Why do we eat?

From feasts to body image issues, eating is more than just staying alive. It makes us feel good and holds communities together. Nutrition and health blogger ***Marisabelle Bonnici*** *interviews researcher* ***Dr Analisse Cassar*** *and delves into the science of our attachment to food.*

We eat for energy and we eat to live. Social situations shape our food choices: we eat to have fun with friends, or to experience new flavours. Who can resist free food at a social event? Or, after we paid money for an all-you-can-eat, don't we just have to get our money's worth?

Our relationship with food can go much deeper than that when we notice how many disorders are linked to what we eat. Among them are eating disorders like anorexia nervosa, binge eating, orthorexia, and avoidant restrictive food intake disorders.

'Research shows that binge eating disorders are often accompanied by anxiety and depression,' explains researcher Dr Analisse Cassar at the Anatomy Department (Faculty of Health Sciences, University of Malta [UM]). 'Now, which state causes the other is not clear, but it is alarming to note that one in five college-aged women (18–20) are known to have passed through a phase of binge eating, showing a high correlation [between eating disorders and] a stressful environment.'

FOOD SUPERPOWERS

In primitive days humans used to hunt or gather just enough food to survive. As the world progressed, advances in agriculture allowed us to grow food with less effort. When food preservation technology came along, produce could be consumed at our convenience. Food eventually became a highly competitive global market, where food scientists are paid to develop tastes and flavours for highly processed foods like bread, doughnuts, and cakes. Food scientists also have a role in research at the University, where they are studying food microbiology and soil composition to grow better crops, amongst a lot of other research.

Studies show that people report eating out of boredom, loneliness, anger, sadness, to relieve anxiety, and also to celebrate. How can

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Photo by Amanda Hsu

food have all these superpowers?

Cassar confirms that pleasure is at the core of this: 'The caudate nucleus in the brain is responsible for pleasure and promotes compulsive behavior. This is because it responds to dopamine — which is a neurotransmitter in the brain that promotes the feeling of pleasure. Therefore, repeating the behaviour — whether it is compulsive actions or compulsive eating, will lead to a reward — the release of dopamine and the increased feeling of pleasure. So this behavior gets positive reinforcements, and we would want to do it over and over again.'

We associate food with pleasure from early on in our lives. When babies cry and are given milk, they start associating food with comfort. Feeding also generally happens in the arms of a parent, so food also makes them feel safe.

Satisfying hunger comforts us. But our brains also respond to particular tastes. Pangborn's study on carbohydrate sweeteners found that combinations of sweet and fat are the most pleasurable in the majority of individuals, although this is not universal — because of genetic differences, some are drawn to coffee and others find its bitter taste repulsive.

FOOD IN OUR SYSTEM

The sight of food activates visual receptors in the retina, which fires messages that switch on the sensory parts of the brain. Knowing the process, marketing companies employ food photographers to stimulate our brain with visuals to make us hungry. Think about it – how many times did you visit a restaurant just because its sight triggered a craving for a particular dish?

Our sense of smell is another trigger. Our brain can hold up to 40,000 scents in its memory bank and can associate scents with feelings. So, you may be walking by a bakery and smell apple pie — this will trigger pleasurable memories of your childhood, and scientists (e.g. Rolls in 2007) have studied the mechanism behind it.

Cassar's research at the UM confirms that brain stimulation can lead to compulsive eating. 'While the caudate promotes compulsivity and the rewarding feeling in eating, it is only one of three areas regulating the urge to eat. The insula [a small region of the cerebrum in our brain], plays an important role in appreciating the taste of food, such as information of taste, smell and texture of food, that ultimately leads to us liking the food we eat. Finally, the hypothalamus [located at the base of the brain, which helps release hormones and regulate body temperature] receives the information from our bodies regarding our satiety [feeling full],

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which is integral for our survival. However, the caudate may override the other factors and lead to a loss of control.'

So far we have only discussed positive triggers. Yet negative environmental factors such as stress also affect eating behaviour, triggering binge eating, and shifting food-choices towards high-fat and carbohydrate-rich foods. To test the effects of stress on brain responses to food, Rudenga, Sinha and Small (2012) performed fMRI brain scans on women looking at a chocolate milkshake, representing sweet, high-calorie 'comfort food.' The level of chronic stress the women experienced boosted the reactivity of the brain to milkshake stimulation. Many people who reach for food to comfort themselves describe food as not only soothing but even addictive. These effects on the brain are what leads to disorder in eating behaviours.

And speaking of women and their soothing milkshakes, we often hear many women say that hormonal changes around their menstrual cycle also affect their eating patterns. But it is not just our oestrogen and progesterone hormones. Our fat cells secrete the hormone leptin, which sends signals to our brain to release energy. Leptin secretion is proportional to the amount of fat we have in our body. Leptin deficiency can lead to constant hunger, resulting in severe overeating and obesity.

Another relevant hormone is ghrelin, which regulates the desire to eat. When we start eating, ghrelin levels fall quickly, and that is when we feel full and decide to stop eating. When the levels of this hormone are high, we fail to realise we are full — and keep on eating. This translates to not being able to leave food on the plate even though we have satisfied our hunger. Learned behaviours from childhood can help keep ghrelin levels high, which lead to eating disorders when we grow up.

I want to encourage you to think about why we eat. When you decide to eat something, think about why: is it because you are hungry? Are you craving something? Or is it because you are stressed or sad? Practising this with everything you eat can help you eat more mindfully.

Further reading:

Pangborn RM. (1980) A critical analysis of sensory responses to sweetness. In: Koivistoinen P, Hyvönen L (eds). Carbohydrate Sweeteners in Foods and Nutrition. London: Academic Press.

Rolls ET. (2007) Sensory processing in the brain related to the control of food intake. Proc Nutr Soc. 66(1):96–112.

Rudenga KJ, Sinha R, Small DM. (2012) Acute stress potentiates brain response to milkshake as a function of body weight and chronic stress. Int J Obes (Lond). 1–8.