

Science Education Collection

Placebos in Research

URL: <http://www.jove.com/science-education/10032>

Overview

Source: Laboratories of Gary Lewandowski, Dave Strohmetz, and Natalie Ciarocco—Monmouth University

Clinical research focuses on the efficacy of treatments for addressing disorders and illnesses. A challenge with this type of research is that participants often have pre-existing beliefs about the treatment, particularly expectations that the treatment will work.

Though it has been practiced around the world for centuries, yoga is a relatively recent fitness craze in the United States with a wide range of alleged benefits, including the belief that it improves one's creativity. However, it is not always clear whether yoga is actually creating the benefits, like improved creativity, or the yoga practitioner's expectations are really the cause.

This video demonstrates a two-group design that examines whether a person who believes he or she is doing yoga (but in reality is not) experiences similar benefits to a person who actually does yoga. Specifically, this study looks at whether there is a placebo effect such that merely believing you are doing yoga benefits creativity.

Psychological studies often use higher sample sizes than studies in other sciences. A large number of participants helps to ensure that the population under study is better represented and the margin of error accompanied by studying human behavior is sufficiently accounted for. Further, human participants for research like this are often readily available and the experiment is quick and inexpensive to replicate. In this video we demonstrate this experiment using just one participant. However, as represented in the results, we used a total of 80 (40 for each condition) participants to reach the experiment's conclusions.

Procedure

1. Define key variables.

1. Create an operational definition (*i.e.*, a clear description of exactly what a researcher means by a concept) of yoga-related beliefs.
 1. For the purposes of this experiment, a yoga-related belief is the activation of a participant's preconceived notions about yoga and its potential benefits that will be manipulated by having the participant do a series of basic stretches that he or she is told is yoga.
2. Create an operational definition (*i.e.*, a clear description of exactly what a researcher means by a concept) of creativity.
 1. For purposes of this experiment, creativity is defined as the number of alternative uses a participant thinks of for a clothespin.

2. Conduct the study.

1. Meet the student/participant at the lab.
2. Provide participant with informed consent, a brief description of the research (Yoga and creativity), a sense of the procedure, an indication of potential risks/benefits, the right of withdrawal at any time, and a manner to get help if they experience discomfort.
3. Run the placebo yoga condition.
 1. A placebo is an inert substance or procedure that a person believes has an active ingredient. Placebos test how much the mere belief that something works can produce changes in the dependent variable.
 2. Tell the participant: "In consultation with the wellness center at a local hospital we are testing the potential benefits of yoga. As you may know, yoga is a 5,000 year-old system of exercises and stretches designed to help build and emphasize connections between body and mind. For this study I'd like you to engage in a series of yoga movements."
 3. Direct the participant to do several "yoga" stretches (these stretches are not actually considered yoga). Each stretch should be held for one minute.
4. Run the stretching condition (shown with a different participant).
 1. Tell the participant: "In consultation with the wellness center at the local hospital, we are testing potential benefits of stretching. As you may know, stretching is an integral component to personal fitness. For this study I'd like you to engage in a series of stretching movements."
 2. Instruct the participant do several stretches. Hold stretch should be held for one minute.
 1. These are purposefully the same as the placebo condition. Everything with the stretching condition should be the same with the exception of the introductory comments to the participant (2.3.2. and 2.4.1.).
5. Give the participant the dependent variable.
 1. Give the participant the Guilford Alternative Uses Task¹ by asking him or her to "list as many possible uses as you can think of in the next 3 minutes for a clothespin."
 2. Give participant a piece of paper with numbered lines to fill in their answers.
 1. See a sample list from a participant (**Figure 1**).

1. To clip photographs to a line during film developing
2. To hold a bag closed
3. To hold papers together
4. To put up curtains
5. To create an alligator craft
6. Use as fake fingernails for a costume
7. To hold a tablecloth in place
8. To remind yourself where a stain is on a shirt
9. To hold a match while lighting a fire
10. To hold curtains closed in a hotel room
11. Clip on wires/cords to help identify them (e.g., TV, Blu-Ray, etc.)
12. To hold the garbage bag in the trash can
13. To hold the back of a toothpaste tube flat
14. Hold mail in the mailbox so the mail carrier doesn't miss it
15. Help clothes not fall off the hangar
16. As a bookmark
17. To hold up a makeshift bib or apron
18. To keep socks together in the wash

Figure 1: Sample list of creative uses for a clothespin.

3. Give participant the open-ended follow-up question about their perception of yoga. For example, what effects (if any) do you think yoga has on the mind and body? Make sure the participant indicates that yoga relates to physical and mental benefits including creativity/open-mindedness.

3. Debrief the participant.

1. Tell the participant the nature of the study.
 1. "Thank you for participating. In this study I was trying to determine that if a person simply believes he or she is doing yoga, it would have the same benefits as actually doing yoga. There were two conditions, each comprising a series of basic stretches. However, one group thought they were doing yoga, while the other group knew they were basic stretches. We hypothesized that the group who thought they were doing yoga would generate a greater number of creative uses for the clothespin compared to the group who knew they were doing basic stretches."
2. Explain explicitly why deception was necessary for the experiment.
 1. "We want to tell you about the deception we used in this study. We used deception by telling participants we were testing these physical movements in conjunction with a local wellness center. That wasn't true. We also told some participants they were doing yoga when in reality everyone did a series of basic stretches. We did this to test whether expectations about yoga's benefits was enough to boost creativity. Deception was necessary because we wanted to get participants natural reaction. If participants were to know the true reasoning and hypothesis behind the study they may have performed in an unnatural way by trying to purposefully disprove the experimenter's hypothesis. Because of the nature of the deception, it is quite natural for participants to not realize that they were being deceived."

Results

80 participants were used (40 per condition in a different instance of this study conducted by the researchers). This large number of participants helps to ensure that the results reflect accurate mean numbers. If this research were conducted using just one or two participants, it is likely that the results would have been much different and not reflective of the greater population. The numbers reported reflect the mean number of creative uses for a clothespin participants in each condition listed (**Figure 2**).

After collecting data from 80 people, a t-test was performed for independent means to compare the placebo (belief in yoga) condition against the stretching condition. This simple two-group experiment shows how researchers use a placebo condition to test whether participants' mere belief in a treatment's effectiveness can influence outcomes on creativity.

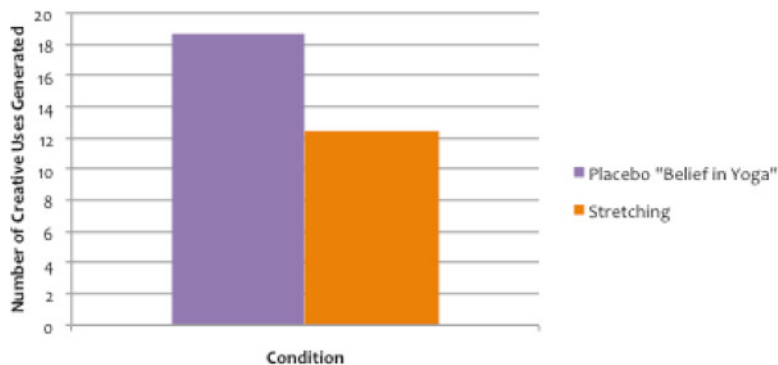


Figure 2: Average number of creative clothespin uses by condition.

Applications and Summary

The use of placebo conditions is particularly common in studies where researchers want to test a medication’s effectiveness.

For example, DelBello and colleagues² conducted a study of over 300 adolescents diagnosed with major depressive disorder. Researchers randomly assigned participants to either wear a patch (the selegiline transdermal system [STS] or EMSAM®) or to wear a placebo for 12 weeks. Compared to baseline measurement taken at week 1, both the treatment and placebo groups experienced similar reductions on their depression scores. This study demonstrates that those who simply believed they were receiving the treatment (*i.e.*, the placebo group) experienced the same level of positive outcomes as those who received the actual treatment.

Similarly, Del Re and colleagues³ conducted a meta-analysis of 47 alcohol pharmacotherapy studies. They found that placebo groups had significant improvement overall and that improvements were greater in more recent studies. Improvements were especially likely when the placebo was administered more frequently and when participants had more severe illnesses.

References

1. Guilford, J.P. *The Nature of Human Intelligence*. New York: McGraw Hill (1967).
2. DelBello, M. P., Hochadel, T. J., Portland, K., Azzaro, A. J., Katic, A., Khan, A., & Emslie, G. A double-blind, placebo-controlled study of selegiline transdermal system in depressed adolescents. *Journal of Child and Adolescent Psychopharmacology*. **24** (6), 311-317. doi:10.1089/cap.2013.0138 (2014).
3. Del Re, A. C., Maisel, N., Blodgett, J. C., Wilbourne, P., & Finney, J. W. Placebo group improvement in trials of pharmacotherapies for alcohol use disorders: A multivariate meta-analysis examining change over time. *Journal of Clinical Psychopharmacology*. **33**(5), 649-657. doi:10.1097/JCP.0b013e3182983e73 (2013).