

JoVE: Science Education
The Simple Experiment: Two-Group Design
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Corresponding Author:	Gary Lewandowski UNITED STATES
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	
Corresponding Author's Secondary Institution:	
First Author:	Gary Lewandowski
First Author Secondary Information:	
Order of Authors:	Gary Lewandowski Natalie Ciarocco David Strohmets
Order of Authors Secondary Information:	

JoVE Psychology Research Methods

Title: The Simple Experiment: Two-Group Design

PI: Gary Lewandowski, David Strohmetz & Natalie Ciarocco

Notes to the author are italicized and highlighted.

1. Overview

- 1.1. Experimental design is the process by which a researcher plans a study. A two-group design is the simplest way to establish a cause-effect relationship between two variables.
 - 1.1.1. Title Slide
- 1.2. Here, a two-group experimental design is used to answer the research question: "How does physiological arousal in the form of exercise influence perceived attraction? In other words, are people more attractive to you after a workout?" **(1.4)**
 - 1.2.1. See storyboard.
- 1.3. This video demonstrates... the process of turning concepts into testable ideas and forming hypotheses **(1.1)**... how to design experimental conditions and controls as well as how to identify experimental variables **(1.8)**... how to execute the study... and finally, analysis of the data and consideration of their implications.
 - 1.3.1. Start with a pop-up of the full screen for 1.1 and then have it shrink into its quadrant. Then for each of the following components, do the same thing by having the full screen pop up and block out the existing quadrant(s), but then shrink down next to the quadrant(s) that is already there. 4 quadrants with 1) 1.1 from storyboard TEXT overlay: Forming Hypotheses 2) 1.8 from storyboard with animation going TEXT overlay: Experimental Design 3) Shot X (participant running on treadmill) TEXT overlay: Conducting Study 4) Figure 1 TEXT overlay: Data Analysis

2. Experimental Design

- 2.1. All research seeks to answer questions **(1.1)**. Often those questions start out fairly broad **(1.2)**. The researcher then forms a hypothesis based on educated guesses about potential answers **(1.3)**.
 - 2.1.1. See Storyboard.
- 2.2. Here, the researcher forms the research hypothesis that those who are experiencing high excitement through exercise will see others as more attractive than those who are experiencing low excitement **(1.4)**.
 - 2.2.1. See Storyboard.
- 2.3. To test this hypothesis, the researcher organizes two groups of people: an experimental group - and a control group **(1.5)**. The experimental group is the one that receives the treatment, which in the case of today's experiment is running on a treadmill. The treatment is the key ingredient that the researcher believes will influence on the outcome **(1.6)**.

2.3.1. See Storyboard.

2.4. The control group does not have the key ingredient. This group serves as the baseline for comparison). In the control group, everything must be kept exactly identical to the experimental condition except for that key ingredient that the researcher wants to manipulate **(1.7)**.

2.4.1. See Storyboard.

2.5. In the present study the researcher wants to focus on how physical excitement influences attraction. As such, physical excitement should be the only piece that changes between experimental and control groups. Therefore, the control group will walk on the same treadmill for the same amount of time that the experimental group will run on the treadmill, in order to remove the excited state from the condition **(1.8)**.

2.6. Now, consider the variables, which are things that change within the experiment **(1.9)**. In a cause and effect scenario, the cause, or the condition manipulated to detect changes, is called the *independent variable*. The effect, or the outcome that the researcher measures, is called the *dependent variable* **(1.10)**.

2.6.1. See Storyboard.

2.7. Based on the hypothesis, excitement is the *independent variable* and perceived attractiveness is the *dependent variable* **(1.11)**.

2.7.1. See Storyboard.

2.8. As we've mentioned, in order to manipulate the independent variable of physical arousal, the experimental group will run on a treadmill. **(1.12)**.

2.8.1. See Storyboard.

2.9. Including a control group is the only way the researcher can determine if changing the independent variable is responsible for the observed changes in the dependent variable **(1.13)**.

2.9.1. See Storyboard.

2.10. To measure the dependent variable of perceived attractiveness, participants in both groups will be shown pictures. It is important to consider factors that could complicate interpretation of the results. For example, in this case, the subject shouldn't have piercings or tattoos, and should only include the head. **(1.14)**.

2.10.1. See Storyboard.

2.11. Here, perceived attraction is quantitated through use of the 7-point Likert Scale where 1 is designated as "Extremely Unattractive" and 7 as "Extremely Attractive." Now that the experimental design has been established, we can proceed to conducting the experiment **(1.15)**.

2.11.1. See Storyboard.

Comment [GL1]: view

Comment [GL2]: quantified

3. Conducting the Study

3.1. To begin the experiment, [the researcher needs to](#) obtain the subject's informed consent to participate in the study. The informed consent gives a synopsis of the study - any risks and benefits of participation - and lets the participant know that she is free to quit at any time.

- 3.1.1. WIDE: Researcher and subject sitting together in the lab as the researcher hands the subject the consent form.
- 3.1.2. MED-over the shoulder: Subject reviews the consent form. *Editors, please freeze frame this scene followed by a blur effect. Then add the following text over screen as narrated: TEXT overlay: synopsis of study, risks & benefits, quit at any time.*

- 3.2. Next, make random assignments to the condition. Randomly order the packets so that the participant's condition isn't based on anything other than chance and any subconscious assumptions on the part of the researcher are avoided.

Authors, could you explain exactly what you mean by ordering packets? I understand that you want random assignments, but I am unsure as to the actions being performed here.

Comment [GL3]: exactly what you describe, packets just need to be in a random order (not all one condition than all the other)

- 3.3. To perform the experimental condition, set the treadmill to 6 mph, explain to the participant what she needs to do, and start the timer for 3 minutes.

Authors, do you start the treadmill and then explain or vise-versa? Is the participant on the treadmill when the Researcher explains what to do?

Comment [GL4]: I'd envision the researcher walking the participant over, the participant getting on, hearing the explanation of what to do from the researcher and the participant actually setting the speed to start the treadmill. The researcher would then start a timer.

- 3.4. Now, show the participant a series of pictures and ask her to rate on the provided scale.

Authors, are the pictures shown after completion of the running task or during? If upon completion, is it while sitting or still on the treadmill?

Comment [GL5]: Pictures would definitely be after while the participant sits at a table/desk.

- 3.5. For the control study set the treadmill to 3 mph, explain to the participant what she needs to do, and start the timer for 3 minutes.

Authors, could you clarify this as before? Do you start the treadmill and then explain or vise-versa? Is the participant on the treadmill when the Researcher explains what to do?

Comment [GL6]: Exactly as above. Only difference being the details of the description.

- 3.6. The control subject then rates the attractiveness of the pictures in an identical manner to experimental condition.

Authors, could you clarify this as before? Are the pictures shown after completion of the running task or during? If upon completion, is it while sitting or still on the treadmill?

Comment [GL7]: Identical to above

- 3.7. Following the experiment, give the subject a debriefing where the researcher explains the purpose of the study.

- 3.7.1. MED or WIDE: Researcher sitting next to empty seat, motions for the participant to take the seat and participant does.

- 3.8. **Researcher:** Thank you for participating. In this study I was trying to determine if arousal from exercise would lead participants to find a picture of a person more attractive. To manipulate arousal there were two conditions; running vs. walking on the treadmill. Do you have any questions?

- 3.8.1. **MED:** Either head on or profile shot of researcher as he/she speaks toward the participant.

4. Representative Results: Mean Attraction Ratings by Arousal Condition

- 4.1. After collecting data from 122 people, a t-test was performed for independent means comparing the high arousal condition - achieved through running - to the low arousal condition - achieved through walking - to see how they influenced attraction.

4.1.1. LAB MEDIA: Figure 1. *Editors, please highlight the red bar as “high arousal condition, achieved through running” is narrated and the blue bar as “low arousal condition, achieved through walking” is narrated.*

4.2. The results reveal that those subjected to the high arousal condition found the pictures more attractive than those subjected to the low arousal condition.

4.2.1. LAB MEDIA: Figure 1.

4.3. The results of this study are similar to the famous “bridge study” performed by Donald Dutton and Arthur Aron in 1974. In this study, Dutton and Aron found that unaccompanied men who crossed a high shaky bridge were more likely to follow up with a female research assistant than other men who crossed a low sturdy bridge **(1.16)**.

4.3.1. See Storyboard.

5. Applications

5.1. Now that you are familiar with setting up a simple experiment using two-group design you can apply this approach to answer the specific questions of your research.

5.1.1. Title card.

5.2. The two-group experimental design is commonly used in psychological experiments to determine a cause and effect relationship of the intervention in question. **(1.1)**.

5.2.1. See storyboard.

5.3. For example, researchers used this type of experiment to determine the effectiveness of combined self-management and relaxation-breathing training for children with moderate-to-severe asthma. .

5.3.1. JoVE MEDIA: 2428 @ 0:18 – 00:26 – Illustration of airway constricting in asthmatic patient.

5.4. In this study, the independent variable was the type of training provided to the children, and the dependent variables were made up of four physiological variables including anxiety levels. The results revealed that a combination of self-management and relaxation-breathing training can reduce anxiety in asthmatic children.

5.4.1. JoVE MEDIA: 2428 @ 5:26-5:40 – Asthma patient being evaluated for breathing.

5.5. In another study, the impact of a feeding log on breastfeeding duration and exclusivity was assessed. The experimental group completed a daily breastfeeding log while the control group did not. The log served to intervene with the participant in the self-regulation process..

5.5.1. JoVE MEDIA: 3368 @ 1:03-1:20 – Mother rocking newborn. *Editors, there is an additional 6 seconds that can be used here if necessary for coverage. Please use only if necessary as the mother solely rocking the baby (and not placing a pacifier in its mouth) would be ideal.*

5.6. The findings suggest that the breastfeeding log may be a valuable tool in self-regulating breastfeeding and promoting a longer duration of full breastfeeding.

5.6.1. JoVE MEDIA: 3368 @ 00:34-00:44 shows baby sleeping in crib.

6. Summary

6.1. You've just watched JoVE's introduction on performing a simple experiment using two-group design. Now you should have a good understanding of how to form a hypothesis **(1.4)**... how to design experimental conditions and controls as well as how to identify variables **(1.11)**... You should also have a comprehension for how to perform a study... and how to assess the results.

6.1.1. 4 quadrants with 1) 1.4 from storyboard 2) 1.11 from storyboard 3) Shot X (participant running on treadmill) 4) Figure 1

6.2. And remember, considering the potential effects of arousal on attraction, a first date at the amusement park may be a better choice than a first date at a poetry reading. Thanks for watching! **(1.17)**.

6.2.1. See Storyboard.

References

Chiang LC, Ma WF, Huang JL, Tseng LF, Hsueh KC. **Effect of relaxation-breathing training on anxiety and asthma signs/symptoms of children with moderate-to-severe asthma: a randomized controlled trial.** Int J Nurs. Stud. 2009 Aug;46(8):1061-70.

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