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Placebo effect in sports

Doctoral (PhD.) thesis booklet

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I. Aims

Research of placebo effect in sports began in the early 1970s (Beedie and Foad 2009; Bérdi et al 2011). The motivation of the subject can be seen as the first investigation included the measurement of the placebo effects of an anabolic steroid (Dianabol). The main aim was the measurement of a strong, and at that time popular, substance's non-specific effects. This aspect of the subject could have been rewarding and could have been a new branch of the general (clinical) placebo effect research.

But this is not what happened. Thirty years had to pass by for the subject of placebo-effects in sports to emerge again, in the year 2000 (Clark et al. 2000). This was almost 50 years (!) after the emergence of clinical placebo effect studies. This happened in a very different way: Clark and her colleagues, investigated the effects of non-doping substances, just like the twelve previous studies on the subject, these research topics fit the subject of the general placebo literature better: the effects evoked by well known substances (eg. Caffeine) were measured in research with improved design.

About ten years after the start of systematic research of the placebo effect in sports, based on fourteen investigations, we now know that 1) there is measurable placebo effect in sport performance, and 2) this effect can be evoked by several kinds of substances. Furthermore, we have data about 3) the role of personality factors and 4) the role of perceptual characteristics of various sport supplement in evoking placebo effect.

Placebo effect can involve at least four factors (*Table 1*. shows some examples of the variables investigated so far in clinical and in sport settings). Unlike in clinical settings, in sport settings little is known about these factors so far. Besides the estimation of placebo effect in sports, the aim of our investigations was to measure the personality factors that affect placebo response. Finally, our aim was to measure the effect of expectations evoked by the perceptual properties of sports supplement frequently used for the enhancement of performance, concentration and regeneration.

Characteristics of the doctor/coach		Personality characteristics of the patient/athlete	
Clinical settings ⅄ Positive attitude of the therapist in out-patient settings ⅄ The positive vs. negative communication of the diagnosis	*Sports* –	*Clinical settings* ⅄ Anxiety ⅄ Self-focus attention ⅄ Trait optimism ⅄ Attribution	*Sports* ⅄ 'Big Five' personality factors
Characteristics of the pills/nutrition products		**Characteristics of the environment**	
Clinical settings ⅄ Form, ⅄ shape, size, and ⅄ color of pills	*Sports* ⅄ Shape and color of sport nutrition goods	*Clinical settings* ⅄ Settings of the therapeutic environment ⅄ Characteristics (e.g. the view of the window) of the ward	*Sports* –

Table 1. Different factors in clinical and sport settings affecting placebo effect
(From Claridge, 1970)

II. Meta-analysis

Our meta-analysis (Bérdi et al. 2011) showed that the variability of placebo effect in sports varies in a wide range between the small and modest effect size, with an average weighted effect size of 0.31. Furthermore the size of the average effect size measured in strength sports (e.g. weight lifting) is almost the double of the average effect size measured in endurance sports. Studies also vary in the quality of their methodology and in the accuracy of the design they apply.

III. Attitudes towards the application and use of placebos in sports

Concerning the factors affecting placebo effect, first we investigated the attitude of elite athletes towards the deception-based application placebos. A surprisingly high number of the athletes accepted the possibility of the use of placebos. Many of them would accept placebo even knowing that it requires their deception. Furthermore, nearly half of the respondents reported that they had experienced placebo effects in their sport performance; more precisely, they reported that the enhancement of their performance had been attributed to a false belief (to a placebo). Based on the reports it turned out that these placebos not only could be pills and drugs, but sport accessories or information from coaches or sport doctors about their own state of health.

IV. Expectancies evoked by perceptual characteristics of sport nutrition goods frequently used in sports

Unlike in clinical settings (e.g. Köteles and Bárdos 2009), the expectancies evoked by perceptual characteristics of performance enhancers and regenerating substances have not been investigated so far in sports, even though the topic has come up a few times. Expectancies attributed to nine different kind of substances (e.g. green and red energy drinks, powders, gels, pills, capsules, etc.) used in sports were investigated (Bérdi et al. 2010). Athletes' ratings of the strength of these substances for the enhancement of strength, endurance and concentration were measured solely based on their perceptual characteristics. A few substances (e.g. green drink) were rated high by athletes for each three purposes, while others (e.g. powder, tablets, bars) evoked more specific expectancies.

V. The size of placebo effect in sport performance and the personality characteristics affecting it

The aims of our two empirical investigations were 1) the measurement of personality characteristics affecting placebo response, and 2) the measurement of placebo and nocebo effect. Investigating the effect of placebo sodium-bicarbonate on cycling performance showed that 9 people out of twelve in the placebo group showed practically relevant performance change after the placebo treatment. These so called objective placebo respondents were characterized by higher level of state and trait anxiety and trait optimism.

In another empirical study the effects of placebo caffeine (placebo effect) and placebo alcohol (nocebo effect) in three sport games were measured. Results showed that performance improved significantly in the placebo caffeine group compared to their own base line performance in two games. Performance of the placebo alcohol (nocebo) group was worse than in the non-treatment group. In the placebo (caffeine) group performance significantly correlated with the level of mental preparation, motivation (two scales measured by ACSI-28), Big Five openness and conscientiousness factors. That is, placebo alcohol was more likely to worsen the performance of those who reached lower score on these scales.

VI. Conclusions

Placebo effect can be measured in sports, but at the same time its size and direction greatly varies. Based on our own investigations the most important practical implication is an ethical one. A factor that must be taken into account is the possible harm caused by deception to the relationship between practicing professionals (coaches and sport doctors) and athletes receiving placebo treatment. Furthermore, because of the great variability of placebo effect and the possibility of random nocebo effect measured in sports, the positive, desired results can be questioned.

More studies are needed to investigate the factors that account for the variability of placebo effects. In the case of performance enhancement, due to the placebo effect it can be supposed that unknown, unmeasured or "hidden" psychological factors play a role. For this reason, in future researches not only athletes' general personality characteristics affecting placebo response should be measured, but also sport and athlete specific factors, such as performance motivation, concentration, confidence, body consciousness, absorption, etc. Beside these athlete-factors, characteristics of coaches, the environment, and the perceptual characteristics of sport nutrition goods should be investigated as placebo effect mediator variables for the better understanding of the great variability of placebo effect in sports.

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