

The Power of Belief: Unraveling the Science Behind the Placebo Effect

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Key points:

- Definition
- Understanding the Placebo Effect
- How Effective is it?
- Implications for Medical Practice
- Conclusion

Definition

The placebo effect, a phenomenon where patients experience real improvements in their health after receiving a treatment with no therapeutic value, has long intrigued both the medical community and the public. This effect underscores the intricate connection between mind and body, highlighting how expectations and beliefs can influence physical health.

Understanding the placebo effect

The placebo effect is more than just "thinking" you feel better—it involves real physiological changes in the body. It occurs when a person experiences symptom relief or improvement after receiving a treatment that has no active medical ingredients, such as a sugar pill, saline injection, or sham procedure.

How the Placebo Effect Works

- **Psychological Expectations:** When patients believe they are receiving an effective treatment, their brain activates healing mechanisms, sometimes producing real health benefits.
- **Neurological Changes:** Studies using brain imaging have shown that placebos can trigger the release of neurotransmitters like dopamine and endorphins, which help reduce pain and improve mood.

- **Conditioned Response:** Similar to Pavlov's dogs associating a bell with food, patients can associate taking medication with healing, leading their body to respond positively even when given a placebo an associate taking medication with healing, leading their body to respond positively even when given a placebo.

How effective is it?

For years, a placebo effect was considered a sign of failure. A placebo is used in clinical trials to test the effectiveness of treatments and is most often used in drug studies. People in one group get the actual drug, while the others receive an inactive drug, or placebo. The participants in the clinical trial do not know if they receive the real thing or the placebo. This way, the researchers can measure if the drug works by comparing how both groups react. If they both have the same reaction — improvement or not — the drug is deemed not to work.

Recently, however, experts have concluded that reacting to a placebo is not proof that a certain treatment doesn't work, but rather that another, non-pharmacological mechanism may be present.

How placebos work is still not quite understood, but it involves a complex neurobiological reaction that includes everything from increases in feel-good

neurotransmitters, such as endorphins and dopamine, to greater activity in certain brain regions linked to moods, emotional reactions, and self-awareness. All of it can have therapeutic benefits. The placebo effect is a way for your brain to tell the body what it needs to feel better.

But placebos are not all about releasing brainpower. You also need the ritual of treatment. When you look at these studies that compare drugs with placebos, there is the entire environmental and ritual factor at work. You have to go to a clinic at certain times and be examined by medical professionals in white coats. You receive all kinds of exotic pills and undergo strange procedures. All this can have a profound impact on how the body perceives symptoms because you feel you are getting attention and care.¹

A 2024 systematic review and meta-analysis examined the effects of placebo treatments across nine major psychiatric disorders by analyzing 90 randomized clinical trials involving 9,985 placebo-treated patients. The study found that placebos significantly reduced symptoms in all psychiatric conditions, but the extent of improvement varied between disorders.

Patients with major depressive disorder (MDD) showed the greatest symptom reduction, followed by those with generalized anxiety disorder (GAD) and obsessive-compulsive disorder (OCD). In contrast, patients with schizophrenia demonstrated the least response to placebo treatments, suggesting that the placebo effect may be more pronounced in mood and anxiety-related disorders than in psychotic disorders.

The researchers emphasized the strong influence of the placebo effect in psychiatric treatments, raising concerns about the need for better trial designs to accurately measure the true efficacy of active medications. The study highlights the importance of including placebo-controlled trials when evaluating new pharmacological and psychological treatments for psychiatric conditions.²

In another review conducted in 2024, The review investigated the neuropsychological mechanisms underlying observational learning in human placebo effects. The authors highlighted that individuals can experience placebo-induced pain relief by merely observing others benefiting from analgesic treatments, without direct personal experience. This observational learning activates specific neural pathways associated with pain perception and relief.³

Another study conducted in 2024 investigated how the right ventrolateral prefrontal cortex (RVLPFC) helps regulate emotional responses to social and physical pain using repetitive transcranial magnetic stimulation (rTMS).

For context, the right ventrolateral prefrontal cortex (RVLPFC) is a region in the brain's frontal lobe involved in emotional regulation, pain processing, and cognitive control. It plays a key role in down regulating emotional distress, particularly in response to social pain, such as rejection or exclusion.

Research suggests that activating the RVLPFC (e.g., through brain stimulation techniques like repetitive transcranial magnetic stimulation (rTMS)) can reduce negative emotions associated with social pain. This region is also linked to the placebo effect, as it helps modulate expectations and beliefs about pain relief, especially in emotional contexts.

Participants who received active rTMS over the RVLPFC reported reduced emotional distress when exposed to social pain (e.g., rejection), as shown by a decrease in late positive potential (LPP) amplitudes, a neural marker of emotional processing. However, this effect was not observed for physical pain, indicating that the RVLPFC plays a more specific role in social pain modulation.

The study aligns with previous research suggesting that the RVLPFC contributes to placebo effects in social pain relief but not physical pain. This reinforces the idea that the placebo effect in emotional pain treatment may be driven by brain mechanisms that regulate social distress.⁴

Implications for Medical Practice

The placebo effect has significant implications for modern medical practice, influencing both clinical treatments and patient care strategies. Here's how it can play a role:

➤ Enhancing Patient Outcomes

The placebo effect demonstrates that patient expectations and beliefs can directly impact health outcomes. Physicians can leverage this by using positive communication, emphasizing treatment benefits, and fostering strong doctor-patient relationships to enhance therapeutic effects.

➤ Ethical Use of Placebos

Traditionally, placebos have been associated with deception, but recent research supports non-deceptive placebos, where patients are informed about their use yet still experience benefits. This offers a way to ethically utilize psychological and neurological mechanisms of placebo responses in treatment.

➤ Impact on Drug Trials and Approval

Placebos are essential in clinical trials to determine whether new drugs are truly effective beyond psychological effects. High placebo responses in pain management and psychiatric treatments challenge the pharmaceutical industry to develop more effective medications.

➤ Potential for Reducing Medication Use

Since placebos can trigger real physiological changes (e.g., pain relief, reduced anxiety), they could help minimize dependency on pharmaceuticals such as opioids or antidepressants, reducing side effects and addiction risks.

➤ Personalized Medicine and Placebo Response Prediction

Certain individuals are more susceptible to the placebo effect, suggesting that genetic and psychological factors play a role. Future advancements may allow

doctors to predict who responds well to placebo-like interventions and tailor treatments accordingly.

Conclusion

The placebo effect is not just a psychological illusion but a real, measurable phenomenon that influences medical outcomes. By understanding and ethically integrating placebo mechanisms into medical practice, healthcare professionals can improve patient well-being while reducing unnecessary medication use.

References

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Main body

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