Essay

Placebo and Nocebo Phenomena

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Abstract

The placebo and nocebo effects affect the brain and the unconscious mind in mysterious ways. In this reflection, I elaborate on how these treatments with sugar pills can relate to psychosomatization, beliefs, magic, nudging, and perceptual illusions, and how they are conceptualized. I reflect about the definition of placebo and associate its function to cerebral areas. By using analogies, examples, experiments, and some of my own previous experiences, and associating them with different subjects, I conclude placebo and nocebo happen because the brain is prone and designed to believe. Finally, placebos have a much wider impact beyond altering the experience of pain.

Keywords: placebo, nocebo, reflective diary, psychosomatization, belief.

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Reflective Diary

I never quite understood the placebo effect. The phenomenon is unique, and it puzzles me that real feelings and symptoms can arise from fake treatments, sugar pills, or even the person's own psyche. What happens in the brain physiology to provoke these phenomena? And in the unconscious mind?

Franz Alexander elaborated a lot on how unconscious repression of certain emotional reactions can lead to somatization (Alexander, 1997, p. 36). Last year, I learned that each emotional state could generate an impact on different body parts—this was a central component for the inauguration of the psychosomatic era. Just like placebo and nocebo phenomena, mental states like emotions or beliefs can create a physical impact, for the good or the bad.

Even though my experience with the module “Psychosomatic Clinic” in my home university was great and fulfilling, due to its strict psychoanalytic perspective, it could not help me with this

specific mystery of the human mind and did not answer some of my questions, so aligned with a neurological view. So, when my lecturer presented that this module would have a topic about placebo, I knew what my first reflection would be of.

Placebo and nocebo are Latin words meaning "I will please" and "I will harm" respectively. Furthermore, Cambridge dictionary defines placebo not as medicine but as a substance given to someone who is told that it is medicine. It is commonly used to test the effect of a drug or to please a patient ('Placebo', no date). Nocebo, on the other hand, is characterized as having a bad effect on an individual's well-being. This can arise from anticipating that a medical or psychological treatment will fail, harm, or produce undesirable outcomes ('Nocebo', no date). In other words, placebos and nocebos are related to expecting good or bad results from a treatment (e.g., a drug), with patients often reporting those presumed outcomes (Shorter, 2011). Randomized Controlled Trials (RCT) in early psychiatry were the first systematic use of placebos. Kopeloff and Cheney (1922) found that there was no therapeutic difference between using placebo or operation in the treatment of focal infection in psychiatric illnesses (Shorter, 2011). The physical effects rely mostly on beliefs, cognitive biases, and group influences. This bridge between social factors, mind, and body is what makes humans biopsychosocial. But where is that bridge?

My past experiences could only say it is unconscious, so I looked up some articles and videos and found out fascinating data about how placebo affects the prefrontal cortex and the striatum (Harvard Medical School, 2013). These areas are responsible for reward processing (thus, related to dopamine), learning, and category representation (Zhang *et al.*, 2016). This suggests that when a person is using placebo pills their brain starts to get filled with dopamine, a process motivated solely by the representation of the medicine (colour, format, etc.) and beliefs. Ultimately, frontal lobes are shown to be fundamental for believing and, consequently, for the placebo to establish its effect (Sathyanarayana *et al.*, 2009).

Placebo is a stimulus for the prefrontal cortex to engage in beliefs. A very creative analogy (Canal do Pirulla, 2011) is in *The Wizard of Oz*. The gifts that the wizard gave were all placebos, since he was only an illusionist, not a real wizard. But Dorothy's peculiar friends needed something—a stimulus—to believe in, and they had the power to make it become reality. The magician was also a figure of authority, just like some doctors who speak with enthusiasm and care. These are some of the main elements for setting expectations and crucial for placebos (Be Smart, 2015). *The Wizard*

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of Oz allegory also reminds me of some concepts from previous and future lectures: belief in magic and perceptual illusions.

Firstly, either to believe in magic or for placebo to take effect, the same mechanisms are required. When being superstitious, the automatic system of thinking, system 1 proposed by Kahneman (2012), which is responsible for fast and intuitive decisions, is engaged. This fast way of thinking is opposed to a slow and logical one, system 2, also presented by Kahneman (2012). To believe that you will be cured if you know that your family is praying for you is religious, superstitious, and an extreme form of placebo, because if you do not know that people are praying, the healing effect of faith does not happen (Cadge, 2009). This process involves an evolutionary adaptation accountable for automatic decisions (the fast thought system). Generally, beliefs and expectations are less analytic—since the brain is a "belief engine" (Shermer, 2011)—and people become susceptible to effects of suggestion and social compliance.

One of those social effects came to mind in my "Decision-Making" lecture: the effect of the messenger on nudging—which can be defined as intervening to influence people in a particular direction while preserving their freedom of choice (Hertwig and Grüne-Yanoff, 2017). The weight we put on information depends on automatic reactions to its source. If an expert, an authority, or people very similar to us are conveying that a sugar pill is going to heal (or harm), that is highly probable to happen. On this occasion, however, it is not because of explicit nudging but solely due to the implicit influence of a respected figure. This means that the messenger can initiate either a conscious or unconscious process, and that believing also involves being influenced by a relevant figure for the person. Family can also generate either nocebo or placebo effects. This tends to happen with psychosomatic disorders, as in M.'s case when a conflict causes the healthy individual to unconsciously provoke their own bleeding (Sanches, 2011). In this regard, M. could be under the nocebo effect.

Secondly, perceptual illusions can be useful for deception involved in magic tricks but also in nocebo and placebo. Eric Mead uses gestalt principles to make public attention shift from his tricks to the bigger context. Consequently, something fake and staged is believed enough to become a reality (TED, 2010). Just like placebo, when illusions change their formats, the mind changes the way it groups information. That way, a line can look bigger or smaller depending on its surroundings, and a small change in the format and/or colour of the placebo pill can make its effect

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bigger (Masrour *et al.*, 2015). To sum up, a magician that uses placebo in his tricks knows that the most compelling perceptual illusion is the size and format of the pill—to use a needle does have a stronger effect (Be Smart, 2015; Chae, Lee and Enck, 2018).

Moreover, there are many experiments about placebo and nocebo, but Lorber *et al.* (2007) stood out to me. As their title stated, illness was triggered through suggestion and belief. Students were assigned to inhale or not a placebo described as a possible toxin linked to symptoms of Mass Psychogenic Illness (MPI). The ones that inhaled the placebo showed increased general and specified symptoms, compared to those in common sickness. When I finished reading this, I thought of it as nocebo because it was a bad outcome. Robson (2015), however, interprets it as harmful beliefs that transmit illnesses, instead of merely adverse effects of placebo. In this case, the information itself of the effects of the pills—the doctor's "informed consent"—could make someone sicker. In addition, psychosomatization can be analogous to nocebo: a harm from the damaged unconscious can lead to genuine physical symptoms. Ultimately, this last definition of nocebo can be considered as broader, embracing the concept of a damaging placebo and the production of psychosomatic symptoms.

Lastly, placebo and nocebo can happen because the brain is prone to believe. In fact, it was designed to, since there are so many mechanisms and areas involved in the process (e.g., prefrontal cortex, frontal lobe, striatum). In placebo analgesia, some pain-sensitive regions in the brain such as the thalamus, insula, and anterior cingulate cortex can lower their activities (Wager *et al.*, 2004). This not only shows that placebos alter the experience of pain but also that they can have a wider impact in the brain. As for nocebo, I established a clear connection with what I have learned before in my "Psychosomatic Clinic" module: harmful beliefs, actions, and thoughts that may be deeply rooted in the mind due to past experiences can burst at some point as a clinical condition. It is a bad effect created by something that is not entirely real (e.g., a chemical substance). In conclusion, I was able to answer some of my questions and understand the basis of the placebo effect, but this weird phenomenon remains mysterious, with so many unexplored factors. And this makes the research even more exciting.

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