

# Happy Hormones at Work: Applying the Learnings from Neuroscience to Improve and Sustain Workplace Happiness

NHRD Network Journal  
11(4) 83–92, 2018  
© 2018 National HRD  
Network, Gurgaon  
Reprints and permissions:  
in.sagepub.com/journals-permissions-india  
DOI: 10.1177/2631454118806139  
journals.sagepub.com/home/nhr



Sambit Kumar Ghosh<sup>1,2</sup>

## Abstract

Workplace happiness is one of the most valued and pursued goals of an organisation. Researchers, scholars and practitioners have acknowledged the benefits that a happy workforce brings to the table and its enormous contributions to business outcomes. Researches in neuroscience help us in gaining more knowledge about the molecular structures of the brain, nervous system and the resultant behaviours. Learning from neuroscience teaches us that happiness is a state of mind and is a result of the complex interplay of hormones and neurotransmitters, and that the release of neurochemicals and neurotransmitters has a role to play in making us happy. There are ways and strategies to trigger these neurotransmitters and boost their levels of secretion, thereby intentionally and naturally causing them to flow and maximise happiness. This article attempts to list various activities and programmes that can be practised at the worksites to achieve, sustain and maximise happiness at the workplace.

## Keywords

Happiness at work, neuroscience and happiness, neuroscience and workplace happiness, happy hormones at work

## Introduction

We all want to be happy. Joy and happiness are fundamental human emotions, and are pursued as a valued goal across different societal frameworks. Happiness ranks high in our personal and professional checklists of wishes and wants. In our pursuit of happiness, we constantly look out for factors that make us happy. We make various efforts and invest time in searching for happiness. But where does happiness reside? Neuroscience possibly has an answer to this. Studies in affective neuroscience (the study of neural mechanisms of emotion) and organisational neuroscience (the study of the benefits in the understanding of the complex human brain for application and managerial practice) provide several new

---

<sup>1</sup> Head-People Development and Engagement, Essel Finance Management LLP.

<sup>2</sup> Doctoral Research Scholar, FPM(I), IIM Indore, Indore, India.

---

### Corresponding author:

Sambit Kumar Ghosh, Flat no. 302, Abhiruchi CHS, Plot no. 6, Sector 12, Vashi, Navi Mumbai 400703, India.  
E-mail: sambitkumarg@yahoo.com

insights into the causal linkages between the brain and behaviour, and reflect on the immense potential that our brain may have to shape and drive our own happiness. The world of neuroscience has explored several ways to provide new insights into organisational scientists and practitioners in solving many of their work-related issues and offering solutions which can be practised at the workplace. Workplace happiness and well-being have occupied adequate attention in this space and have been the subject of several discussions. Neuroscientific studies through the use of neuroimaging techniques, brain data and physiological measures have thrown light on the neural correlates of happiness. The neural knowledge of the alteration of neurocircuitries, the release of neurotransmitters and the non-pharmacological methods of arousal and release of the brain chemicals has contributed to the scientific understanding about happiness and well-being (Dolcos, Moore, & Katsumi, 2018; Fox, Kaplan, Damasio, & Damasio, 2015; Suardi, Sotgiu, Costa, Cauda, & Rusconi, 2016; Young, 2007). The present article is an attempt to discuss 13 breakthrough insights into neuroscience which can be readily used to improve happiness at the workplace. Through deliberate attention and practice of certain activities, the neural pathways get stimulated which in the world of neurosciences is referred to as Hebbian theory, which states, 'Neurons that fire together wire together', thus forming new neural connections (Burton, 2016).<sup>1</sup> The more number of times the new neural connection is travelled, the easier it makes to stimulate the pathway and this results in forming new habits. The formation of new habits at the individual and collective levels along with continuous practice is what makes us unique and formidable as units, helps to transform ourselves individually and collectively, and navigate the complex arena of work, and generates desired outcomes of happiness, productivity and business success.

The researcher and author Sonja Lyubomirsky in her book, *The How of Happiness* captures happiness as 'the experience of joy, contentment, or positive well-being, combined with a sense that one's life is good, meaningful, and worthwhile.' Work occupies an important space in an individual's life. People work for economic needs and also for psychological fulfilment. Thus, being happy is of great importance at the workplace too. It is widely known both from research and practice that a happy workplace contributes to several business outcomes. In the *Harvard Business Review* article, 'Positive Intelligence' (Jan—Feb 2012), the author Shawn Achor reflects that every business outcome reports improvement when the brain is positive (Achor, 2012). He goes on to argue that *happiness is a pre-cursor to success*. Workplace happiness is crucial for enhancing productivity in an organisation, and maintaining happiness at the workplace can also increase employees' productivity. A study conducted by the researchers Andrew J. Oswald, Eugenio Proto and Daniel Sgroi from the University of Warwick, Coventry, UK reports that people who are happy at work are about 12 per cent more productive (Oswald, Proto, & Sgroi, 2015). Happy employees are more loyal, generates positivity, fosters positives relations, increases camaraderie, and contributes in improving customer services (Seppala & Cameron, 2015). *Neuroscientific research has revealed that happy employees are better workers, and they work both harder and smarter*: Companies who aim to create an engaged workforce do so by valuing happiness (Mckee, 2014).

Antonio Damasio, one of the world's leading neuroscientist reflected, 'We are not thinking machines that feel, but emotional machines that think'. Feelings and emotions do matter at work, and this is being increasingly proved by advances in neuroscience; there are clear neurological links between feelings, thoughts and actions. Neuroscience helps in educating us through scientific explanations, the underlying factors that generate happiness—the hormones and neurotransmitters which are at work and responsibly functioning at the background to make us feel happy, trusted and motivated. Our feelings and emotions are a result of chemical reactions taking place in the brain. Happiness is a state of mind, and studies in neuroscience inform us that the feeling of happiness is related to the complex interplay of chemicals in

the brain—that the release of certain chemicals in the brain called neurotransmitters which are responsible for the transmission of messages from one neuron to another across a synapse. These reactions are responsible for making us experience both negative emotions (anger and sadness) and positive emotions (love, happiness, joy, etc.). The brain releases the so-called happiness hormones—dopamine, oxytocin, serotonin and endorphin—which affect our happiness (Bergland, 2012).

**Dopamine:** Dopamine is a hormone and neurotransmitter which is related to the brain's reward and pleasure centres. It is linked to motivation, memory, attention and focus, and it gets released when one strives towards a goal. It initiates actions in us and motivates us to work hard to achieve the satisfaction of reaching the goal. The good news is that dopamine can be increased, and one can effectively improve the motivation, focus and mood by taking natural steps in order to increase the dopamine level in his/her brain (Asociación RUVID, 2013; Baixela, 2017).

**Oxytocin:** Oxytocin is a hormone and a neurotransmitter secreted by the hypothalamus of the brain. It is released when people bond socially, thus influencing social behavior. It is the chemical behind human trust, empathy and relationship building. Neuroscientist Paul J. Zak's talk at TED Global 2011, 'Trust, morality -- and oxytocin?', focused on the benefits of the hormone oxytocin, which he called the 'moral molecule' because of its strong linkages to trust, empathy and prosperity. Oxytocin deficiency makes it hard to feel affection, makes one depressed, anxious or fearful, angry, aggressive, and also makes it difficult to enjoy social interactions (Zak, 2013).

**Serotonin:** Serotonin, another important neurotransmitter, plays a major role in regulating our mood. It is produced in the intestines (guts) and the brain. Individuals with high levels of serotonin are peaceful and calm by nature, open and clear-minded, and are socially dominant. Deficiency in serotonin makes people anxious, depressed and aggressive, lowers self-esteem and results in low mood. It is the precursor to melatonin, the neurotransmitter that allows us to sleep (McIntosh, 2018; Watanabe & Yamamoto, 2015).

**Endorphin:** Endorphins are neurotransmitters which lead to decreased feelings of pain. They are released during exercise to cope with the pain of physical exercise. They also trigger a positive feeling which leads to euphoria (intense happiness). The euphoric feeling that follows an exercise, often described as 'runner's high', is a positive one which is triggered by endorphin. Exercising, thus, becomes enjoyable; endorphins make oneself happy. Endorphins help to alleviate anxiety and depression as they are released in response to a pain. They can make one feel wonderful. There are natural ways to boost the endorphin levels, thus making oneself feel happier (Stoppler, 2018).

Knowledge of everyday events that may trigger any of these neurotransmitters and boost natural flow of specific neurotransmitters are contributions from the researches in neuroscience. We do engage in all of these activities at some point of time with no or little knowledge of what effect these activities have on our brain. Numerous neuroscientific researches have provided scientific validation to the following activities in order to boost positive culture in an organisation.

### 1. **Break the bigger goals into smaller tasks and prepare the checklist of smaller tasks**

Research suggests that dopamine levels are increased when we finish a task or reach a goal. These could be a bigger goal that we are striving for or even the smaller tasks at hand. This is primarily because the brain releases dopamine as soon as we acknowledge that any task at hand is completed.

This dopamine release generates a good feeling in us and also moves us to complete the remaining tasks (if any) with the continued experience of the pleasant feeling. Thus, it would be

a good strategy to structure our day at work to give us such small hits of dopamine (Hamid et al., 2016). The happy feeling of target achievement generated through this dopamine release helps develop a sense of repetition of the same actions that resulted in the initial success. This is referred to as 'self-directed learning' by the neuroscientists (Marchese, 2016). This is precisely why achieving smaller goals is an effective way to continue to stay motivated in course of reaching long-term goals and projects. Thus, to have more dopamine hits, the big jobs and goals can be broken down into smaller tasks. Research also suggest that our brain feels satisfied when some items are checked off from the to-do list and releases dopamine that in turn motivates us to repeat the actions that would lead to checking off more items. Marking of completed tasks provides us with a feeling of satisfaction in our brain (Marchese, 2016). This activity of checking the to-do list off after finishing the tasks brings in a sense of accomplishment, can help to increase the dopamine levels, thereby generating happiness. I have witnessed that this works wonders and raises the confidence of the employee, and results in a feeling of sense of achievement and generates lots of happiness.

**2. Looking for new things, engaging in creativity**

Research also suggests that Dopamine production is triggered when an individual finds something new and exciting in front of them. This increase of dopamine levels can be achieved by practising simple creative hobbies that need an individual to focus like photography, crafting, drawing, etc. (Chermahini & Hommel, 2012, Article 319). Thus, at the organisation level, we can create opportunities for employees by assigning them with a new project, creating task forces to build new product lines, encouraging them to participate in research works, etc. We can also organise fun activities around the several festival times which may include photography contests, creative workshops, activities that calls for creativity, slogan competitions around certain themes, involving the employees and their kids and families in crafting and drawing competitions during annual day celebrations or any other national event celebrations.

**3. Cultivate positive thoughts to increase serotonin: Stay positive, remember happy events, practise optimism and recite affirmations**

Researchers from the University of Montreal, Quebec, have suggested that our thoughts affect our serotonin levels. In an experiment, the researchers used positron emission topography to measure serotonin levels in participants going through positive, negative and neutral mood inductions, and it was found that serotonin production was higher when the participants reported higher mood levels and its production was lower when the participants reported lower mood levels (Perreau-Linck et al., 2007; Young, 2007).

Staying positive is the key to better performance, overall health and well-being. Optimism is associated with the structure and functioning of the brain (Dolcos et al., 2018). It helps to raise serotonin levels. It has been found that remembering positive and happy events increases serotonin production in the brain, thereby diverting an individual from negative thinking (Korb, 2011; Suardi et al., 2016). At the workplace, there can be a visual display of photographs that carry happy memories of past achievements, get-togethers, picnics, off-sites, office celebrations at important places in the offices such as receptions, meeting rooms, cafeteria, general work areas and also digitally through wallpapers. Organisations can also customise and prepare calendars with such photographs and gift them to employees during the New Year.

Some of us may also have experienced that affirmations really do work. Affirmations are positive short, self-believable statements of a future and desired outcome. Research suggests that affirmations are able to help increase the production levels of endorphin which can instantly

improve the mood, and repeatedly reciting affirmations helps change and create neural pathways for positive thinking (Sherman, 2013).

**4. Get social: Make time for social interactions, increase social dominance**

It is important to create more social interactions at the workplace. Social connectivity triggers the release of oxytocin. Our role in social circles may also influence the serotonin levels. Research suggests that social dominance increases more serotonin, and tryptophan, a precursor to the neurotransmitter serotonin, enhances dominant behaviours (Watanabe & Yamamoto, 2015). In another study, it was found that an increase in serotonin and tryptophan decreases aggressive or quarrelsome behaviours and significantly increases affiliative and socially dominant behaviours (Moskowitz, Pinard, Zuroff, Annable, & Young, 2003; Young, 2007). Organisations can create multiple social groups with definite purposes, such as taskforce committees, engagement committees, sports committees, mentor–mentee teams, and provide opportunities to individuals to take active participation in these groups and increase their social dominance.

**5. Create opportunities to celebrate at work**

As human beings and more so as professionals, we all strive to and love to win. Celebrating a win releases a flow of dopamine into our system (Wildermuth, 2018). Judith E. Glaser, the author of *Conversational Intelligence*, posts on *Psychology Today*, ‘Celebration conversations elevate the level of such “feel good” chemicals as oxytocin and the endorphins’. At the workplace, it is therefore important that we create opportunities to celebrate small winnings, do a victory celebration, cut a cake, send a congratulatory email, click pictures of winning celebrations and stick them around the work area. Through these practices, I have observed that these actions generate a feeling of accomplishment, create a sense of fulfilment, bring positive energy on the floor and motivate the individual to get up and go for the next achievement. Thus, from a scientific standpoint, these gets the happy hormones rush on every next achievement.

**6. Handshake and hugs**

Dr Paul J. Zak, a pioneer in the field of oxytocin research, recommends connecting and talking with friends or colleagues, making eye contacts, a pat on the shoulder and even shaking hands to boost the levels of oxytocin; he even recommends eight hugs a day. Thus, when connecting with friends and colleagues at work, it is important to maintain eye contact while speaking and firmly shaking hands while greeting. Back at home, cuddling a pet also generates a higher level of oxytocin. These activities generate trust, and trust is the highest form of motivation which makes an individual happy (Zak, 2013).

**7. Gifting at work and practising charity**

Employees are the backbone of any organisation. Organisations need to take care of the employees in the best possible ways. Dr Paul J. Zak’s human oxytocin studies showed that receiving gifts raised oxytocin (Zak, 2013). Those who engage in acts of giving reach-a-state of euphoria which psychologists term as ‘helper’s high’ and emphasises that giving produces more endorphins in the brain (Baraz & Alexander, 2010). Organisations can promote a culture and make a regular practice of gifting through various ways—through fun events, gifting on birthdays, on employees’ marriages, marriage anniversaries, attaining parenthoods, on special and personal achievements, festival gifts, initiating tenure awards, or by participating in charity work, encouraging employees to volunteer for activities that support a social cause, donate items to orphanages, old-age homes by actively participating directly or through NGOs. Through fun activities, employees can also be encouraged to gift each other. During Christmas celebrations, while organising fun events like ‘Secret Santa’, where employees were encouraged to gift each other by drawing chits to become

‘Secret Santa’ to another employee and presenting a surprise gift, I noticed increased enthusiasm and participation. Those missing the event ensured that they also reciprocate the act when they joined back. This generates lots of positivity in the environment. Through the contagious effect that they have, these activities generate camaraderie amongst team members and increase happiness at work. While engaging in works of charity, I have witnessed the altruistic behaviour and the whole-hearted participation amongst the employees who felt satisfied and happy because of the opportunity that the organisation provided them to contribute towards a social cause, thus generating a sense of fulfilment and happiness from within.

#### **8. Laugh: Humour at work**

We have often heard that laughter is the best medicine; Norman Cousins have even referred to it as ‘inner jogging’. Science has helped us to learn that the process of laughter boosts the immune system, reduces blood pressure and drops the stress hormones. Neuroscience informs us that laughter increases happiness by producing higher levels of endorphin. The brain gets into an action just after hearing the first few words when a joke is cracked, and at the climax, when the punch line is revealed, the heart rate rises, the listener jiggles with amusement, and the brain releases dopamine, serotonin and endorphin (The Harvard Mahoney Neuroscience Institute Letter, 2010). Organisations should, therefore, encourage humour at work. At the workplace, I organise several fun events which include inviting an artist to draw cartoon faces of employees and gifting it to the employees, placing a ‘humour board’ at the cafeteria or in an area frequented more by the employees. Intellectual and decent jokes (after scrutiny) put up in the humour board everyday create joy, happiness and excitement amongst employees. Organisations can also organise ‘joke competition’ or laughter events amongst employees, set up laughter clubs activities and therapies on Friday evenings or can include a section on humour in the monthly newsletters.

#### **9. Cultivate a culture to develop an attitude of gratitude across the organisation**

There is a considerable attention from both researchers and practitioners on the wellness benefits of gratitude, and scholarly works of researchers continue to enlighten us on the correlates of gratitude and neuroscience and the associated impact on organisational wellness (Burton, 2016; Fletcher, 2015; Fox et al., 2015). The world of neuroscience informs us that the expression of gratitude releases dopamine that makes us feel good. It was also found that when we reflect on or write down the positive situations or experiences that we encounter in our life, the brain releases serotonin and, as serotonin enhances our mood, we start feeling happy (Burton, 2016). Robert A. Emmons, through his researches in the area of gratitude, found that people who consistently practise gratitude enjoy a host of physical, psychological and social benefits (Emmons, 2010a). Eric Mosley and Derek Irvine in their book, *The Power of Thanks* recognise that expressing gratitude and appreciation plays a role in enhancing productivity. It is, thus, evident that practising and dispensing gratitude at work has far-reaching positive consequences, both for the organisation and employees. Organisations can, therefore, help cultivate and propagate a culture of gratitude and appreciation at work. Robert A. Emmons recommends spending time with oneself, lingering on to positive thoughts and creating a gratitude journal, enlisting the things one have to be thankful for each day. If regularly practised, it helps in developing grateful thinking (Emmons, 2010b). At the organisational level, gratitude needs to be driven as a core value and the culture of gratitude needs to be developed. The values of gratitude need to be institutionalised and campaigned across the organisation. This is contagious in nature and will spread fast. To promote such a culture, I organised activities like ‘Appreciation week’ where we encourage employees to



record and send their appreciation statements to fellow colleagues for the help and support they would have received from them. Awards for most appreciated employees, and appreciators were institutionalised to recognise the desired behaviour, increase participation and fun amongst the employees for such events.

#### **10. Get adequate exposure to bright light and sunlight**

Bright light and sunlight exposure help synthesise Vitamin D in the body and boost production of serotonin levels. Studies have also shown that sunlight exposures can increase the levels of dopamine (Young, 2007). However, it is also important to adhere to safety guidelines of sunlight exposure, as too much sunlight exposure can be harmful; thus, moderation is the key. Research recommends to limit sunlight exposure during peak hours when ultraviolet radiation is the strongest, typically between 10 am and 2 pm (Hansen et al., 2016). Thus, guided by these research works, organisations can also plan activities like outbound training programmes, events, sports days and so on to provide employees an exposure to the sunlight. The programmes can be either planned before 10 am and after 2 pm to limit the sun exposure and prevent them from any hazardous effects. It would also be a good idea to have lunch or tea/snacks in a place where there is exposure to sunlight. In fact, workplaces and corporate cafeterias can be created accordingly to have adequate exposure to bright lights and sun lights.

#### **11. Exercise and meditation at workplace**

Regular habits of exercise, meditation or activities that help to build concentration are the building blocks of physical and mental well-being. Studies have shown that exercise increases multiple neurotransmitters—serotonin, endorphin and besides—and dopamine also gets a boost and these causes a fast improvement in our moods. Exercising not only relieves stress, it also helps in achieving better physical health and makes an individual more productive. The possible neurobiological mechanisms behind the positive effects of exercise result in neurogenesis and neuroplasticity (Dolcos et al., 2018; Semeco, 2017; Young, 2007). At the workplace, organisations can arrange for a gym in their own premises (or tie up with a nearby gym) where employees can exercise before or after the day's work, organise sessions on aerobic exercises, organise weekly yoga sessions, train yoga techniques to practice at the work desk within work intervals, etc. Even taking a stroll and avoiding a lift and climbing some stairs can help release these hormones and make oneself happy.

Meditation is the practice of concentrating, focusing inward and letting our thoughts float. Research suggests that meditation helps in increased levels of dopamine and regular practice is associated with improved mental and physical health (Kjaer et al., 2002; Williams, 2013). Organisations can help employees learn meditation through experienced trainers who can teach them the right techniques to concentrate and meditate in between work intervals, organise meditation and similar sessions, create a place for employees to meditate before the start of work, etc.

#### **12. Aromatherapy at the work desk**

Smell of vanilla and lavender has been linked with the production of endorphins. Smell of Lavender is associated with decreased anxiety and improved mood (Butje, Repede, & Shattell, 2008). Thus, organisations can plan to keep some scented oils at the employee's work—desk, reception, boardrooms, meeting rooms and so on for a quick endorphin release and decrease of anxiety and improvement in mood.

#### **13. Music: Listen to favourite music, anticipate music and make music**

Music has a universal appeal in conditioning human minds. It influences our moods and emotions. When we listening to our favourite tune and enjoy the music that we like, our brain releases

dopamine as a response (Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011). At the workplace, organisations can play soft and soothing music during lunch hours or at the cafeteria, reception areas, organise weekly piano or any other instrumental music classes after office hours, organise employee talent hunt competitions, etc.

## Conclusion

To conclude, the above-mentioned 13 everyday practices are not very difficult and demanding changes in our daily chores and can be easily adopted at the workplace. We are free to choose what we want to see, eat, hear, touch, and desire to think, feel and act. Happiness is also a choice that we can make, a gift that we can present ourselves through modulating our attention, goals and action. The neural knowledge provides us with a scientific validation of what we do and how we can consciously create and cultivate a culture of happiness in the organisation, thus creating a happy workforce and rendering countless benefits and limitless possibilities of growth, harmony and well-being.

## Note

1. This article companion piece to the ‘Discovering the Health and Wellness Benefits of Gratitude’ entry in the October 2016 issue of the Wharton Healthcare Quarterly.

## References

- Achor, S. (2012, January–February). Positive intelligence. *Harvard Business Review*, 90(1–2), 100.
- Asociación RUVI. (2013, January 10). Dopamine regulates the motivation to act, study shows. *Science Daily*. Retrieved from [www.sciencedaily.com/releases/2013/01/130110094415.htm](http://www.sciencedaily.com/releases/2013/01/130110094415.htm)
- Baixauli, E. (2017). Happiness: Role of Dopamine and Serotonin on mood and negative emotions. *Emergency Medicine*, 7, 350.
- Baraz, J., & Alexander, S. (2010, February 1). The helper’s high. Greater Good Magazine: Science-Based Insights for a Meaningful Life. Retrieved from [https://greatergood.berkeley.edu/article/item/the\\_helpers\\_high](https://greatergood.berkeley.edu/article/item/the_helpers_high)
- Bergland, C. (2012, November 29). The neurochemicals of happiness: 7 brain molecules that make you feel great. The Athlete’s Way. *Psychology Today*. Retrieved from <https://www.psychologytoday.com/us/blog/the-athletes-way/201211/the-neurochemicals-happiness>
- Burton, L. R. (2016). The neuroscience of gratitude: What you need to know about the new neural knowledge. Wharton Health Care Management Alumni Association. Retrieved from [https://www.whartonhealthcare.org/the\\_neuroscience\\_of\\_gratitude](https://www.whartonhealthcare.org/the_neuroscience_of_gratitude)
- Butje, A., Repede, E., & Shattell, M. (2008). Healing scents: An overview of clinical aromatherapy for emotional distress. *Journal of Psychosocial Nursing and Mental Health Services*, 46(10), 46–52.
- Chermahini, A., & Hommel, B. (2012, November 26). More creative through positive mood? Not everyone! *Frontiers in Human Neuroscience*, 6.
- Dolcos, S., Moore, M., & Katsumi, Y. (2018). Neuroscience and well-being. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. Salt Lake City, UT: DEF Publishers.
- Emmons, R. (2010a, November 16). Why gratitude is good. Greater Good Magazine: Science-Based Insights for Meaningful Life. Retrieved from [https://greatergood.berkeley.edu/article/item/why\\_gratitude\\_is\\_good](https://greatergood.berkeley.edu/article/item/why_gratitude_is_good)
- . (2010b, November 17). 10 ways to become more grateful. Greater Good Magazine: Science-Based Insights for Meaningful Life. Retrieved from [https://greatergood.berkeley.edu/article/item/ten\\_ways\\_to\\_become\\_more\\_grateful1/](https://greatergood.berkeley.edu/article/item/ten_ways_to_become_more_grateful1/)
- Fletcher, E. (2015, November 24). The neuroscience of gratitude. Retrieved from [https://www.huffingtonpost.com/emily-fletcher/the-neuroscience-of-gratitude\\_b\\_863](https://www.huffingtonpost.com/emily-fletcher/the-neuroscience-of-gratitude_b_863)



- Fox, G. R., Kaplan, J., Damasio, H., & Damasio, A. (2015). Neural correlates of gratitude. *Frontiers in Psychology*, 6, 1491.
- Hamid, A. A., Pettibone, J. R., Mabrouk, O. S., Hetrick, V. L., Schmidt, R., Vander Weele, C. M. et al. (2016). Mesolimbic dopamine signals the value of work. *Nature Neuroscience*, 19(1), 117–126.
- Hansen, L., Tjønneland, A., Køster, B., Brot, C., Andersen, R., Lundqvist, M., ... Olsen, A. (2016). Sun exposure guidelines and serum Vitamin D status in Denmark: The status D study. *Nutrients*, 8(5), 266. Retrieved from <http://doi.org/10.3390/nu8050266>
- Kjaer, T. W., Bertelsen, C., Piccini, P., Brooks, D., Alving, J., & Lou, H. C. (2002). Increased dopamine tone during meditation-induced change of consciousness. *Cognitive Brain Research*, 13(2), 255–259.
- Korb, A. (2011, November 17). Boosting your Serotonin activity: 4 ways to boost your serotonin! *Psychology Today*. Retrieved from <https://www.psychologytoday.com/us/blog/prefrontalnudity/201111/boosting-your-serotonin-activity>
- Marchese, L. (2016, January 27). The psychology of checklists: Why setting small goals motivates us to accomplish bigger things. *Productivity*. Retrieved from <https://blog.trello.com/the-psychology-of-checklists-why-setting-small-goals-motivates-us-to-accomplish-bigger-things>
- McIntosh, J. (2018, February 2). What is serotonin and what does it do? [Reviewed by Debra Rose Wilson]. *Medical News Today*. Retrieved from <https://www.medicalnewstoday.com/kc/serotonin-facts-232248>
- McKee, A. (2014, November 14). Being happy at work matters. *Harvard Business Review*. Retrieved from <http://hbr.org/2014/11/being-happy-at-work-matters>
- Moskowitz, D. S., Pinard, G., Zuroff, D. C., Annable, L., & Young, S. N. (2003). Tryptophan, serotonin and human social behavior. *Advances in Experimental Medicine and Biology*, 527, 215–224.
- Oswald, A. J., Proto, E., & Sgroi, D. (2015, October). Happiness and productivity. *Journal of Labor Economics*, 33(4), 789–822.
- Perreau-Linck, E., Beauregard, M., Gravel, P., Paquette, V., Soucy, J. -P., Diksic, M., & Benkelfat, C. (2007). In vivo measurements of brain trapping of <sup>11</sup>C-labelled  $\alpha$ -methyl-L-tryptophan during acute changes in mood states. *Journal of Psychiatry & Neuroscience*, 32(6), 430–434.
- Salimpoor, V. N., Benovoy, M., Larcher, K., Dagher, A., & Zatorre, R. (2011). Anatomically distinct dopamine release during anticipation and experience of peak emotion to music. *Nature Neuroscience*, 14, 257–262. doi:10.1038/nn.2726
- Semeco, A. (2017, February 10). On the top 10 benefits of regular exercise. *News Letter, Health Line*. Retrieved from <https://www.healthline.com/nutrition/10-benefits-of-exercise>
- Seppala, E., & Cameron, K. (2015, December 1). Proof that positive work culture are more productive. *Harvard Business Review*. Retrieved from <https://hbr.org/2015/12/proof-that-positive-work-cultures-are-more-productive>
- Sherman, D. K. (2013). Self-affirmation: Understanding the effects. Santa Barbara: University of California. *Social and Personality Psychology Compass*, 7/11, 834–845.
- Stoppler, M. C. (2018). Endorphins: Natural pain and stress fighters. W. C. Shiel (Ed.). *Medicine Net.com News Letters*. Retrieved from [https://www.medicinenet.com/endorphins\\_natural\\_pain\\_and\\_stress\\_fighters/views.htm](https://www.medicinenet.com/endorphins_natural_pain_and_stress_fighters/views.htm)
- Suardi, A., Sotgiu, I., Costa, T., Cauda, F., & Rusconi, M. L. (2016). The neural correlates of happiness: A review of PET and fMRI studies using autobiographical recall methods. *Cognitive, Affective, & Behavioral Neuroscience*, 16(3), 383–392. doi:10.3758/s13415-016-0414-7
- The Harvard Mahoney Neuroscience Institute Letter. (2010). Humor, laughter, and those aha moments. *On the Brain*, 16(2), 1–3.
- Watanabe, N., & Yamamoto, M. (2015). Neural mechanisms of social dominance. *Frontiers in Neuroscience*, 9, 154. doi: 10.3389/fnins.2015.00154
- Wildermuth, E. (2018). The science of celebration: 5 reasons why organizations should do it more often. Retrieved from <https://michaelhyatt.com/science-of-celebration/>
- Williams, P. B. (2013). Your brain on happiness: The neuroscience of joy. Retrieved from Retrieved from [http://truehomewithin.net/Dharma\\_essays\\_files/essay\\_joy10\\_brain\\_on\\_happiness2.pdf](http://truehomewithin.net/Dharma_essays_files/essay_joy10_brain_on_happiness2.pdf)
- Young, S. N. (2007). How to increase serotonin in the human brain without drugs. *Journal of Psychiatry & Neuroscience*, 32(6), 394–399.

Zak, P. J. (2013, November 7). The top 10 ways to boost good feelings, lab-tested methods to raise oxytocin, and feel better about yourself and others. Psychology Today. Retrieved from <https://www.psychologytoday.com/us/blog/the-moral-molecule/201311/the-top-10-ways-boost-good-feelings>

## Author's Bio-sketch

**Sambit Kumar Ghosh** is a versatile strategic HR practitioner and has been contributing in creating performance-driven, target-oriented cultures, piloting competency-driven strategic HR interventions, engaging employees proactively and building learning organisations across various industries such as construction, retail banking, stock broking, telecommunications and financial services. He is an accomplished HR and L&D professional, and has been working in various senior HR leadership positions with reputed brands spanning across various industries. He is pursuing his doctoral research programme (FPM Industry) from IIM Indore. His research interest lies in the areas of emotions and leadership decision making, emotional labour, happiness and engagement at workplaces, applications of neuroscience in management and power and politics in organisations.