Probabilities of Biases in Propagation of Research

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1. Research Propagation

Propagation is the final part of the research and evaluation process, and is equally important for practitioners reporting on the findings of their research to their funder or wider group, i.e. research students submitting their work for assessment to academic boards, or anyone that has to present orally often complex findings in front of audience. Any kind of research or evaluation Propagation needs to combine three aspects- content, audience, and delivery medium. The importance of structure, precision, clarity, and objectivity of content will be emphasized throughout. The choice of Propagation depends upon its intended audience, that is the need of the client/ funding organization and any collaborators, the context of the study, and likely readership or group being reported to.

2. Key Elements of Propagation Plan

In creating a Propagation plan, researchers should consider several key questions:

- Goal: what are the goals and objectives of the Propagation effort? What impact do you hope to have?
- Content: what to disseminate
- Audience: who is affected most by this research? Who would be interested in learning about the study findings? Is this of interest to a broader community?
- Delivery Medium: what is the most effective way to reach each audience? What resources does each group typically access?
- Execution: when should each aspect of the Propagation plan occur (e.g. at which points during the study and afterwards)? Who will be responsible for Propagation activities?

3. Characteristics of an effective propagation plan

- Orient toward the needs of the audience, using appropriate language and information levels
- Include various Propagation methods: written text including illustrations, graphs and figures; electronic and web-based tools; and oral presentations at community meetings and scientific conferences
- Leverage existing resources, relationships, and networks fully
- There is various form of Propagation: written reports; oral presentations; and representation of research in the media. In each and every form of Propagation there may a chance of certain kind of biases. List of these types of biases are discussed below:

4. Probabilities of Biases in Propagation of Research

4.1 Outcome reporting bias

Outcome reporting bias occurs when studies with multiple outcomes report only some of the outcomes measured and the selection of an outcome for reporting is associated with the statistical significance or importance of the result. This bias is due to the incomplete reporting within published studies, and is also called ‘within-study reporting biases in order to distinguish it from selective non-reporting of a whole study. Number of outcomes measured within trials- The existence of a large number of measured or calculated outcomes within a study is the prerequisite of selective reporting bias, which is

present in almost all research studies. The selection of outcomes to report can be further classified into three categories:
(1) The selection of outcomes investigated
(2) The selection of methods to measure the selected outcome, and (3) the selection of results of multiple subgroup analyses.

A large number of results can be generated by the combination of all possible choices.
Pocock et al. (1987) found that the median number of reported end points was six per trial. They also discussed selective reporting of results and related issues of subgroup analyses, repeated measurements over time, multiple treatment groups, and multiple tests of significance.

5. Time lag bias
When the speed of publication depends on the direction and strength of the study results, this is referred to as time lag bias. Empirical evidence on time lag bias could be separated into two categories:
(1) the relationship between the study results and time to publication, and
(2) changes in reported effect size over time.

6. Time to publication
The process of research is usually complex and involves several important milestones. These include development of the research proposal, approval by a research ethics committee, obtaining research funding, recruitment of participants, completion of follow-up, submission of manuscripts to a journal, and final publication in peer-reviewed journals. Measurement of elapsed 'time to publication' could be considered to start from any of these milestones.

7. Grey literature bias
Occurs when the result reported in journal articles are systematically different from those presented in reports, working papers, dissertations or conference abstracts.

8. Full publication bias
Occurs when the full publication of studies those have been initially presented at conferences or in other informal formats are dependent on the direction and/or strength of their findings.

9. Language bias
Many prestigious international scientific journals are published in English, and journals published in English are more likely to have greater journal impact factors. However, writing for journals published in English can be more difficult for researchers who are non-native English speakers.

10. Citation bias
In published articles, references to other studies are cited for various reasons, for example, to show the importance of a research question, to borrow methods and techniques, or to give positive credit to the material referenced. The chance of a study being cited by others may be associated with many factors like the journal impact factor, nationality of authors, working partnerships, etc. Citation bias occurs when the probability that a study will be cited is associated with the study result.

Shadish et al. (1995) randomly selected one citation from each of 283 articles published in three psychological journals and asked each author about the most important reason for citing the selected references. It was found that citation was most commonly used to support the author's argument, while study quality was not considered in most cases.

11. Duplicate (multiple) publication

Duplicate, redundant, repetitive or multiple publications are defined as submission of similar manuscripts to more than one journal or the republication of the same data in two or more journals. It has been estimated that 10–25% of the published literature in biomedical sciences represents duplicate or redundant publications. The publications may overlap partially or completely, representing a similar portion or major component of a study, and may share the same hypotheses, methods, results and/or discussion.

12. Place of publication bias

In this review, this is defined as occurring when the place of publication is associated with the direction or strength of the study findings. For example, studies with positive results may be more likely to be published in widely circulated journals than studies with negative results. The term was originally used to describe the tendency for a journal to be more enthusiastic towards publishing articles about a given hypothesis than other journals, for reasons of editorial policy or readers' preference.

13. Media attention bias

Media attention bias occurs when studies with striking results are more likely to be covered by newspapers, radio and television news. The overly optimistic portrayal of the scientific findings to the public affects the public participation in policy discussions and creates unrealistic expectation of the potential benefits of a new scientific development.

Combs and Slovic (1979) found that the coverage by two newspapers in the USA about causes of death was not related to the statistical frequency of their occurrence. The newspaper over emphasized homicides, accidents and disasters, and under reported diseases as causes of death. Violent accidents and homicides make more interesting and exciting stories than diseases.

14. Conclusion

Propagation is the final part of the research and evaluation process. There is various form of Propagation: written reports; oral presentations; and representation of research in the media. In each and every form of Propagation there may probability of certain kind of biases. Propagation of research findings is likely to be a biased process, although the actual impact of such bias is still uncertain, depending on specific circumstances. Therefore, the potential problem of research Propagation bias should be taken into consideration by all who are involved in evidence based decision making.

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