collaboration. With team collaboration, especially in a competitive environment, comes significant potential for interpersonal friction. Although little research has been done in this area, a recent study showed that a brief mindfulness intervention in agile teams improved the ability to listen to each other [4], which is crucial for preventing and reducing interpersonal friction. Traditionally, mindfulness is used as a natural method to increase compassion, thought to arise naturally when you develop a sense of kindness and nonjudgmentalness toward your own thoughts. In fact, one experimental study provided empirical evidence for such compassion: when faced with a confederate of the experimenters who was on crutches, people gave up their chair more often after a mindfulness intervention than a wait-list control [2].

## Pitfalls of Mindfulness

The preceding sections demonstrated the positive effects that have been reported of mindfulness and meditation practices on cognitive and emotional skills that are crucial for productivity. However, it is important to note that also adverse effects of mindfulness are starting to be reported [6]. These effects have not yet been systematically inventorized, but a large number of interviews with meditation teachers and serious practitioners indicate that adverse effects of mindfulness can range from sleep disturbances to emotional problems to resurfacing of past trauma and many more. One may think that those adverse effects will arise only after long hours of mindfulness practice, but in fact they have also been reported in first-time meditators taking part in mindfulness interventions. It is therefore important to engage in mindfulness under the supervision of a well-trained teacher who can recognize signs of adverse effects and halt the intervention if necessary. Moreover, mindfulness interventions should

never be rolled out as a blanket intervention for a whole company because they may not be suitable for every individual. Future research will ideally develop an overview of personality traits for whom mindfulness is a less desirable intervention.

## Mindfulness Breaks

Now if we want to implement a mindfulness intervention in the workflow of a software engineer, how could we go about this? These more practical recommendations follow primarily from my own experience as a mindfulness practitioner and as a meditation teacher. First it should be emphasized that, given its potential adverse side effects, it is not advisable to force it upon software engineers. It is also important to set the expectations right; as mentioned, the cognitive benefits are limited, and the first gains are likely to arise in emotional resilience.

Having established these boundary conditions, if software engineers would like to engage in a mindfulness practice at work, in my experience, the best approach is a combination of substantial practice before the day starts and small mindfulness breaks during the day itself. The longer mindfulness session (ideally at least 20 minutes) serves to cultivate and develop cognitive skills, while the shorter sessions serve as reminders and refreshers during the workday. In fact, it has been suggested that these short—less than three-minute—sessions may be the most effective breaks (i.e., more effective than, for example, browsing social media for the same amount of time). One could take such a short mindfulness break after completing a subtask such as writing a routine. Alternatively, it is possible to set a timer to interrupt a debugging session, which may help to give a fresh view of your program.

For most people, using the breath as a meditation object works well because it reconnects you to your body. For some, however, the breath can be a little claustrophobic. In that case, focusing attention on a sound can be helpful (especially because there are probably many sounds to choose from). Focusing on sounds has the added benefit that you may learn to develop a more friendly attitude toward sounds that you would otherwise consider to be annoying or disturbing.

Perhaps surprisingly, for most people, taking short mindfulness breaks during a workday is not easy in practice. Even for a seasoned meditator, the thought frequently creeps in: “Should I not be doing something more useful?” There is always more to accomplish, and often having more tasks makes us feel more worthwhile. Even social media can sometimes be justified as being more useful than a mindfulness break

because at least you are doing something. Nevertheless, my own experience and that of others [9] indicates that when you muster the courage to actually take a break, you are able to zoom out and get a better sense of priority in your work, and you are able to build a deeper connection with your inner kindness and therefore with your co-workers. To have a productive mindfulness break, it is important to not completely close yourself off from what is going on but instead to perceive it mindfully. A mindful attitude involves not only having some sense of kind attention toward it but also a sense of curiosity. You can investigate your gut reactions to the current situation, or you can investigate your intention. Also realize that a brief mindfulness break won't always lead to feelings of calm and bliss. The trick is to be present and OK with whatever shows up in these moments. The goal is not to be a perfect meditator!

A final consideration to incorporating mindfulness in work is paying attention to your intention. Intention is much less discussed in the popular literature on mindfulness than focus. Nevertheless, cultivating a good intention is a crucial component of mindfulness [5]. Mindfulness practice is typically engaged with an intention to not just feel better oneself but to also benefit other sentient beings. In my own personal experience, this attitude, when reinforced at the beginning and end of a working day, creates a tremendous sense of space and peace of mind. Suddenly work is not primarily to get ahead oneself, but also has a larger purpose. When work is not just done for yourself then also setbacks are less frustrating because you realize you are not working alone.

## Conclusion

In conclusion, it is fair to say that mindfulness has the potential to be beneficial for software engineers. Mindfulness has been associated with limited cognitive benefits such as a reduction in distraction and more substantial emotional benefits, such as improved ability to manage emotions and resilience in the face of setbacks. Nevertheless, it is important to realize that it is not a panacea. Mindfulness is not something that begets immediate results with no effort. Moreover, mindfulness may not be beneficial for every individual. Incorporating mindfulness in the software engineer's workflow has to be done with skill, and then it can make a large difference.

## Key Ideas

Here are the key ideas from this chapter:

- Mindfulness has limited benefits for cognition but may improve emotional intelligence.
- Short mindfulness breaks could lead to better productivity.
- For some people mindfulness can also have adverse effects.

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