

# Framing and Testing Hypotheses: Defining, Methodology, Undertaking Data Collection, Analysing Results

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15 April 2008

## PhD Research

- Candidature is tied to strict funding arrangements.
- You must satisfy certain standards and meet deadlines exercising.
- A PhD requires similar management to professional research. You must consistent discipline in research design and conduct.

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## Purpose of Seminar

- The intended benefit of this seminar is NOT to issue rules or instructions on 'how research must be done'.
- The discussion is largely 'ideal' and research practice is not ideal.
- The purpose is to give you intellectual tools to help you design, manage and conduct your PhD research with further confidence.

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## *Plan*

- 1) Discussion of concepts
- 2) Arriving at a Research Topic/Question/Objective/Hypothesis
- 3) Further Relevant Aspects of Social Research

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## Discussion of concepts

### ***Research objective***

- A research objective is a mission statement identifying main foci of study and general research boundaries e.g
  - **Identify significant consequences of anti-terrorism policy on Malaysian students at Monash University, Caulfield.**

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## Hypotheses

- A simple and general hypothesis is a statement of causal relationship between two 'things'
- **A causes B**

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## Hypotheses

- For sociologists, a simple hypothesis states a causal relationship between two 'social things' or social variables e.g. gender, ethnicity
- Examples of simple and general hypotheses in sociology are:
  - **As the school drop out rate increases, the rate of youth crime increases**
  - **As youth sports participation increases; the rate of youth crime decreases.**
  - **As Enrolments decrease in Catholic Schools; Catholic Congregations also decrease**

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## Hypotheses

- Hypotheses can include more than two variables.
- Hypotheses can refer to special causal relationships
  - specific levels of correlation
  - causal relationships only under certain conditions
  - no causal relationship.
- It's possible to have systems of hypothesis.

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## ***Inductive Approach - Hypothesis Development***

## ***Hypothetico-Deductive Approach - Hypothesis Testing***

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## ***Inductive Approach - Hypothesis Development***

- Induction is about creation of hypotheses through experience. In practice the researcher makes deliberate acquaintance with a 'site' of social events or phenomena; and with reference to this experience, develops, or inducts, general impressions which they state as a hypothesis or a set of hypotheses.

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## ***Inductive Approach - Hypothesis Development***

- The inductive approach is also associated with the concept of 'exploratory' research, where so little is known about the research site that an informed hypothesis cannot be postulated.

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### ***Inductive Approach - Hypothesis Development***

- Classical ethnographic research has many example of inductive research
  - Associating with a street gang
  - Living with an Indigenous community
- Observations are made, documented and analysed and hypotheses postulated

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### ***Inductive Approach - Hypothesis Development***

The inductive approach in sociology might be outlined as:

- 1. Gain social experience of the site through informal interaction, data gathering, second hand reports etc.
- 2. Develop impressions of the site's social reality. Be aware of your assumptions and biases and continually refine impressions.

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### ***Inductive Approach - Hypothesis Development***

- 3. Analyse impressions in an attempt to substantially understand the studied social reality. Be prepared to return to the site when necessary to reconsider your impressions.
- 4. Write up, stating a hypothesis. (See Kellehear 1993; de Vaus 2002)

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- Essentially this approach – or aspect of research - involves 'testing' hypotheses. The approach is deductive because it involves 'deducing or predicting that certain things will follow or be observable if the theory is true' (de Vaus 2002).
- Hypothetico-deductive research might also be called as 'explanatory research' because it attempts to 'explain', subject to testing.

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- **Basic Stages of the Hypothetico-Deductive approach**
  - 1 State the hypothesis in a form where measurement of variables is possible (operationalisation).
  - 2. Collect relevant data using credible techniques.
  - 3. Analyse data; with respect to hypothesis
  - 4. Write up results (de Vaus 2002)

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- 1. Hypothesis: Victims of Child Abuse are more likely to Commit Child Abuse**
- 2. Collect data on a sample of case histories of child abusers. (Use a rigorous sampling technique)**

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- 3) Investigate whether most were abused as children. (Use rigorous definitions of child abuse; allocate cases with discipline; use statistical methods to calculate the probability same results will occur in further sampling)
- 4) If 'Yes': Accept hypothesis; if 'No': Reject hypothesis

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- Strictly, testing a hypothesis is not about attempting to arrive at 'proofs'.
- Efforts to 'prove' a hypothesis tend to give the proof the best possible chance of success.
- A more robust testing approach is to attempt to disprove the hypothesis. If the hypothesis cannot be disproved, it is accepted for the time being.

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### ***Hypothetico-Deductive Approach - Hypothesis Testing***

- Researchers using the hypothetico-deductive approach are inflexible to the social reality they encounter in the field.
- Their task is to test rather than develop hypotheses and they maintain the same hypotheses throughout.
- This can be seen as an imposing approach that disempowers participants who have no opportunity to comment on biases or misconceptions of hypotheses.

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### ***Relationship: Inductive and Hypothetico-Deductive Approaches***

- Ideally, the Inductive and Hypothetico-Deductive approaches are dialectic.
  - Induction produces impressions of 'reality' that are refined into hypotheses.
  - Hypothetico-Deductive research tests the hypotheses and broadens knowledge of the world.

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### ***Relationship: Inductive and Hypothetico-Deductive Approaches***

- Then Newly informed induction occurs that develops a second generation of hypotheses, which are tested - and the process continues.
- In practice, researchers may follow this circular path but may also go forward and backward e.g. conducting further inductive research when attempts to apply a hypothesis do not work

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### ***Relationship: Inductive and Hypothetico-Deductive Approaches***

- Or may apply either approach as necessary e.g. doing some theory testing while in the induction stage to clarify impressions.

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### ***Post-Enlightenment Considerations***

- For centuries, the hypothetico-deductive approach was believed to be reliable in explaining 'objective reality'.
- Researchers were thought to be able to conduct hypothesis tests with complete lack of influence over the results – and they were expected to do so, avoiding any actions that might introduce their values and biases to the testing procedure.

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### ***Post-Enlightenment Considerations***

- These days, complete objectivity is not considered possible.
- Researcher subjectivity and 'researcher standpoints' are recognised as unavoidably influential on research design and interpretation of results. In inductive research, a researcher is less likely to notice things unimportant to their values. For many decades social researchers did not see women or homosexuals.

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### ***Post-Enlightenment Considerations***

- Even when researchers recognised these groups, they usually assumed their judgement was superior in deciding which data was relevant, disempowering participants, who were then called 'subjects'.

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### ***Post Enlightenment Considerations***

- Researcher values will affect interpretations of hypothesis testing. It might be demonstrated that a one million dollar increase in resources for family support lowers reported child abuse by 1%. For some researchers this is a significant causal relationship, for others it is insignificant.

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### ***Post Enlightenment Considerations***

- The first chapter of your dissertation should carry a description of your background, values and any personal involvement you have had in the thesis research area. You should also empower participants, by acknowledging their values and beliefs in your research conduct and writing.

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### **Qualitative and Quantitative Research**

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## Quantitative Research

- Broadly, quantitative renders analysis of social phenomena using numbers and or statistics. It is applied to research questions where numbers and percentages are immediately and sufficiently meaningful e.g.
  - How common is homelessness in Queensland and Western Australia?
  - In which Australian capital city are Turkish migrants most common?
  - Which age groups are most likely to take skin cancer risks?

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## Quantitative Research

- Quantitative research is has been associated with the hypothetico-deduction approach, as numerical/statistical analysis was seen as an unambiguous and objective way of testing hypotheses.

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## Quantitative Research

- Quantitative research is often applied to large populations. Individuals or sub-groups are placed in standard classifications to produce manageable units for analysis.
- This offends some researchers who believe that small disadvantaged groups become obscured in large data sets.

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## Qualitative Research

- Qualitative research looks at the experiential or existential aspects of social reality.
- Examples of questions that might be confronted in qualitative research are: 'What is the social reality of homelessness'? 'How are war veterans viewed by the rest of the public'?

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## Qualitative Research

- Qualitative research mostly uses 'qualitative data' that is data that is non-numeric and usually textual, like interviews or observations.
- For most qualitative research topics, numbers and statistical results are likely to be inadequate descriptors.

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## Qualitative Research

- While numbers can give some useful information on what it is like to be homeless, descriptions of the actual experience from homeless people are likely to be much richer, contain subtlety and document the experience more vividly.
- Also when the data is textual, participants can use their own voices, and be empowered to render data they consider important.

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## Qualitative Research

- Historically, qualitative research has been associated with the inductive approach. Qualitative research:
  - deals with impressions
  - is often exploratory
  - is flexible in research design and data collection.
  - incorporates researchers' and participants' subjectivity in observations and interpretations of narratives.

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## Qualitative Research

- In sociology, qualitative research is usually applied to comparatively small sample populations, or 'micro-social' environments e.g. work teams, street gangs.
- Qualitative data is often voluminous and qualitative analysis highly labour intensive and time consuming. Hence, qualitative analysis of large populations or samples is impractical.

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## Qualitative Research

- Attempts to summate qualitative data are likely to sacrifice important subtleties in the data. A single qualitative case study of a returned soldier is likely to contain a richness of insights on the experience, but in trying to make the case comparable to thousands of others, it would need to be simplified.
- Much qualitative research doesn't set out to answer questions about macro-social issues, anyway. Usually qualitative researchers set out to either support hypothesis development or document significant aspects of social experience.

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## Qualitative Research versus Quantitative Research

- This issue is of common concern for many PhD students. Qualitative research and quantitative research are NOT POLAR OPPOSITES.
- Neither should be assumed as inappropriate for any kind of analysis.

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## Qualitative Research versus Quantitative Research

- The distinction between qualitative and quantitative research is not always clear in practice.
  - Quantitative research incorporates subjectivity in the choice of data and choice of statistical techniques.
  - Qualitative research often uses quantitative analysis methods (Handwerker 2001).

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## Qualitative Research versus Quantitative Research

- Qualitative research can also be appropriate in complementing findings of quantitative projects including those of large samples.
- While all researchers may have preferences, they limit the scope of their inquiries when they rule one form out. Be prepared to use either method.

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## **2. Arriving at a Research Topic/Question/Objective/Hypothesis**

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## **Arriving at a Research Topic/Question/Objective/Hypothesis**

- This is the stage at which you focus your thinking and set up your general task for the rest of your candidature.
- Until you have settled on a research topic and refined it to a research objective or a hypothesis, it will not be possible to go further.

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## **Identify a 'Topic' or 'Area'**

- The initial stage of doing a PhD is the selection of a general research topic. A topic may come from:
  - personal curiosity
  - political concern
  - personal experience etc.

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## **Identify a 'Topic' or 'Area'**

- At this stage, there is only a general topic e.g. Australian anti-terrorism policy; Australian males' culture of health; Islam in regional Australia.
- It is important to consider your personal motivations and any personal associations with the topic. This usually takes some introspective writing which may be part of your first chapter.

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## **Find 'Gaps' in the State of Knowledge.**

- To successfully complete your PhD, you must contribute to the 'state of knowledge'.
- Therefore, it is necessary to consult the literature and identify gaps in the state of knowledge i.e. conduct a literature review.
- You might also talk to experts, other researchers, or users of research.
- You could also plan and conduct some exploratory research – formally or informally.

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## **Find 'Gaps' in the State of Knowledge.**

- On anti-terrorism policy, you may find a need for research on the consequences of Australia's anti-terrorism policy for Malaysian students.
- The literature on male health culture may require research on work stress.
- Literature on Islam may have a gap on the religious lives of Indigenous Muslims in regional Western Australia.
- At this stage you have a research topic with some, but probably inadequate focus

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### ***Focusing with a Research Objective***

- Research objectives usually allow the researcher freedom to be flexible in practical approach and definitions,
- Research Objectives are associated with inductive, qualitative approaches.

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### ***Focusing with a Research Objective***

- To be useful in 'guiding' an extended project like a PhD, a research objective must have specificity in its definition of social variables, situations and goals.
- 'To research the Australian male culture of health with regard to work stress' has limited use.
- It brings little focus to a very broad topic and identifies no point at which the objective will be satisfactorily achieved.

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### ***Focusing with a Research Objective***

- To be useful, research objectives need to be focused with respect to social dimensions, populations, geographical places, or other pertinent aspects. A more useful version of the above objective would be:
  - To identify significant aspects of the male culture of health, relevant to work stress among male police at East St Kilda Police station'.

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### ***Focusing with a Hypothesis***

- You may create a hypothesis of your own
- You may borrow a hypothesis that has already been tested and:
  - modify it
  - test it under different conditions
  - test it under the same conditions to see if the original results are repeated.

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### ***Focusing with a Hypothesis***

- Initially hypotheses are presented in only conceptual terms. For example:
  - **Education affects the amount of Crime**
  - **Religious Schooling affects the Strength of Religious Organisations**
- What is meant by 'Education', 'Crime', 'Religious Schooling', and the 'Strength of Religious Organisations'?
- How will you measure these variables?

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### ***Focusing with a Hypothesis***

- **To be useful, a hypothesis must express the social variables in definite, and ultimately measurable terms. It must also specify a direction of a casual relationship e.g.**
  - **Decreases in levels of School Education cause Increases in Armed Hold-ups**
  - **Decreases in Religious School Enrolments cause decreases in Religious Affiliations**

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### **Focusing with a Hypothesis**

- The variables must be 'specific': Rather than 'Education', use 'Completed Schooling'. Rather than 'Crime' use 'Armed Hold-ups', 'Assaults', 'Burglaries', 'Gang Related Incidents'.
- Also 'variables' must have detectable or measurable changes. School Education can be measured according to the average number of years of schooling held by a population. Armed Hold-ups can be measured according to the number occurring in a given period.
- Data for these variables can be collected for different points in time and compared thereby testing whether school education

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### **Focusing with a Hypothesis**

- There are further issues of hypothesis refinement, such as how you define variables. For example,
  - Increases in Poverty cause Increases in Armed Hold-Ups
- What qualifies as a 'Hold Up? Does it include menacing demands by email? Does it include demands made with convenient weapons like sticks and stones.

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### **Focusing with a Hypothesis**

- Having defined 'Hold Ups', what is the most valid way to count them: 'Reported Hold-Ups only'; or 'Reported and Unreported Hold-Ups'.
- These issues must be considered before the hypothesis is accepted as ready to use. See Bouma and Ling (2005), De Vaus (2002) and Kidder et al (1991) for further discussion on refining hypotheses.

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### **3. Further Aspects of social research**

- Research Design Models (Case Study, Comparative Longitudinal, Experimental etc.)
- Research Ethics
- Sampling (Random, Non-Random etc)
- Data Collection (Questionnaire Design, Interviewing, Observation, Data Storage)
- Data Analysis and Interpretation
- Thesis writing

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