



## Description

Researchers decide whether or not to publish a study based on the final outcomes. They are more likely to report findings that are positive and similar to those previously reported in literature. Null, insignificant, or inconclusive results often stay hidden in lab notebooks, never to be published! Some researchers on the other hand, in a bid to get published, either attempt to fabricate or manipulate the data. All these practices imperil the credibility of scientific evidence. So the big question here is how to deal with null, inconclusive, and insignificant results? How should researchers proceed when they find themselves in a situation where their research failed to deliver any significant outcomes?

## Find the Root Cause and Revise Your Study

Are your results indeed meaningless or there has been a miss or error on your part? Before arriving at a conclusion about your results, it is critical to evaluate the following factors before tagging your results as inconclusive or insignificant.

1. Was your original hypothesis based on credible literature sources and background information?
2. Do you need to re-run certain experiments or run additional experiments with other variables?
3. Have you correctly assessed your data?

## What if the Results are not Statistically Significant?

Carefully examine all your experimental steps to identify places where an error might have occurred. Determine whether correcting those steps or closing any experimental gaps might lead to different results. There can be factors that you did not anticipate or consider that might have affected the study. Perhaps certain problems related to experimental design arose during actual application that were not evident in articles that you referred. You need to correctly identify all these factors and work on them. However, to achieve this, it is important that you document every minor detail of what you did and what was the result. Human error – while setting up or running the experiment or during observing and noting the results, can remarkably skew the final outcomes.

## Validate Your Methods for Their Sensitivity and Specificity

What if your [methodologies and protocols were not specific or sensitive enough](#) to determine and accurately capture the experimental outcomes? You can check for these aspects using controls (positive and negative). Both these controls allow you to improve reliability and credibility of your

experiments by providing a benchmark. When repeating your experiments, ensure that you have a more rigorous and robust design. This is very critical specifically in the field of biomedical sciences where sample size strongly influences power of statistical tests. A sufficiently large sample size ensures that you have more precise mean values. It also helps in identifying any outliers that may skew your data.

## Contact the Authors of Original Studies

An experimental failure also stems from the [inability to reproduce results](#) reported in earlier studies. Technical errors can indeed be one of the main reasons for this! In such cases, researchers may approach the authors of the original study and seek help. You may request the authors to provide a more detailed account of the study protocols that were followed. Faulty or incorrect reagents may also lead to variations in results. Consequently, you could also ask for the catalogue numbers and company specifications for source materials, reagents, and instruments. If need be, you could also discuss your findings and repeat the study with appropriate directions from the authors. This will surely help you gain confidence in your results, whether positive, negative, or inconclusive.

## Illustration of the Role of Communication

A [classic example](#) of the role of communication was provided by two highly-established, independent labs in Boston and Berkeley working on a joint funded project. They were investigating the role of myoepithelial cells in the progression of breast tumor cells. Despite using similar protocols and starting with the same primary source, they consistently obtained two different sets of FACS profiles in each lab. For resolving and seeking an explanation for these discrepancies they used various approaches. Upon a thorough investigation, they finally realized that a minor difference in the agitation speed post an enzymatic treatment was the root cause for different outcomes!

## Collaborate with Experts in Your Field

Sharing your research findings with subject matter experts or peers is definitely a good move for excluding experimental fiascos! Science is certainly enriched when well-meaning scientists work together to achieve a common goal. This is especially important for early career researchers who have limited experience, expertise and resources to conduct big-scale research. You may learn new skills, theories or even alternative ways of doing certain things. Furthermore, collaborations may widen your access to and increase your knowledge about other techniques used for research.

## Prevention is Better Than Cure

Rather than finding ways to deal with inconclusive or null results, it is advisable to take the necessary measures to avoid being in that situation. Won't you love to be rest assured that regardless of the outcomes of your study, you can still have a publication? Yes! Indeed, there is a way to achieve this. You can publish a registered report for your proposed work. They are two ways of registering your study.

1. Authors may submit a detailed description of the intended study (objectives, sample size, methods, planned analyses) to a credible study registry such as the [Open Science Framework](#)

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2. Authors may provide a complete account of their work (background literature, hypothesis and the rationale, objectives, methodologies and the planned statistical analyses and pilot data if applicable) to the target journal for [peer review](#) prior to data collection. This allows the referees to evaluate the theoretical basis and experimental design before beginning actual research.

An [in-depth peer review analysis](#) is performed to judge the quality of your proposed work. If found suitable, studies are provisionally accepted. Following the provisional acceptance, authors can proceed with their study. The feedback provided by the reviewers can help you to effectively plan and improve your study design, before embarking on actual experimental work. On completion of all the experiments, authors have to submit their final manuscript for a second round of peer review to confirm sensible interpretation of the results. If the manuscript passes this quality check, it is likely to receive acceptance, regardless of the results – negative, null or insignificant.

Have you ever had such results? We would love to hear how you dealt with them! If you have any questions related to publishing of negative, null or insignificant results, post them [here](#) and our experts will be happy to answer them! You can also visit our [Q&A forum](#) for frequently asked questions related to research writing and publishing answered by our team that comprises subject-matter experts, eminent researchers, and publication experts.

## Category

1. Manuscript Preparation
2. Publishing Research

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