The Theory and Practice of the Application of Placebo

A New Complex Bio-Psycho-Social Modell of the Placebo Effect Based on Two Empirical Studies about the Clinical and Everyday Application of Placebo

Doctoral thesis

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Introduction

The placebo effect is one of the most exciting unsolved mysteries of psychology and physiology. The first part of the dissertation discusses the concept, the history and the application of placebo, followed by the discussion of some twenty of the main theories in four major groups: biological theories (endogenous opiate peptides, classical and operant conditioning, etc.), the „complete medicine effect” theory (anthropological theories, the doctor as a placebo, etc.), cognitive and social psychological theories (attribution, cognitive dissonance reduction, Pygmalion effect, etc.) and finally the personality trait theories (suggestibility, sensation seeking, etc.). The second half of the dissertation presents a clinical research with the participation of patients suffering from food allergy and food aversion. This part is followed by a short analysis of the ethical aspects of the usage of placebo in clinical settings. The third part is a series of experiments about the everyday placebo effect, investigating the phenomenon during alcohol consumption. In the fourth, closing part of the dissertation I suggest a complex bio-psycho-social model that discusses the biological, the psychological and the social effects in a common framework.
Methods

In the **clinical research**, patients suffering from food allergy and others diagnosed with food aversion were given placebo pills. (Patients suffering from food allergy and food aversion have similar symptoms, but the etiology of the two illnesses is different: the background of food allergy is immunological, while the background of food aversion is rather psychological. Patients belonging to both groups receive symptomatic treatment, which is usually unsuccessful for patients suffering from food aversion.) They had to take the pills for one month. The pills were presented as a new medicine that had been developed in the United States and had proven to be a really effective drug in the treatment of food allergy. We measured the changes in the objective health status and the subjective well-being of the patients. 14 patients participated in the research, of which 6 had food aversion.

In the **series of experiments** our hypothesis was that the effect of alcohol is partially mediated by placebo effect if the person expects consuming alcohol. Subjects were 156 university students and were tested in groups of 10-15. Subjects had to drink 4x4cl rum (37 % ethanol) or 4x2 cl rum aroma (0 % ethanol) with Coke in 20cl cocktails, one cocktail in every ten minutes. Short term memory, standing balance and self-evaluation of subjective physical, emotional and social state were measured before the experiment and after each four rounds of drinking. Every second subject had alcohol-free rum aroma instead of rum. In the
first setting, all subjects believed that they were consuming alcohol. In the second setting they were told that half of them had got placebo, but they did not know who is consuming alcohol and who is consuming aroma. In addition, other subjects had to imagine only that they are drinking the same amount of rum with Coke, and estimate their possible scores on all tests after each of the four rounds (cognitive control).

Results

Clinical research:

• As expected, none of the patients with food allergy responded to placebo, while 5 of the 6 patients with food aversion did respond.
• These 5 patients showed improvement, of which two had a relapse (our suggested reason is non-compliance: the husband of a patient withdrew his wife from the research when she started to get better); one was still getting better when the research ended; two of them had completely recovered. The recovery of the last two patients was a “miracle”: none of the ordinal biomedical treatments could have helped these patients before. One of them did not want to stop taking the pill even after the research ended.
• Subjective well-being of food allergic patients was better than food aversion patients both before and after taking placebo.
• Placebo-taking did not change the well-being scores significantly in any of the two groups.
Series of experiments investigating the everyday placebo effect:

- Neither in the short term memory task, nor in standing balance task there was no significant difference between the alcohol consuming subjects and the aroma consuming subjects in both settings. There was significant difference between the five measurements but it was not relevant (we have not measured decline in the scores in any of the groups). We conclude that most alcohol consuming subjects entered the so called “excitation phase” due to consuming 4 x 4 cl of alcohol during the experiment, but very few or none of them entered the “sleepiness phase”.

- The 17 item visual analogue scale measuring the self-evaluation of subjective physical, emotional and social state split to two factors as a result of factor analysis: Social behaviour and Physical symptoms.

- In the first setting, where all subjects believed that they were consuming alcohol, there was no significant difference between the groups in any of the two factors, so subjects drinking aroma self-evaluated their physical, emotional and social state during the five measurements similar to those drinking alcohol. It seems that it is enough if people believe they consume alcohol to feel the effects of alcohol consumption, and they will feel these effects in case they are not drinking alcohol as well.

- In the second setting, where subjects were told that half of them had got placebo, but they did not know who is consuming alcohol and who is consuming aroma, there was a significant difference in the
Physical symptoms factor between alcohol and aroma consumers. In this setting, the leader of the research asked the participants to pay attention to what they are drinking. This triggered a stronger self-monitoring, and as a result, subjects were more aware of physical symptoms, aroma consumers stayed sober while alcohol consumers scored even higher on the self-evaluation scales than alcohol consumers in the first setting. It seems that strong self-monitoring cancels out the placebo effect.

- There was significant difference between men and women in the Physical symptoms factor in the first setting. We did not find any significant difference between the two genders in the second setting.
- The scores of the cognitive control group significantly differed from all the other four groups in both the short term memory task and the standing balance task. Members of the cognitive control group estimated a much steeper decline in both tasks than the measured scores of any of the four groups.
- There was a significant difference between the cognitive control group and the aroma consuming group of the first setting in the Physical symptoms factor, but there was no difference in the Social factor. It seems that more or less we can estimate the social effects of alcohol consuming, while our estimation about physical symptoms and performance in skills differs from the actual measured scores.
- We conclude that while there is an implicit expectation in the background of aroma consumers “getting drunk”, this mechanism is
different from the conscious, explicit expectation of the cognitive control group. When we search for the background mechanisms of expectation induced placebo effect, we have to look for implicit mechanisms instead of conscious cognitive mechanisms.

Conclusions

In the fourth, closing part of the dissertation I suggest a complex bio-psycho-social model that discusses the biological, the psychological and the social effects in a common framework. I made a distinction between the placebo effect based on conditioning and the placebo effect based on expectation: while the first one can be completely explained by our knowledge of conditioning, the second one’s mechanism is almost unknown for us (yet). My model tries to explain the expectational placebo effect on a biological basis: I assume the presence of two “gates” (nervous inhibitions) that have been emerged during evolution. The first one filters the information coming from the vegetative organs to the orbitofrontal region (bottom-to-up), the second one filters the instructions going from the mind to the visceral system (up-to-bottom). I assume that the temporary opening of the second gate might be responsible for the expectational placebo effect, when discrete instructions from the mind can be sent directly to the vegetative nervous system. Cognitive and social stimuli have a role in the opening. Besides, I assume that there is a genetically determined disposition to open the
gate, this might be responsible for the placebo response of a part of the population. I suggest that the second gate is located in the anterior cingulum. The model builds on the results of the research and the experiment presented in the thesis, and all discussed theories fit into it.

Bibliography

Related publications:

Most important posters and presentations:


In addition, several informative articles and presentations for non-academic audiences.