

Running Head: EXPECTANCY EFFECTS ON MOTIVATION

Expectancy Effects of Performance Enhancing Supplements on Motivation to Exercise

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### Abstract

This study will be conducted with 23 male participants to look for expectancy effects of performance enhancing supplements (particularly Creatine) on motivation to exercise. The participants will be randomly assigned to a control or placebo group. The placebo group will be told they are receiving Creatine but will consume a Kool Aid mixture that looks and tastes like Creatine. The control group will not receive any additional substances. All of the participants will follow the same workout schedules for four weeks and were given questionnaires at the beginning, middle and end of the experiment. We expect that the placebo group will have more motivation than the control group throughout the study. This research could be beneficial to anyone interested in using or selling supplements. If the same motivational boost can be obtained from a placebo than from the supplement, placebo treatments could eliminate the dangerous effects of using supplements.

## Expectancy Effects of Performance Enhancing Supplements on Motivation to Exercise

Interest in performance enhancing supplements and their effects on the human body has increased in the “exercise community” over recent years. Most importantly, these supplements have attracted much attention from the athlete who feels it necessary to have an edge over the rest of the population. These supplements are intended to provide an athlete with a competitive edge (Lawrence, 2002). An example of the competitive edge performance enhancing supplements can provide an athlete is the large gains of power, strength, and endurance. In 1999 Mark McGuire, a major league baseball player with the St. Louis Cardinals, broke baseball’s all-time homerun record by 13 homeruns. McGuire shattered the record hitting 74 when the previous record was 61. That same year McGuire was taking androstenedione, a supplement intended to increase muscle mass and strength. However, now McGuire suffers of back pains, which led him to retirement.

The arrival of such supplements as creatine, androstenedione, and ephedrine has attracted the attention of many physicians who seem to be concerned about the short-term and long-term effects that these supplements have on the body (Lawrence, 2002). One of the most controversial instances in sports involving the supplement ephedrine occurred in 2001. Corry Stringer, a professional football player for the Minnesota Vikings, died on the practice field after a heart attack. After the autopsy, it was revealed that Stringer had been using ephedrine.

Whatever edge these supplements give athletes, there tends to be side effects. Both Major League Baseball and the National Football League have banned the use of

ephedrine and androstenedione. Although supplements may have possible side effects, whether long or short term, there seems to be an increase in sales. According to the California Interscholastic and Safety Federation (2004), the supplement industry predicts to have sales increase from thirty million dollars in 1995 to one-hundred and eighty million dollars in 2004.

The effect of creatine on the kidneys is one topic that has been of interest to researchers over the past years. Although creatine has not consistently shown to have any major side effects, there is some question regarding creatine's effects on the kidneys due to long-term use (Pecci & Lombardo, 2000). Creatine is an amino acid that is an important store of energy in muscle cells. The energy released in the muscle cells is used to regenerate the primary source of energy, ATP. This provides the muscle with a constant supply of energy, reducing fatigue in the muscle and increasing the muscles' maximum output (Lawrence, 2002). Creatine seems to be beneficial to athletes by increasing lean muscle, strength, and weight loss. In addition, the question of the effect of ephedrine on people with heart conditions, high blood pressure, and overweight problems has been researched.

However, there seems to be a lack of research on the effect that these performance enhancing supplements have on the expectations regarding supplements. For instance, the effect that just the thought of taking a supplement has on a person's belief in his or her own physical capabilities and motivation to exercise is not substantially researched. The psychological effects that believing one is taking a performance enhancing supplement has on the motivation to exercise and belief in one's own physical capabilities is measured by using the placebo effect. The placebo effect is any

psychological response to an inert or irrelevant substance (sugar pill) or procedure (Stewart-Williams, 2004). For example, a patient is prescribed a placebo unaware that the pill is simply a sugar pill and despite the irrelevance of this pill to the patient's condition, the patient makes an authentic recovery.

There are two main theories of how the placebo effect operates. The first theory is the expectancy theory. In this theory, an expectation sets the stage for a placebo effect (Stewart-Williams, 2004). For example, the participant may think to themselves, "If I take this drug I will experience this particular effect." In relevance to supplements, if an athlete takes "creatine" he or she may expect to experience a certain outcome. Taking the placebo then produces a categorical expectancy and it is this belief that produces the placebo effect (Stewart-Williams, 2004). For instance, the athlete may say to his or herself "I will experience this effect because I am taking creatine." Another way which the expectation can produce an effect is through the belief of pain control. In this instance inert substances (sugar pill) can cause a placebo effect (Evans, 2004). This suggests that when the body releases its own endorphins pain is decreased. For example, if an athlete is expecting to lift more weight and takes a placebo, which he or she believes to produce an outcome, hypothetically the placebo will reduce the pain experienced from lifting more weight and the athlete will in turn lift more weight.

A second main theory of the placebo effect relevant to the effects of supplements is the emotional change theory. This theory proposes that when people take placebos that they think will lead to the amelioration of unpleasant symptoms or enhance their control over a disease, this likely promotes a reduction in anxiety and stress, which in turn may lead to improvements in psychological and physical health (Brody & Brody, 2000). In

relevance to supplements in general, the placebo may act as an “emotional booster” to the participants’ motivation to exercise. For example, create a feeling of wanting to exercise because they expect to see results due to the supplement. Stewart-Williams (2004) states that decreased depression due to the belief of the placebo may lead to improved or greater levels of activity. Therefore, in relation to the placebo in this study, the placebo may produce a greater motivation to exercise.

This study intends to pursue the psychological effect that taking a performance enhancing supplement has on a persons’ motivation to exercise and belief in ones own physical capabilities. This study will not use a typical treatment condition where the participants receive an actual drug. The placebo in this study will be “creatine” (kool-aid) which will be used for the experimental group. The “experimental” group will be told they are taking creatine, which is really kool-aid. The control group will not be taking any supplements. After analyzing the research on performance enhancing supplements and on the placebo effect, we hypothesize that participants who are taking the placebo will show a greater increase in motivation to exercise and a greater increase in their own belief in physical capability than participants in the control group.

## Method

### *Participants*

The participants in this study are all Hanover College students. The students will either all be enrolled in a weight or conditioning class at Hanover during the winter ’05 semester or volunteer to participate by signing up. Another option for participants will be football players lifting weights or “training” in the off-season. The participants were between the ages of 18 and 21. The mean age of the participants was 19.63. There were

15 males and 11 females in the study. All of the participants were Caucasian and from the United States.

### *Materials*

The materials used were the Hanover College weight room including cable machines, free weights, and dumbbells. The placebo group will be given a Kool-Aid and sugar mixture served from a creatine container. One variety of powder creatine looks and tastes like Kool-Aid, this is the desired supplement the Kool-Aid mixture is acting as the placebo for. The participants will also have a workout schedule based on the schedule used by the Hanover College football team for weight conditioning. The schedule will be individualized to each participant depending on the maximum amount of weight they can lift initially. All of the participants will lift three times a week and do legs, back, arms and chest exercises.

Participants will also take two questionnaires, one that will measure their motivation and the other to measure their perception of their physical capabilities. The questionnaires had 15 questions each and will be answered using a 7-point Likert scale (1= not at all, 7=extremely). A sample item from the motivation questionnaire is “I feel like working out/exercising today.” A sample item for the physical capabilities questionnaire is “I think I have the ability to lift more weight than my previous max.” The answers to both surveys were then plotted in SPSS in order to compare the two groups.

### *Procedure*

The participants will all fill out an informed consent form and they will be told that they may be placed in either the Placebo or Creatine conditions. All of the

participants will fill out both the motivation and capability surveys before they know which condition they are placed in. The participants in the placebo group will be given instructions on when and how much “creatine” to take. The experimenters will be distributing the creatine to each participant in small amounts and instruct the participants not to share their supplement with anyone else.

The control group will be informed that they will not receive a performance enhancing supplement during the testing period. Participants will all be given the workout schedules and be familiarized with the weight room and all of the machines and weights. Then the participants will begin their workout schedules and continue to complete the workout three times a week for one month. The participants will once again fill out the surveys two weeks into the schedule and again after completion of the month of weight conditioning.

### Results

We hypothesized that the participants in the placebo (or experimental) group would have a higher motivation to exercise as well as a higher belief in their physical capabilities than the participants in the control group. We ran a 2x3 mixed analysis with the 2 being the 2 conditions (placebo vs. control) and the 3 being the 3 levels of time (before, during and after) with repeated measures on the second factor. Our analysis was mixed because there is one between-subjects factor (condition) and one within-subjects factor (time). The interaction between the condition and time was significant  $F(2,40) = 16.3, p < .001$ .

Our two hypotheses were both supported, there was a higher report of motivation as well as belief in physical capabilities in the placebo condition vs. the control condition.



The motivation measurements were significant half way through the study and at the conclusion of the study. Half way through the study the placebo group was an average of 0.655 units higher than the control group with  $p = .002$ . At the conclusion of the study, the placebo group was an average of 1.665 units higher than the control group with  $p < .001$ . The belief in physical capabilities was also significant, but only at the conclusion of the study. At the conclusion of the study, the placebo group was an average of 1.543 units higher than the control group with  $p < .001$ .

The means for the three different times for the placebo groups' motivation were 5.058, 5.425 and 5.925. The three means for the control groups' motivation were 4.600, 4.770 and 4.260. The means for the three different times for the placebo groups' physical capabilities were 4.125, 4.942 and 5.983. The three means for the control groups' physical capabilities were 3.830, 4.690 and 4.440.

### Discussion

The hypothesis was supported, the placebo group showed a significantly higher increase in their motivation to exercise and in their beliefs in their physical capabilities than the participants in the control group. The current study provides support for the suggestion that there are psychological factors that play a role when a person believes they are taking a performance-enhancing supplement. It was evident that the placebo effect did play a role in the influence of the participants' attitude towards exercising. This finding relates to the two theories discussed in the introduction expectancy theory and emotional change theory. Emotional change theory proposed that the placebo would act as an "emotional booster" to the participants' motivation to exercise. In other words, the placebo would create a feeling of wanting to exercise because the participant expects

to see results from what the participant thinks is an actual performance enhancing supplement. This is what occurred in this study. The placebo group or the experimental group displayed an increase in the motivation to exercise in the second measuring time and in the final measuring time. The placebo group actually had a slightly higher motivation to exercise when the study began, which was interesting but not relevant to what was being observed.

The effects proposed by expectancy theory were also supported by the results in this study. Expectancy theory suggested that an expectation would set the stage for the placebo effect. In this case, the participant would expect to see the results from taking creatine, which are increased strength, lean muscle, and increased energy. The participants in the placebo group showed a significant increase in their beliefs of their own physical capabilities throughout the study. In addition, this suggests that the participants may attribute their gains to creatine.

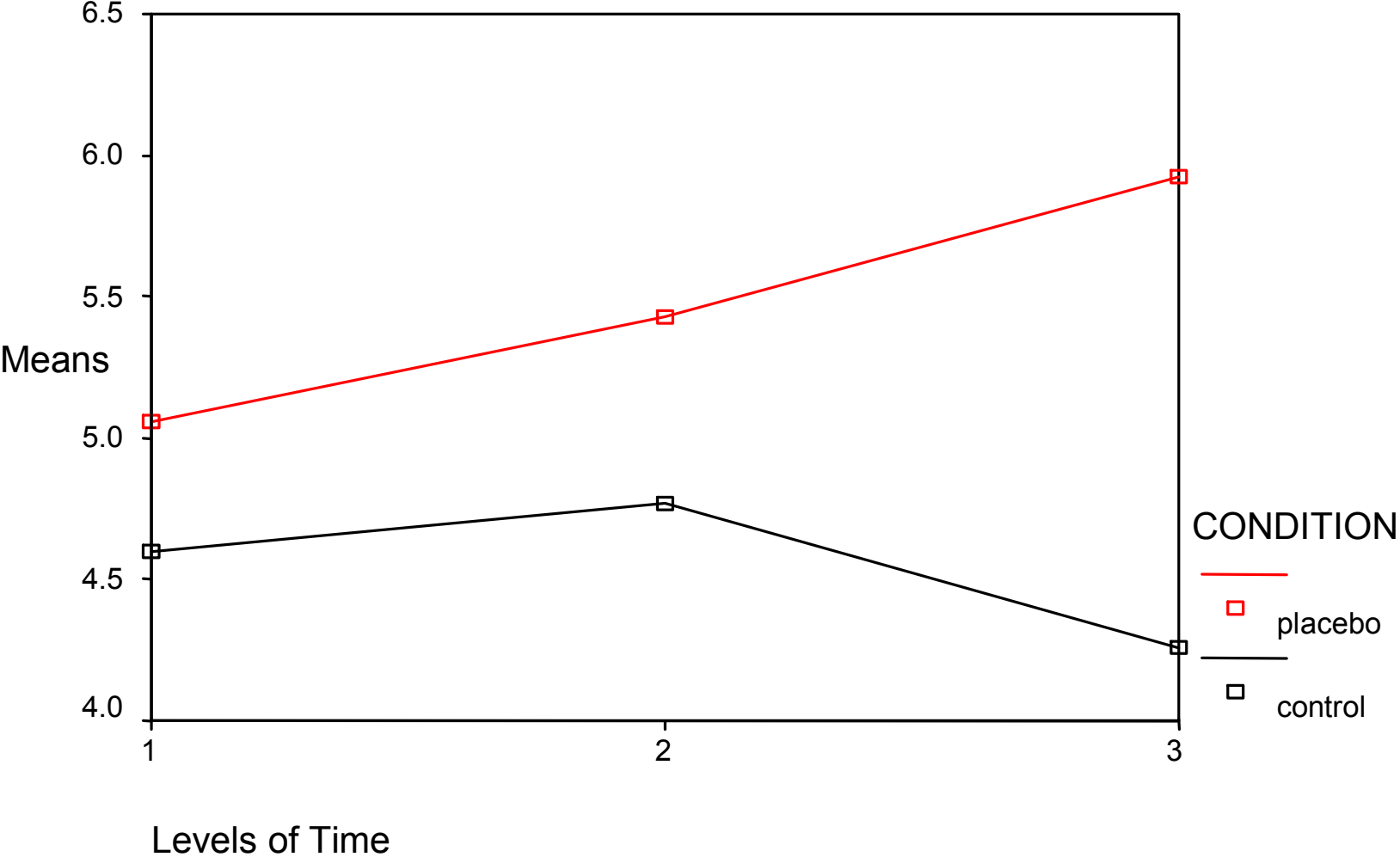
There are a few limitations to the present study. One limitation is that the sample size was small. There were only twenty-two participants. Although significant results were found, it would be beneficial to observe if these results occur with a larger sample size. A second limitation of this study was that the participants were people who regularly lift weights. This may provide reason for why the placebo group's motivation to exercise was already slightly higher than the control group's. A third limitation to this study is that actual gains from the weight lifting were not kept. For example, the participants were not tested on actual physical gains at the conclusion of the study. It may have been interesting to observe if there were any actual significant differences in physical gains between the placebo group and control group.

This study has contributed to the current literature in sports psychology by providing evidence that are psychological factors that influence a person's motivation to exercise and belief in physical capabilities. Furthermore, this study suggests that increases in motivation to exercise and belief in physical capabilities were solely due to the participant's belief that they were taking a performance-enhancing supplement. If these findings suggest that the participants in the placebo group showed an increase in their motivation to exercise and belief in their physical capabilities without the actual use of a supplement, what is to say that the participants cannot have these same gains when they know that they are not taking a supplement? Future research should move forward in pursuit to discover new ways that people can increase their gains in exercise not by taking supplements but by influencing their behaviors through the usage of techniques that influence their minds in positive ways. Some techniques may include increasing a person's focus or determination on a task. In addition, a technique found to increase motivation may be useful. If future research pursues and is successful in finding new ways to increase motivation to exercise, they may provide a safer and healthier way to exercise.

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# Means of Motivation Questionnaires



### Means for Physical Capabilities Questionnaires

