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# MODULE 9

## HABITS AND THE FOOD ENVIRONMENT

# 9. MODULE 9: HABITS AND THE FOOD ENVIRONMENT

## 9.1. Module aims

- To describe the way in which a habit can form
- To explain the impact that these can have on your behaviour
- To show the way in which unconscious decisions can play into your ability to regulate your bodyweight
- To describe a process by which you can overwrite old habits
- To indicate key areas where your food environment can play into habits and unconscious decisions
- To provide examples of ways that you can alter your food environment to improve your dietary adherence, and the impact that this can have

## 9.2. Key principles from module 8

In the last module, we discussed supplements. There we explored the meaning of the word 'supplement' and the different reasons that an individual may or may not decide to use something. We broke supplements down into two categories before explaining the purpose of each, then explained the rationale behind some of the most popular supplements on the market. To end the module, we then provided some example situations that could potentially lead someone to consider supplementation. To summarise the previous module:

- Supplements are something used to complete or augment a diet
- Supplements can be loosely grouped into 'food' and 'non-food' supplements
- Food supplements are designed to complete a diet which may be low or deficient in one or more nutrients, or to make a healthy diet more affordable. Non-food supplements are generally ergogenic aids or stimulants, though other products do exist
- Most food supplements are effective provided the context for their use is considered fully. More critical thinking is required for non-food supplements as many claims do not stand up to scrutiny
- Supplementation is more likely to benefit certain populations
- There is a process which is recommended before determining supplement use and this should be followed prior to any purchase

Module 8 signalled the final stage in our conversation about nutrition per se. You are now armed with the fundamental principles of nutrition that can apply to anyone. Of course, these may need to be tweaked for special populations, but that is not the aim of this course. The remaining two modules will look far closer at the application of generalised nutrition because, as we have mentioned before, knowing what one should eat is not the only challenge. Though

many people will not have the knowledge that you now have when it comes to food and nutrition, most people have at least a rough idea of what constitutes a healthy meal – yet this is not what they eat every day. In fact, the act of eating isn't only a nutritional consideration, but a behavioural one; because of this it is to the behaviours governing food and nutrition that we will now turn.

## 9.3. Introduction to habits and the food environment

Behaviour is the way in which an organism acts or behaves in response to a given stimulus, be that stimulus external – you may see, hear, smell or be told something, or internal – you may have a natural urge to eat or sleep, or you may think of doing something in relation to other factors in your life. Many of our behaviours are intentional and calculated, but the vast majority are at least in part influenced by outside factors and a surprising amount of our behaviour is undertaken without any input from conscious thought at all.

In fact, even conscious action isn't as conscious as we like to think it is. Humans like to think that we are rational, but this is often a misguided belief. For example, when asked in surveys most people claim that they are not swayed by advertising, despite the fact that in the early 2000's, Marks and Spencer were given an advertising effectiveness award after their "No Ordinary Food" campaign caused sales of a melt in the middle chocolate pudding to increase by over 3500%.

This goes far deeper than effective adverts with seductive voices. Most of us are under the impression that we will encounter a choice, weigh up the options and then come to a rational conclusion about the action that we will take, but a short consideration of our own subjective experience teaches us that this is not in fact the case. If you are presented with a choice between two actions, or between action and non-action, the decision of what to do will almost invariably 'present itself' to you, and then you will make a post-hoc justification for that decision. Neuroscientists have in fact shown that decisions are often subconsciously made up to 7 seconds before you are consciously aware of the action you will take.

If you are offered dessert after a meal you could say yes or no. The route of action you will take is, almost every time, the one that appears to you first. You will then calculate why you made that decision after the fact. This doesn't seem the case, but paying close attention to your own behaviour will reveal that, actually, it is.

If, rather than choosing immediately, you took the time to weigh up the pros and cons of two options on paper before making a decision then you could in theory claim that this process and its outcome was informed and rational; but in the vast majority of (of course not all) cases the decision of what to then do will be based upon a value judgement, meaning that all you have done is pushed the irrational decision back one step. Which pros do you value more, which cons do you value more and, of the two, which carries more meaning to you? The final answer you come to will, again, present itself in your mind in what seems like an obvious manner but this does not necessarily make it ultimately correct. If another individual saw those pros and cons they could make a completely different decision depending on their values, and you do not pick your values – they are given to you by millions of years of

evolution, thousands of years of culture and your subjective experiences from childhood and beyond.

Looking back at the dessert example above, you could be facing the decision of whether or not to have a dessert while you are attempting to lose weight. For this thought experiment consider that the dessert will cause you to overeat for that day. Some of the arguments for and against could be:

**For:**

- This is your favourite dessert
- One day probably doesn't matter in the long run, you will reach your goal anyway
- You have done extremely well at sticking to your desired approach in the previous few weeks and so, you know that eating this dessert isn't a reflection on your ability to maintain a healthy diet
- Someone will be buying it for you, meaning there is some level of social expectation at play and you don't want to appear rude and say no

**Against:**

- You have a holiday coming up soon and every day counts right now
- You are already satiated and don't **need** more food
- You thoroughly enjoyed your main course and glass of wine, so your psychological need of a break has been curbed
- You aren't entirely sure that the dessert won't lead to days of poor eating because you have 'fallen off the wagon again'

The action that one 'should' take is probably obvious to you already, but it's obvious for other people who would disagree with you, too. Even if it isn't obvious, the answer would come eventually and, as there is no objectively correct course of action (as is the case for almost all decisions), it's difficult to consider any answer to be the rational one.

This failing in rationality is an important thing to consider when looking at human behaviour because it (and many other examples like it) explains, amongst many other things, why nutritional alterations are so hard. If we were completely rational beings then altering your food intake to improve your health, subjective feelings of wellbeing, life expectancy and disease risk would be the easiest thing in the world to do. However, it takes little more than a short conversation to a perpetual dieter to know that this is not the case.

One aspect of irrationality that plays a truly significant role in food consumption is this: humans are creatures of habit. In fact, it could be argued that our habits are one of the key reasons why changing our food intake is often difficult, and through reading and appreciating the information in this module it is our hope that you will not only be more aware of how habits govern our behaviour, but you will also be better able to put yourself in a position to make habits work for you rather than against you.

Firstly, we will explain and describe what a habit is, how it is formed, and how it can negatively influence your food choices in the face of your goals and values. We will then outline methods for altering your current habits in a relatively painless way before segueing to talk about how your food environment, the foods and food related things that surround you, can hijack your proclivity for habit formation and make dietary adherence almost impossible or, with careful planning, easy. So, what is a habit?

## 9.4. Defining a habit

Habits are generally considered to be trivial, small behaviours. When you hear the word habits you may think up images of someone who cracks their knuckles, bites their nails or who uses the word 'like' inappropriately in sentences; but habits are actually far more pervasive in your day-to-day life than you may realise. In fact, habits make up a huge amount of our daily activity. At the American Psychological Association's 122nd convention, top researcher Wendy Wood estimated that around 40% of our daily activities are performed in the same way, and in the same context, which are the two criteria for defining an action as a habit. This means that around 40% of what you do isn't done after careful deliberation or with specific goals or values in mind; instead it is done as a direct result of circumstance, in the same manner as you always do it.

A habit is, simply, a settled or regular tendency or practice – it's a learned automatic sequence of behaviours that is not influenced by goal seeking or more simply what you 'want', but is rather initiated by a certain environmental cue and carried out to achieve an established end result. You may have taken initiative and decided to do it initially, but after an undefined period the conscious effort is removed meaning that you will continue to act it out even if it goes against what you are trying to achieve. Leading expert and researcher, Ann Graybiel from MIT, put forth the idea that habits were chunks of behaviours grouped together and considered to be one process. According to her research, a habit is a sequence of tasks which have been 'bracketed' together and are then treated by the brain as one single action, initiated by a cue in pursuit of a reward.

We will explain this fully below but for now consider the following – this makes some amount of intuitive sense because every day you perform routines which could be broken down into smaller parts of behaviour but you don't think of them step-by-step. To make filter coffee you would enter the kitchen, boil the kettle, add grounds to a filter, then add that to a pot, pour boiling water over them and wait for the coffee to filter, pour and drink, but this is all grouped into 'making a coffee'. Your brain manages well-rehearsed actions in the same manner.

Not only that, but it ties a cue to that routine provided the reward for completing it is reliable and then runs the program on autopilot after that cue is presented. Looking back at our coffee example, when someone starts to drink coffee in the morning it may be because they feel tired and need a pick me up or because they want to try (and then subsequently enjoy) a new beverage. After they drink the coffee they will experience a pleasant sensation due to the stimulating effects, taste or both, and therefore consciously decide to continue drinking coffee in the morning upon waking up. After multiple repeats of this routine the act of drinking a coffee will become tied to the cue of 'waking up' because of the reward created,

and the person no longer decides what to do, they just do it. They could justify their repeating of the routine by remembering that they enjoy the taste or feel that they need the caffeine hit; but this does not take away from the principle that their instigation of the 'make a coffee' routine was not due to a conscious decision based in a rational weighing up of pros and cons.

The same thing will happen to a person who decides to have a glass of wine when they come home from work. At first, they choose to undergo the series of steps needed to go from where they currently are, to the state of 'drank some wine'. After a while they will start to simply pour as they enter the house and, in many cases, crave their wine when they don't have any. This doesn't necessarily amount to alcoholism (though it can of course end up that way) but rather it indicates a habitual behaviour instigated by a cue and tied to an expected reward.

## 9.5. How are they formed?

Of course, this raises more questions than it answers. How does a person go from consciously deciding to do something, to running on autopilot and performing complex sets of actions without thinking? In fact, what does it mean to do something without thinking about it anyway? To fully explore these questions, we need to turn back to neuroscience and discuss some key areas of the brain.

Three broad areas which you need to consider for this module are the basal ganglia – specifically the striatum, the orbitofrontal cortex which is a part of your frontal cortex and the sensorimotor cortex. They have the following loose functions:

- The orbitofrontal cortex is a part of the prefrontal cortex (the part of the brain best considered to house 'consciousness' and executive function). It is chiefly res-ponsible for goal-seeking behaviour, meaning that you use your orbitofrontal cortex to internally debate the correct course of action in a given situation and then act appropriately. Damage to the orbitofrontal cortex leaves individuals behaving impulsively and without restraint, and it becomes very active when acting to bring yourself closer to something that has perceived value (of any sort). Individuals with Tourettes, drug addictions and OCD display reduced activity in the orbitofrontal cortex
- The sensorimotor cortex is comprised of the somatosensory cortex, responsible for the processing of somatosensory input (for example the tactile stimulus which you will receive if you touch something) and the motor cortex is used for performing physical movements. For this discussion, we are primarily focused on the latter of these two
- The striatum is a part of the basal ganglia. It sits deep within your brain and is heavily involved with dopaminergic reward, after being fed in to by numerous areas of the brain including the prefrontal cortex (which includes the orbitofrontal cortex) and with motor planning. The striatum has three areas which are especially relevant to this module – the area involved with goal seeking, that involved with habit formation and execution, and the area involved with reward (via communication with the dopaminergic reward centres in the midbrain)

The formation of a habit occurs via the following process:

- **A new behaviour is explored.** The prefrontal cortex including the orbitofrontal cortex communicates with the striatum regarding what is going on (while the sensorimotor cortex is active because you are moving). The area of the striatum involved with goal seeking communicates with the midbrain to release dopamine, and then back to the orbitofrontal cortex to reinforce behaviour which 'works'

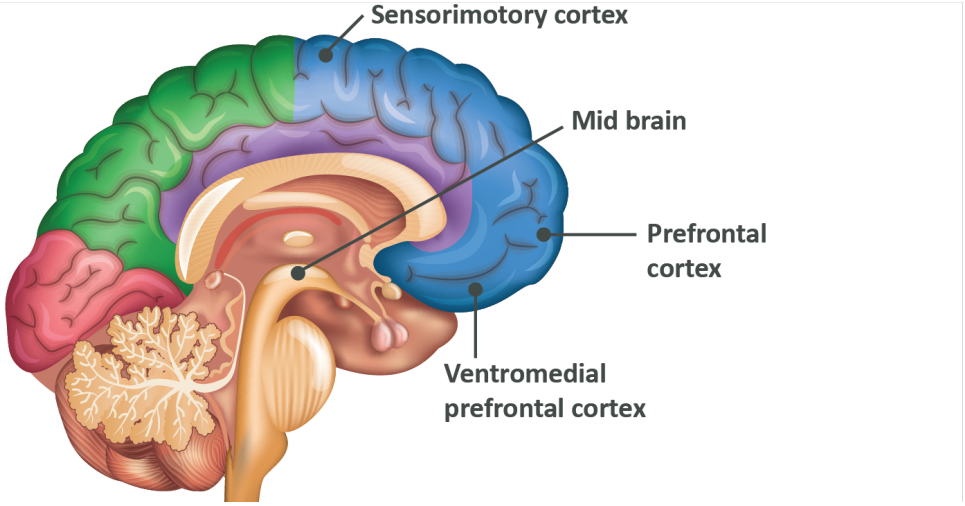
  In our example, your orbitofrontal cortex decides to have coffee and so instigates a series of actions in the sensorimotor cortex. It also tells the striatum what's going on, which then sends positive signals back to the orbitofrontal cortex to let it know that what it's doing is 'good'

- **Habits start to form.** Gradually the area of the striatum involved with habit formation creates a feedback loop with the sensorimotor cortex to bracket the rehearsed series of actions used in the newly explored behaviour together. By doing this it removes the need for the orbitofrontal cortex to remain so engaged in the task

  Your coffee making process starts to become more automatic. You no longer have to work out how much coffee you want to add, how much hot water, how long to let it brew or whether or not you want milk

- **A habit is formed.** As the connections between the habit-related area of the striatum and the sensorimotor cortex become stronger, those linking the goal-related area of the striatum and the orbitofrontal cortex get weaker. Once this has happened, instead of your entire orbitofrontal cortex communicating with your striatum to cause an action, a tiny part of the ventromedial prefrontal cortex known as the infralimbic cortex recognises a cue then 'remembers' that a task was once tied to both this cue and something you value, so it just 'runs the program'. You effectively act on autopilot as soon as a cue is encountered

***Fig. 89***




Eventually, you wake up and make a coffee without thinking and without even really working out whether or not you want one.

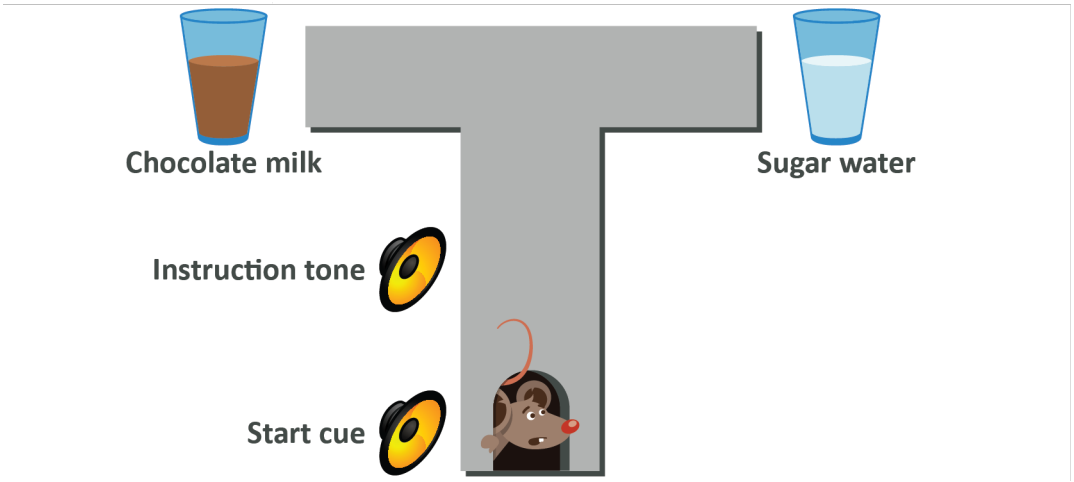
In short, as soon as you see the cue, your infralimbic cortex recalls what the reward was that is associated to that cue, and then it simply runs the chunk of associated behaviours necessary to get it, without even 'consulting' the orbitofrontal cortex – the area of the brain which would tie your actions to a goal.

This was discovered thanks to an enormous body of work undertaken at MIT using rats.

## 9.6. How the neuroscience of habit formation was discovered

In an extensive series of experiments conducted by Ann Graybiel and colleagues, rats were trained to run through a T maze.

***Fig. 90***




The rats heard a start cue, a gate opened and they were allowed to run along a path. Shortly before reaching a T junction they heard a specific noise. If they turned the correct way according to the noise they would get chocolate milk, if they turned the wrong way they would get nothing. After sufficient trials the rats turn the correct way each time.

In the next phase the chocolate milk was removed and sugar water was placed at the end of the other T junction branch. The noise was also changed. Again, after a lot of runs the rat turned the correct way upon hearing the noise and got its reward.

In the next phase both drinks were placed in the maze and sure enough, the rat turned the correct way depending on the noise, meaning that the rat didn't just learn that any noise meant a treat, it meant that it knew noise A meant turn left for chocolate milk and noise B meant turn right for sugar water. This experiment was conducted hundreds of times in order to imprint the behaviour as a habit – as evidenced by two different things. First of all, the researchers recorded brain activity in the rat as the above image shows, with the patterns seen following a reliable and predictable pattern. In the initial stages, the striatum of the rat was hugely active – it was communicating furiously with the prefrontal cortex because new activities were being explored and the rat needed to know whether those activities were good or not. As the experiment was repeated further, however, it was seen that the activity in the rat's striatum became far less pronounced; only really showing when the rat needed to make a decision of which way to turn, and shortly before receiving an expected reward. Eventually

activity was almost non-evident other than at the beginning and end of the run, displaying that the behaviours involved with running and choosing a direction had been tied to the cue of the noise – the rat no longer thought about where to go, it just went with its habit.

How do we know that this was a habit, and not just the well-trained response of a rat that knows it gets a reward for running in the correct direction? In the next phase the rat was left in its cage and given chocolate milk at will. Each time it drank, however, it was injected with a drug which made it nauseous. After a short while the rat would associate chocolate milk with nausea meaning now chocolate milk was **not** tied to being a reward. Despite this association, the rat would still run to the chocolate milk upon hearing the correct noise. Critically, the rat didn't value or want the chocolate milk (in fact it often wouldn't drink it), it simply ran to it anyway because it wasn't actively thinking, and was simply acting according to habit.

## 9.7. The permanence of habits

As you have seen, after multiple repetitions of a certain reward-tied behaviour, a given routine will become tied to a cue and then simply acted out without conscious thought even if it doesn't necessarily match our values or desires. It is easy to dismiss this data because, of course, we aren't rats, but it's important to remember that these processes are highly evolutionarily conserved and therefore play in to the governance of our behaviours, too. This is why people will often drive on their usual work commute when they had intended to go somewhere else, if they set off at the same time of day as they usually would. Habits aren't just powerful, though, they are considered semi-permanent because they are hardwired into your brain.

Continuing with the rat experiment from above, it was noticed that during the initial programming of a habit, the infralimbic cortex had very little activity but as the goal-seeking striatum activity became less and less, the activity in this other structure increased, indicating that it was involved with 'housing' habit circuitry. A technique called optogenetics which involves shining a light into the brain to disrupt certain patterns was used to 'turn off' this area.

After this was done, the rat started to avoid the chocolate milk and, over time, re-trained itself to turn towards sugar water regardless of the sound. The habit was lost and therefore the rat's behaviour became goal-oriented once more and it was displayed that chocolate milk was no longer seen as valuable.

In the final stage of the experiment this process was undone, however, and the rat went immediately back to its old habits. It ran to the nausea-associated chocolate milk even though it had established this was a bad idea. The habit was somewhat permanently engrained.

This is important for one simple reason – you cannot remove the physical systems within your brain that govern a given habit. Once you have a well-engrained habit it stays for life. This is why a smoker who, after 72 hours no longer has physical cravings to smoke, will pick smoking back up after 10 years of cessation simply after having 1 cigarette.

So, to summarise the above:

- Habits are series of actions bracketed into a given routine
- They are acted upon after experiencing an associated cue, in order to get an expected reward
- Initially the reward is something tied to your values. It's a goal towards which you 'want' to progress, and is approached as an exploratory behaviour, reinforced by dopamine
- Over time the areas of your brain involved with value based judgements become less and less active as the areas involved with habitual action become more and more active
- Eventually the area of the brain associated with habits (the infralimbic cortex) will communicate to your striatum and then your sensorimotor cortex to act upon a certain cue, even if it goes against your values
- If the infralimbic cortex is 'turned off' in a rat, behaviour returns to being goal oriented but once it's turned back on, the habit returns even though the rat has established a 'better' course of action, indicating that the circuits that operate habitual behaviour are at least somewhat permanent
- Similar behaviours are observable in humans

However, we have one advantage that lower animals do not. We exist with a higher level of consciousness than anything else on the planet, with an understanding of the future and an appreciation for vague and somewhat abstract consequences. Unlike rats, we are not our brains and we are able to engage executive function if only we are willing to make the effort to do so.

## 9.8. Mindfulness

As you have learned, habits will 'take over' in order to free up your conscious brain for other tasks that it may need to do. This has self-evident evolutionary benefits because your brain is one of the primary users of energy in your body (gram for gram), and of course your attention is limited. If you had to calculate every single action you complete on a day-to-day basis it would be overwhelming.

With that said, habits can become pathological. The individual who makes it a habit to go to the gym before work is using this brain region but so is their co-worker who eats a chocolate bar from the vending machine at work each day, a practice that often gradually results in steady weight gain. In fact, it has been shown that rats will habitually eat even when satiated, thus gaining weight.

As such, it's important to engage your 'mind', which is conceptually separate from your 'brain'. This abstract principle can be illustrated in the following way:

- Your brain is the source of information about which decisions can be made. It receives and processes external stimuli, and provides memory-based information that can result in action. This action can be engaged in automatically to save effort and energy

- Your mind can be considered to be your conscious self, capable of overriding some of the automatic functions of the brain provided that you are willing and able to engage in your present moment

Habits, for the most part, can be thought of as processes that removes the mind from the equation and therefore mindfulness can be thought of as a practice that re-engages it.

Mindfulness has been hijacked by various unscrupulous, New-age philosophers to mean a wide range of things, most of which aren't evidence based or even particularly well defined but for our purposes here consider mindfulness to be the conscious and volitional act of paying attention. The above individual gaining weight from her habitual chocolate intake could therefore notice this habitual behaviour and become mindful. Rather than acting out her practiced routine she could follow the four steps below, set out by Dr. Jeffrey Schwarz in his manual "You are not your brain":

- Relabel
- Reframe
- Refocus
- Revaluate

**First, she would relabel.** This would be the act of noticing the negative urge and call it what it is "Oh, I'm having a strong urge to go and get a chocolate bar".

**Next, she would reframe.** "I'm having a strong urge to eat a chocolate bar because…". This could be because she is craving readily usable energy, because she is hungry, because it makes her happy and she hates her job and the monotony of it, or something else. We will discuss this aspect far more in the next section.

**Then, she would refocus.** She could go for a short walk, go talk to a friend or colleague or make a better snacking choice. This, too, will be discussed in a different context in the next section.

**Finally, she would revaluate.** She would appreciate that the urge she is having for chocolate doesn't **have** to be acted upon and, in fact, it's just a signal from her brain sent because of habit. She would realise that she can opt to do something else and ultimately beat what it is that is holding her back.

By engaging mindfulness and practicing self-control she is able to take charge of her decisions. Note that this does not contradict what was said in the initial section about the irrationality of decision making – the final decision may be entirely irrational and not necessarily authored by her, but by paying attention to her thoughts she is able to use her mind rather than her brain and act with intent rather than on impulse alone. The important thing in this example is not changing her mind and having an apple instead of a chocolate bar, it is her deciding to pay attention and make a decision rather than act automatically.

To improve mindfulness one of the most effective methods is mindfulness meditation. Only 4 days of meditation practice has been shown to improve mindfulness, cognition and

executive function, and monks well practiced in mindfulness meditation display greater thickness in their frontal cortexes, indicating that some of the effects of this practice are permanent and rooted in physical alterations. Taking regular breaks during prolonged tasks, walking in silence while paying attention to your thoughts, and exercise all seem to help improve mindfulness, executive function and/or inhibitory control (your ability to resist acting on impulse). This is exceedingly important to bear in mind because cortical thickness in the frontal cortex has been shown to be lesser in obese individuals compared to those of a healthy weight, indicating that a genetic (or life-long habitually programmed) reduction in the ability to inhibit behaviours via executive control, may play some role in weight gain.

If this proves somewhat difficult it can be efficacious to use self-affirmations. The term 'self-affirmations' has, much like mindfulness, been hijacked to some degree by new age philosophers and life coaches but it does have a specific meaning – self-affirmations are reflections upon one's core values. Once you have reflected upon core values it can be far easier to refocus and revaluate your urges because it places them in a context more closely associated to what it is you truly desire. To do this, consider the things that matter most to you. Examples could include:

- Health
- Family
- Wealth
- Your career
- A hobby
- Money
- Sports
- Fame
- Creativity
- Religion

Then from this list pick the most important one or two factors (ideally just one). The thing(s) that mean more to you than anything else. After this, reflect upon how your behaviour feeds in to these values (or doesn't) and then consider how you could act and how you could reframe those urges in your mind. This is not only behaviourally effective, there is a neuroscientific reason that it works.

Reflecting upon your core values activates the infralimbic cortex and some of the surrounding tissues, in an area most closely related not only to habits but to values. This activation, in theory, results in alterations to neural circuitry that is related to certain habits and subsequently changes your behaviour – in fact, when health messages are played to individuals who have undergone self-affirmations, their eating and exercise habits improve more than those who have heard the same messages without the reflections. Engaging an

outside-in objective view of your inner experience is powerful, and by tying it to values, you are able to use this view to alter what it is that you do far more easily.

Changing your habits **can** be difficult. It is not the case that we need to only pay attention and recognise when habits are leading us to change what those habits are. We also fall victim to cravings. As you learned already, habits are closely tied to reward circuitry and the removal of that reward is not without consequence.

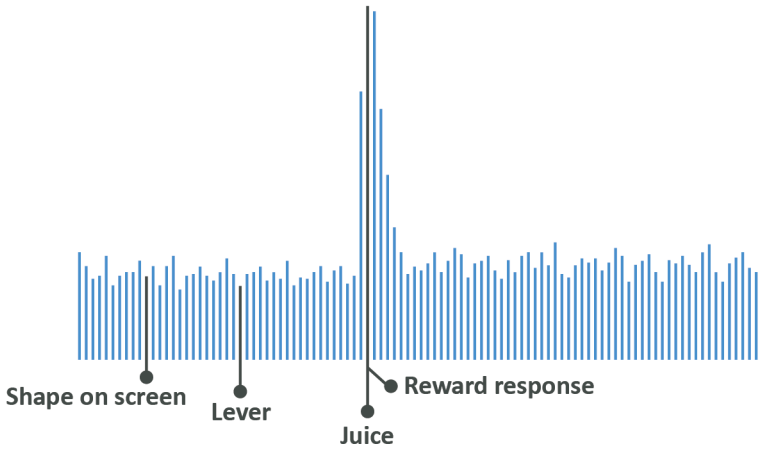
## 9.9. Habit loops and cravings

To bring all of the above information together in a simple format, consider that habits can be thought of as behaviours engaged in via a 'habit loop'. A habit loop is a very simple concept, namely that a habit follows the pattern of cue > routine > reward. An environmental cue initiates a well-rehearsed routine which is associated with a reward remembered as a result of that routine. Though the reward may or may not be associated with your current values, it is a reward nonetheless (drug addicts still get a reward stimulus from their 'fix' when they are quitting, and overweight people still get a hit of dopamine when they eat an unplanned dessert during a fat loss effort).

What we have only tentatively hinted at so far, however, is that the dopaminergic reward associated with an action is, after sufficient repetitions of that action, not actually experienced upon performing the activity. Instead dopamine is released **before** you do something rewarding, in order to create excited and motivated anticipation – which then leads you to complete the routine you were going to complete. Because of this early release, some interesting things happen that can be best explained by introducing another series of experiments; this time from the Laboratory of Dr. Wolfram Schultz, professor of Neuroscience at the University of Cambridge.

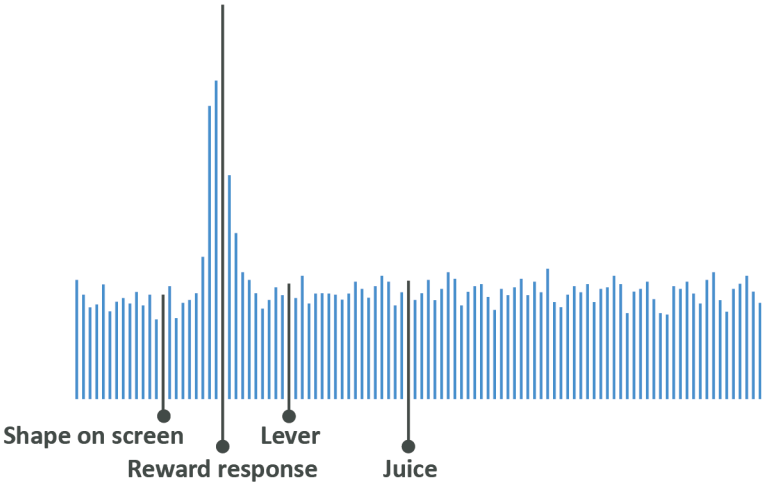
Schultz performed his experiments using a monkey called Julio, who was placed in a chair in front of a lever attached to a TV screen. On the screen, various shapes would appear and, if Julio touched the lever as a shape was showing he would be given some sweet blackberry juice as a reward. The below chart indicates activity in the reward centres of his brain at various time points in the experiment. Dopamine activity is low while the shape appears and when he touches the lever, then it increases dramatically upon being given juice.

*Fig. 91*




Once this habitual activity became well-engrained, however, the timing of this response was different. Rather than dopamine being released as a reward for drinking juice, it started to be released upon seeing the shape on screen (the cue).

*Fig. 92*




If Julio was then given his juice he remained engaged in the task and happy, but if he was given watered down juice or nothing at all he became agitated, aggressive or displayed signs similar to what could be described as depression.

What Julio was experiencing was a craving. He had learned that a given cue resulted in a given outcome provided he executed a routine, so upon seeing the cue his brain started to want its reward.

If the reward didn't come then cravings set in. We need to place this in context with what we know about the unchangeable nature of habit loops, too – our brain ties a cue to a reward which it expects, and if we are on autopilot we will simply robotically perform the routine needed to get the reward we want. If, however, we do manage to engage our more executive brain functions and intentionally override our habits in order to achieve a goal which we value

more then we get cravings – and because those habit circuits are hardwired and very difficult to change, it is not a reasonable course of action to simply try to ignore what you want.

Because of this, mindfulness and awareness of habits should not be used to resist action or exercise the force of will often referred to as willpower. We cannot delete habit loops and we cannot ignore them forever, so we must overwrite them. To close this module, we will describe the most potent methods of doing this, altering your routines and altering your environment.

## 9.10. Change your routines

The routine is the bracketed set of actions you perform upon seeing a cue in order to get a reward. Changing this allows you to make what has become pathological, a bad habit, and transform it into something that is positive, but it requires a certain level of deeper thought and reflection.

To illustrate this, it's necessary to choose a specific example. Consider an individual who always craves a sweet food after eating a savoury meal. The cue – routine – reward loop here seems somewhat easy to detect:

- **Cue:** Finishes their meal
- **Routine:** Goes to the kitchen and gets a dessert
- **Reward:** Dessert

This is not the way to look at these things, however. The dessert itself is not the reward, it is a piece of food that creates a reward in the brain, via dopamine, and it is up to that individual to work out why. Perhaps they are simply still hungry and so are rewarded for eating more food. Perhaps their meal was very low in fat and/or carbohydrates and so satiating signals are not being released either owing to certain macronutrient requirements not being met and/or because of the resultant low palatability of their meal. Perhaps the individual is stressed and/or tired and so is craving sweet comfort foods that remind them of the desserts they would eat as a child.

Once this 'true desire' is identified, it is simply a case of recognising the craving and using mindfulness to perform a different set of behaviours that play more in to the positive lifestyle that the individual is hoping to lead. The first two options listed above are somewhat easy to 'fix' by altering the meal or choosing a healthier dessert option, the latter craving could be satisfied by spending quality time with a loved one or pet, playing video games, listening to music or otherwise unwinding in a manner that they find enjoyable.

The person who has a glass of wine every night and wants to change that could work out why they started doing it in the first place (to relax, for the taste, to help with sleep) and then look to meet that need in some other way. The person who habitually has a takeaway on Friday nights or who hits the drive thru after work need only look to why they want the food that they go for (convenience, associated happy memories) and then look for a different meal that meets **that** need. The same principle can apply to almost any habit you can think of, and

although the root cause may not always be immediately clear and you may not meet the craving that you have with the first new routine that you try, it can be life-changing.

Changing one variable while still respecting the deeply engrained habit loop is a sure fire way to reach success because eventually this new more adaptive habit will overlay and replace the old one. After a while this new good habit will be just as automatic as the old one was, so long as the variables stay the same, success will happen without ever paying attention.

### 9.11. Change your environment

Clearly mindfulness is a fantastic option and the one which is likely to be preferable but this is not always possible, and even when it is there may not be a better routine to use. If this is the case, then it can be useful to consider trying to remove the cue or change your environment instead.

Consider the person who always snacks when they get in from work. This person arrives home and gets the cue that there are snacks in the cupboard, they undergo the routine of eating them and get the reward associated with salt, sugar and fat that was discussed in previous modules. In this instance, the simple act of removing these snacks from the kitchen (or at least making them less obvious by placing them in opaque containers at the back of the cupboard) can make a huge difference to the actions of the individual. No cue, no craving.

Those who always eat snacks late in the evening will do so at home but find it very easy to avoid this on holiday. Their environment, and therefore the cues by which they are surrounded, are different.

Relating back to the M&S advert mentioned at the start of this module, humans are visual creatures and often the cue to eat can be as simple as seeing food. Someone who always has an after-work snack will be able to cut out their snacking, even if their confectionary of choice is in full view, so long as they are able to stay mindful. If, however, they sleep poorly, become tired or experience high amounts of stress, or are distracted by other things going on around them, someone will be less able to engage their higher functioning prefrontal cortex and utilise inhibitory control. Smokers who have not touched a cigarette in years will start smoking when stressed or when drunk. Distracted and stressed people will open the fridge upon entering the kitchen for no reason and this is why.

Some great alterations to make to your home and work environment are:

- Keep unhealthy snacks to a minimum level. Buy amounts that you need immediately or in the very short-term and no more. Don’t be tempted to bulk-buy
- Snacks that you do keep in the home or office should be kept out of the way
- Foods you don’t want to eat habitually should be stored in a sealed, opaque container. Clear biscuit or sweet jars force you to see a cue and act mindfully every time you look at them, making you vulnerable to times of distraction
- Avoid eating while distracted, as you will habitually finish a meal. Instead eat mindfully and concentrate on fullness signals

On top of this it could be wise to identify times of the day during which you find it most difficult to eat well. This could be immediately after work, midmorning or immediately before sleep. Once these are identified, create a specific action that you will do at that time instead. After work, you could go to the gym, call your parents before going in the house, or do the washing up immediately. Before bed you could set aside time to read. This interrupts your normal routine and disturbs the bracketed set of behaviours, therefore putting you back in control.

And as a final note, remember that this can take a lot of time and self-reflection. Distractions are more and more omnipresent in the modern world, alongside external cues driving us to eat. Not only that, the automation of numerous daily activities is leaving us more and more time in which we can become bored and distracted, allowing bad habits space to form. If you have bad habits, think of them systematically. First notice them and highlight what is really going on – your brain is driving you to do something you don't want to do. Then, consider what it is you are truly craving and if possible look to alter your routine. If not, consider how you can eliminate the cue. Finally, reframe that craving for what it really is and remember the times of day that you are especially vulnerable to it so you can be alert and prepared to act consciously. Altering habits is hard because they rule a significant amount of our behaviour, so give yourself a fighting chance.

In our final module, we will pull everything together that you have learned so far and speak about the first step of long-term, permanent lifestyle change: goal setting. There we will discuss the ways that goal setting can be used to improve the success rate of any endeavour, and explore the different kinds of goals that can be used, how to use them and when. Finally, we will talk about motivation – how do you stay motivated long-term, and how do you use internal and external motivation to stay on track?

## 9.12. References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