

How to Write a Research Protocol

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Clinicians are inspired not infrequently with an excellent research idea. There are two alternative steps which they then take. One is to tell themselves that distinguished investigators in the past must have had the same idea. They think Index Medicus will show a list of past studies on the topic. Even the absence of literature in Index Medicus seems to them a sign that the idea was experimentally tried in vain and that there is no use repeating the project.

An alternative step which they take if they have fanatic tendencies is to believe in the originality of their idea and to be convinced that they can be a Bleuler, a Pavlov or even a Freud of the 1980s. They jump into energetic attempts to realise their idea. They may, however, find themselves in difficulties, practical or theoretical, if lucky, halfway through or if under no lucky stars, when their project has been completed. It is a pity that only when everything is over do they realise simple mistakes in their hypothesis or careless flaws in the project design.

I studied ECG changes due to neuroleptic treatment years ago.¹⁾ I completely forgot to measure blood pressure when ECG's were recorded. It was only when I was about to write a paper that I realised this simple point which was nevertheless crucial in drawing a conclusion as to the causal relationship of neuroleptic-induced hypotension with tachycardia observed in my study.

My message should not, however, be misunderstood. The aim of this essay is not to discourage researchers particularly in psychiatry who desparately wish to prove their original hypothesis; rather it is to encourage them by demonstrating that careful protocol writing is the initial and the the most important stage of any research plan and that it can considerably reduce the whole time spent on the project.

A research protocol is a detailed practical guide of the project you are about to start. It is not a mere note or a reminder of some points of the project. It should be written up in such a way that your colleague, who has heard nothing about it, could take over the project were you unable to carry it out.

For a protocol to be explicit it is recommended that it be divided into a few sections as follows.

Aim—This is a brief and concise description of the project. It may contain the purpose, the hypothesis to be proved or disproved, the sample and the methods.

Background—This is a summary of your literature survey on the topic. Index Medicus should be always consulted. A computer system of medical literature survey MEDLARS may be of great help. Then mention the reason why the present project has been planned as well as your basic hypothesis (or hypotheses). References should be as voluminous as possible so that when a paper is to be written in a very short time (as it usually is) you can easily cull only necessary ones. Also recommended is the use of personal library cards. One card should be for one article with the

authors' names (do not use et al !) the title in full (including a sub-title), the full name of the periodical (since it is easy to find its abbreviated name from its full name but not vice versa), the volume number, the starting and ending pages, and the year. You will find it helpful since different journals have different reference systems.²⁾

Sample—This section is self explanatory. A few points should, however, be made clear. Firstly, consider whether the sample subjects, be they patients or normal volunteers, whom you are going to examine, are fair and reasonable representatives of the population you want to study. One example may be enough. Not all neurotics visit medial institutes. Whether they seek psychiatric consultation depends not only, as is generally considered, on the severity of neurotic conditions, but also many other factors³⁾—the subjects' insight that they have psychological problems (Many neurotics are hypochondriacal and want to see physicians, not psychiatrists !), stigmata the society has laid on psychiatric conditions and psychiatric professions alike, availability of psychiatric care (if no psychiatrist, no psychiatric patients !), desire of the subjects to take a patient role, the nature of medical insurance system (how many people can attend a private clinic ?) and so on. Easy though it looks, the question of whether the samples chosen are randomly selected out of the population is a difficult one to answer.

Secondly, if you are studying "patients", what is the diagnostic criteria by which to select them (and to exclude "non-patients")? The reliability of diagnoses made by clinical psychiatrists has been reported to be unsatisfactorily low between many countries^{4,5)} and even within one country.⁶⁾ The recognition of this has resulted in an attempt to establish operational diagnostic criteria. At present there is a flood of criteria⁷⁾ and you may choose one you like, but the point is that you ought to choose one.

Thirdly, although "controlled study" is such a fascinating word that many investigators plan to have matched control subjects, usually normal volunteers, it should be remembered that looking for "matched" "normal" "volunteers" and asking them to participate in the project is an awful job. Are they matched for age, sex, race, social class, marital condition, education or anything else? If all variables are to be matched, it is hardly possible to find matched controls. Are they normal? Have they been non-psychiatric in their life time? And how many of them can you expect to volunteer to participate in the research plan?

Finally, consider ethical aspects⁸⁾ of the plan. In many countries ethical committees⁹⁾ have been established. Some journals will not accept a paper if an informed consent is not included. Informed consents, more desirably written ones, should be given by subjects who have been explained the nature and the purpose of the project prior to its start.

Methods—This section should be detailed in practical terms. Charts and tables¹⁰⁾ may be utilized. Remember that there will be delay in any part of any project. Patients may not attend the clinic on the day of appointment. Cooperative volunteers may suddenly change their mind. Your equipment may get out of order. Blood samples may be clotted. So decide what should be done when(not if !) there is delay in the research progress.

Statistical analyses—It is imperative to consider the most appropriate statistical test(s) in this stage prior to the start of the job.^{11,12)} If necessary, revise the protocol. The size of the project i.e. the number of samples, the number of interviews and the number of variables studied can also be determined by the nature and capacity of the test you plan to apply. The whole statistical

analyses usually take longer than expected. Many tests are, though simple to apply, extremely time consuming. It may be a good idea to try to make use of computer facilities in this stage. Non-parametric tests^{13,14} are often recommended at psychological studies and there is a good computer package¹⁵ for them.

Co-operators—If asked what is the most important point in research work, I would not hesitate to say “Good colleagues”. List up the names of those who are willing to co-operate. Decide who will be the co-authors of the paper(s) and who will be just acknowledged (and tell them so!). Otherwise friendship with them will be broken through political rather than academic arguments.

Consultation with experienced, reliable and helpful senior or junior colleagues is of great help. Do not, however, rely on the titles, posts or qualifications of the consultants, who have from time to time no interest in giving productive comments. Rely on those, senior or junior, medical or non-medical, who are interested in refining the design of your project, and who know what scientific research is.

Financial plan—Each financing body has its own favourite research topic. Study it carefully and apply for the most suitable one.

Time table—It is reasonable to spend 1/3 of the whole research period (i.e. from the initial inspiration of the plan to the publication of the paper) for preparation, another 1/3 for the actual job and the last 1/3 for data analyses and paper writing. *And then double the time you think is sufficient for the whole project.* As previously mentioned, there is no way to shorten research period whereas there are a great many potential hazards anywhere in the project. If you have to tell a financing body how long the whole project will take, tell them the doubled period, not the one you think is enough. Delay in reporting to the financing body will be disadvantageous when you apply subsequent funding.

Many investigators produce quite a few papers from a single study. This is an excellent idea not only because of the efficiency in paper production but also because a single lengthy paper which reports every detailed aspect of the study is simply boring to readers and editors¹⁶ alike. Consider also how many papers you can write so that your colleagues and yourself can share the first authorship.

A few more words about a protocol. Firstly, as can be seen from the above mentioned, the sections of “introduction”, “sample”, “methods”, “appendix”, “references” and “acknowledgement” of papers are just a summary of the protocol.

Secondly, it can not be said often enough that a protocol is a practical guide to the job not a mere note or essay. Therefore a rating scale, a questionnaire or any other assessment techniques should not be designed in the project unless they are actually available. Well known questionnaires may be out of print. Although a rating scale is “available by request for the author”, it may be impossible to know his present whereabouts, so do not construct the project until you have the materials and instruments in your hands.

Thirdly, sufficient time must be given for revision and elaboration of the protocol. This is the key to successful research.

Fourthly, your hypothesis should be as clear as possible.³ This is the core of the investigation. Even epidemiological surveys need their own hypothesis. A hypothesis should not be an open-ended question like “What is the aetiology of schizophrenia?” One can neither prove nor disprove it.

A hypothesis should be, however, a Yes - No type question like "When one is schizophrenic, is it more likely as compared with the general population that his/her mother is schizophrenic?" This question is acceptable as a hypothesis because this can be either proved or disproved. A more vague idea like "Is schizophrenia an inheritant disease?" can not be accepted as a hypothesis since there will be no single way to prove/disprove it.

Remember, the best way to prove something is to make it clear that there is no way to disprove it.

Finally, though consultation with your supervisors and colleagues is extremely helpful, I would like to insist that you must believe in the originality of your plan. And more often than not your originality may be difficult for outsiders to understand. Be aware that, after all, it is you yourself who is about to advance into noman's land.

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研究計画書の書き方

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詳細な計画書を準備することが、研究を成功へ導びく鍵である。そのためには研究計画書は単なる覚え書きではなく、実際的にかつ詳細なものでなければならない。

研究計画書は以下の 8 部門にわけて記述することが望まれる。

1) 目的：研究の目的、証明すべき仮説、実験の全体像を示す。

2) 背景：研究に先立って行われる文献調査の要約と仮説を導びいた理由を述べる。

3) 対象：対象群の選択方法を述べる。選択された対象群が研究の中心となるべき母集団を正しく代表しているかどうか注意を払わなければならない。患者が対象になる場合には、いわゆる診断基準の運用がすすめられる。さらに研究に際しての倫理的側面からは、対象者に実験内容を説明した上で同意書をとるこ

とが重要である。

4) 方法：可及的に実際に適したものでなければならない。

5) 統計処理：計画書の段階で統計処理の方法について考慮し、必要ならばコンピューターを利用することも計画すべきである。変数が多い研究では計算に長時間を要する。

6) 共同研究者：共同研究者を列記し、各人の仕事を明確にする。

7) 経済的計画

8) 日程表：研究はおくれることはあっても早く済んでしまうことはありえない。常に研究の進展に遅れがあることを想定して日程表を作製しなければならない。

以上の各項目につき実際におこりうる問題において具体的に述べた。