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## **Capitalizing on the placebo component of treatments**

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## **Abstract**

A placebo treatment is traditionally administered in a double-blind, randomized controlled trial to control for the 'real' effects of the treatment under investigation. In the present paper a broader view of the placebo is proposed, one in which the idea of a potentially 'useable' placebo component of a sports or exercise medicine treatment is presented. It is argued that many interventions in sport and exercise psychology might contain a placebo component that could be capitalized upon by practitioners, through processes often as simple as communicating positive expectations of a treatment to clients. Research findings relating to factors that might influence an individual's response to a placebo, such as personality, situation and genetics, are briefly addressed. Ethical considerations for practice and future research are discussed.

## **Introduction**

The placebo effect is a positive outcome arising from the belief that a beneficial treatment has been received (11). It has been termed the 'belief effect' (12) and the 'meaning effect' (24).

A negative belief effect, the 'nocebo effect' (16) is a negative outcome resulting from the belief that a desired treatment has not been received, or that a received treatment is harmful.

The inclusion of the placebo control in the double-blind randomized controlled trial is regarded as the 'gold standard' for biomedical research. Researchers gain confidence about any 'real' effects of a treatment when it is compared to a placebo control condition which is, theoretically at least, indistinguishable from the treatment under examination. Participants in a trial are therefore, in theory, unaware as to whether they are receiving the placebo or the real treatment. This allows researchers to identify whether observed effects are the direct result of the biological, pharmacological or mechanical qualities of the treatment, cognitive factors such as expectation, cognitive-behavioral factors such as conditioning, or psychophysiological (emotional) responses such as reduced anxiety.

As well as employing placebo controls in research examining, for example, the effects of ergogenic aids on sports performance, sports scientists have also investigated the direct effects on performance of placebos purporting to be ergogenic aids (5, 7, 8, 13, 29).

Collectively these studies demonstrate that when athletes believe that they have received a beneficial treatment, even when this treatment is a placebo, the performance of a significant percentage of those athletes is enhanced. Work in sport has also addressed potential mechanisms and implications (3, 4, 6, 34). This body of research has arguably presented interesting data relating to the direction, magnitude, and frequency of the placebo effect in sport, with implications both for research and practice. For example, whilst it has been reported that the belief that a beneficial treatment has been received might significantly enhance performance, it is also evident that:

- Athletes' beliefs can result in both positive (placebo) and negative (nocebo) effects on performance
- Placebo effects may be experienced both objectively (e.g. improved performance) and/or subjectively (e.g. reduced pain or exertion)
- Not all participants are placebo responsive, or at least, not all athletes are placebo responsive all of the time

However, whilst traditional treatment/control designs are used in much ergogenics and placebo effect research (albeit deceptively in the latter case), that design cannot answer many of the more interesting questions relating to the placebo effect, for example whether there are any interactions between a treatment and the belief that the treatment will improve performance (10, 25). Researchers in sport have therefore used the four condition balanced placebo design (BPD: Figure 1) , which allows assessment of each possible combination of what the athlete believes they have taken (i.e. placebo or drug) and what the athlete has actually taken (again, placebo or drug) (8, 13, 22, 23). Collectively, findings suggest that the 'real' (i.e. biological, pharmacological or mechanical) and placebo (i.e. psychological) components of a treatment often interact to influence performance or other sports related variables such as pain or perceived exertion. These findings have implications for sports medicine practitioners, specifically in ensuring that athletes believe that a treatment will be effective.

### **Applied psychology and the placebo effect**

Psychology is the science of behavior. Many of the key processes employed by practitioners in sports performance enhancement and in sports medicine, whilst grounded in the biological and mechanical sciences, are essentially psychological. That is, practitioners in sports-related professions such as coaching, physiotherapy, nutrition, biomechanics and physiology are often interested in change in one or more target behaviors; it is therefore not unreasonable to

argue that most expert sports practitioners are also expert applied psychologists. Whilst most sports professionals are of course not licensed psychologists (with the obvious exception of sports psychologists, which we return to below), there exists a substantial overlap between the day to day work of both.

Sport psychology is of course an applied and licensed discipline in its own right. The day to day work of many sports psychologists will include dealing with a range of psychosocial variables including motivation, competitive anxiety, confidence, decision making and concentration. Several key variables of applied sports psychology, but specifically confidence and anxiety, are in essence *beliefs*. Self-confidence is the belief we have in our own or our team's ability, or the belief that we will recover from an injury, or the belief in our ability to maintain a strict athletic diet. Anxiety on the other hand is the belief that we might not have the ability to meet an upcoming challenge, to recover from an injury, or maintain the diet. Furthermore, confidence and anxiety are often catalyzed by further broader beliefs about ourselves.

Sport psychologists often have to modify the beliefs of their athletes to enable those athletes to perform to a higher level. For example, an under-confident athlete who suffers from tunnel vision might require a confidence-boosting strategy alongside work on correct attentional focus, while an over-confident athlete who is not sufficiently focused on the task in hand might need reminding of the seriousness of the challenge ahead and of the potential threat that the opponent poses. It could be argued that, by modifying organic (i.e., naturally occurring) levels of confidence or anxiety, a sport psychologist is actually catalyzing a false – or at least currently unjustified – belief, in order to bring about a positive outcome. Does this sound familiar? In other words, many interventions in sport and exercise psychology might operate in part via a placebo effect.

Surprising though this might sound, the issue has been the subject of research in clinical and counseling psychology for many years. In fact, the charge that psychotherapy might exert its effect via a placebo mechanism is not the worst to be aimed at it; that is, it has not only been suggested that many forms of psychotherapy are no better than a placebo, but that they may even be no better than no-treatment (31, 32). Research has also suggested that the beliefs of the practitioner about a treatment might be a significant factor in the success of that treatment (9). Therefore in any therapeutic setting, the magnitude of any placebo effect might be driven by the beliefs of both practitioner and patient/client. This has often been cited as the mechanism underlying many examples of ‘faith healing’ (24).

The idiosyncrasies of a treatment may also impact the nature and magnitude of the response to treatment; the participants’ belief in a treatment can be affected by its physical characteristics. For example, Szabo et al. (33) revealed how perceptual properties of sports ergogenic supplements (e.g. shape, size, color) influence its perceived effectiveness, and effects can be quite specific. Athletes perceived a white powder to be more effective for strength, compared to endurance or concentration, whereas a green gel was perceived to be more effective for endurance than strength and concentration. It could be speculated that even before an athlete has been given information about a treatment, on the basis of perceptual information received, the athlete has already made up his/her mind on whether it will be effective or not.

It is fair to say that, in many respects, whether an intervention operates via what we term ‘real’ or what we term ‘placebo’ mechanisms is not important. If it works, it works. If an athlete runs faster because they believe that they have ingested 450mg of caffeine when they have not, or if the same athlete runs faster because they believe that their sport psychologist has resolved their anxiety issue, the athlete is *still running faster*. Perhaps the placebo effect

and many sports psychology interventions operate in the same gap between what is currently being achieved and what is achievable?

### **Placebo responsiveness**

Placebo effects are traditionally viewed as a positive phenomenon. Indeed, the common sense model of the placebo effect is one in which an individual benefits from false information such as “the tablet I am about to give you will enhance your power output in the upcoming competition”. However, post-experimental interview data (7) revealed that enhanced performance in placebo trials was often coupled with positive changes in psychological factors such as confidence, motivation, and arousal. These findings suggest that the placebo effect may be reflective of a sub-optimal psychological status whereby the belief that a beneficial treatment has been received optimizes psychological variables, subsequently enabling the athlete to perform to their full potential. If this is in fact the case, then sport and exercise practitioners would perhaps be better to address such deficiencies, as opposed to attempting to bridge the gap by means of a false belief. This is particularly germane given the evidence that an individual susceptible to a false positive belief may be equally susceptible to a false negative belief (5, 7), and therefore the potential for belief effects to impact negatively on performance.

While not all individuals will be placebo responsive in all situations, the understanding and prevention of placebo/nocebo responses should be the concern of sports and exercise practitioners. But how does the practitioner know if their athlete/exerciser is placebo responsive? Is placebo responsiveness a function of personality? Is it more of a contextual situational phenomenon, or a genetic predisposition?

Attempts to identify a relationship between placebo effects and personality have indicated that certain psychological variables such as anxiety (26), extraversion (20), openness (35), and agreeableness (27) could be related to placebo responding. While these findings are



equivocal, data from social psychology (15) suggests that personality characteristics *may* predispose an individual to respond to a placebo, but that situational factors are likely to interact with these traits to determine the degree of response exhibited. For instance in medicine, saline solutions and sugar pills may fail to elicit a placebo response if the psychosocial context is absent, the response to placebo influenced by factors including the practitioners' clothing, the instruments used, the appearance of the room or laboratory, the words communicated to the patient and the relationship between the practitioner and patient (1, 9, 19). All these characteristics may play a role in eliciting placebo effects and in influencing the individual's response to treatment.

Interestingly, recent research has suggested that placebo responsiveness may have a genetic basis. Patients with irritable bowel syndrome who possessed a specific gene were placebo responsive, whereas participants who had a variation of the gene were not (17). While this may offer an explanation as to why some individuals are placebo responsive, psychometric assessment of personality to identify potentially placebo responsive traits and assessment of beliefs and expectations may provide more accessible means by which to help alert sport and exercise practitioners to the potential for placebo responsiveness, and facilitate appropriate counsel.

### **Capitalizing on the placebo component of treatments**

It is reasonable given the above to conclude that the effectiveness of treatments is influenced by the relationship between the athlete and their practitioner, and that this, in turn is influenced by the trust held between them. However, while deception would not usually be expected to feature in a successful coach-athlete relationship, there is anecdotal evidence for the deceptive manipulation of belief in the field. Australian swim coach Harry Gallagher described how he used to doctor the watches and clocks at swimming pools to provide athletes with false negative feedback, ensuring that they swam 'faster' in competition than in

training (14). This application could backfire, however, as illustrated by Seligman et al. (30). The authors conducted an investigation to examine the impact of false negative feedback on the performance of swimmers. They found that swimmers who reported a pessimistic personality would swim slower in response to the receipt of false feedback, while optimists tried harder and swam faster. This suggests that in addition to problematic ethics of deception, the deliberate use of false feedback to produce a placebo effect might be counterproductive. An athlete falsely led to believe that they have ingested a powerful ergogenic aid might produce a better performance than usual, but that athlete – upon being either debriefed or inadvertently finding out – might have less trust in their coach in future. In any coaching relationship, although the drive for improvement and success is powerful, the need for trust and honesty is a critical factor.

The examples presented above suggest that using a deceptive placebo treatment as a means to stimulate performance enhancement is unethical. However, using our knowledge about the impact of beliefs on performance to maximize the effects of a legitimate intervention, coaching plan, or nutritional strategy, is not. In short, a placebo treatment can be a legitimate treatment. If an athlete is provided with information about the benefits of a challenging training regime, they are more likely to believe that it will be effective, more likely to see it as worthwhile, and more likely to adhere to it. No deception is involved; the practitioner is simply using their understanding of the important role of belief to bring out the best in their athlete.

### **Investigating the placebo component of treatments**

The ideas presented above of course warrant further research. While careful consideration of ethical guidelines for the conduct of both practice and research is of paramount importance, the use of deceptive methods in research has the potential to generate knowledge about the impact of beliefs on performance that cannot be obtained otherwise. It is also worth

highlighting that what is and what is not acceptable in research is a function of what ethics committees and journal editors deem appropriate methods for addressing often increasingly complex questions. Historical trends in research ethics suggest that as the result of changes in law, culture, or knowledge, practices considered legitimate at one point in time may not be so at a later date (and arguably vice-versa). For example, in the early days of drugs research, the identification and elimination of placebo responsive participants from clinical drug trials might have been deemed unethical. Such practice constituted what amounts to a self-selecting sample, deprived some participants of potentially effective treatments, and inflated observed drug effects. However, the practice has become increasingly widespread as drug companies strive to derive ever less ambiguous findings from increasingly expensive and time-consuming drug trials (21). The ethics of research will to a certain extent always be guided by the shifting balance between the need to protect participants on the one hand, and the need to provide society with reliable information about the effects of interventions on the other.

## **Conclusions**

Sport and exercise medicine is increasingly evidence-based. With growing interest in the links between mind and body, the placebo effect and related phenomena such as psychoneuroimmunology (2), have become the focus of medical research, academic enquiry and media speculation. Greater knowledge of the placebo effect will not only enhance our understanding of the interaction between mind and body, but will likely enhance our understanding of the findings of research, findings that form the basis of the evidence base of sports medicine. This will allow researchers in a wide range of scientific and academic disciplines to make more reliable estimates of the effects of the interventions under investigation.

Despite the attempts of many scientists to argue otherwise (18), the placebo effect is likely both a legitimate phenomenon and an evolved adaptive mechanism. Like many other

adaptive mechanisms, evidence suggests that we, or those from whom we seek help or advice, may be able to ‘tap in’ to these mechanisms when a certain set of environmental conditions are met. Such a set of environmental conditions is, for example, when there is a desired state (e.g. a certain level of health or performance), a difference between our current state and that desired state (an illness or low level of performance), a mechanism we believe may enhance our chances of reaching the desired state (e.g. a course of antibiotics or a sports intervention), and the belief that the intervention has been received. This does not discount the legitimacy of either antibiotics or sport psychology interventions, it merely highlights that a treatment in which an individual holds a strong and positive belief is more likely to elicit a positive placebo response that might augment the treatment response.

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## FIGURE LEGENDS

**Figure 1:** The balanced placebo design (adapted from Rohsenow & Marlatt (28))