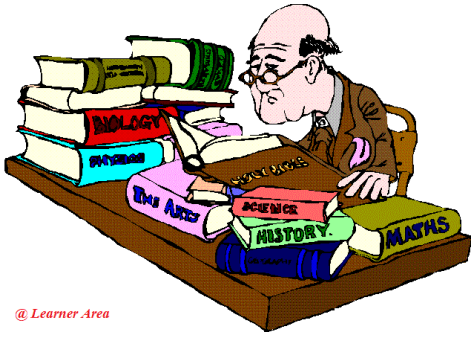
Wolters Kluwer
When you have to be right

Chapter 6
Research Problems, Research Questions, and Hypotheses

1

- The purpose of research is to "solve" the problem—or to "contribute to its solution"—by gathering relevant data.



2

Basic Terminology

- **Research problem**
  - An enigmatic, perplexing, or troubling condition
- **Problem statement**
  - A statement articulating the research problem and making an **argument** to conduct a new study
  - explains the need for a study.
- **Statement of purpose**
  - Summary of an overall goal
  - Also referred as aim or objective

3

Basic Terminology—(cont.)

- **Research questions**
  - The specific queries the researcher wants to answer in addressing the research problem
  - *Where do ideas for research problems come from?* At the most basic level, research topics originate with researchers' interests.
- **Hypotheses**
  - The researcher's predictions about relationships among variables

4

Terms Relating to Research Problems With Examples

TABLE 6.1 Terms Relating to Research Problems With Examples

Term	Example
Topic	Side effects of chemotherapy
Research problem (problem statement)	Nausea and vomiting are common side effects among patients on chemotherapy, and interventions to date have been only moderately successful in reducing these effects. New interventions that can reduce or prevent these side effects need to be identified.
Statement of purpose	The purpose of the study is to compare the effectiveness of patient-controlled versus nurse-administered antiemetic therapy for controlling nausea and vomiting in patients on chemotherapy.
Research question	What is the relative effectiveness of patient-controlled antiemetic therapy versus nurse-controlled antiemetic therapy with regard to (1) medication consumption and (2) control of nausea and vomiting in patients on chemotherapy?
Hypotheses	Subjects receiving antiemetic therapy by a patient-controlled pump will (1) be less nauseous, (2) vomit less, and (3) consume less medication than subjects receiving nurse-administered therapy.

5

Question

Tell whether the following statement is True or False.

The statement of **purpose** makes an argument to conduct a new study.

a. True

b. False

6

Answer

b. False

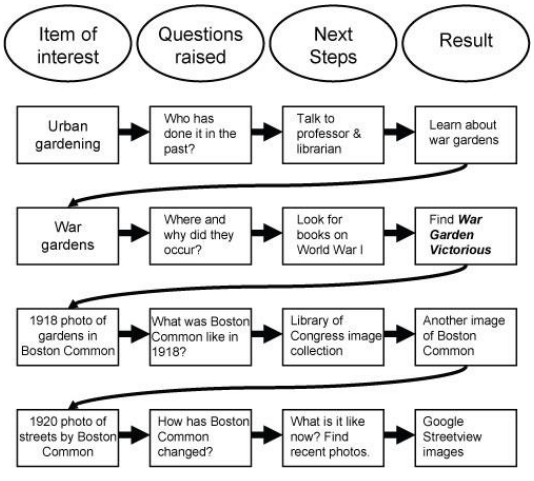
Rationale: The **problem statement** articulates the research problem and makes an argument to conduct a new study.

The **statement of purpose** is a summary of an **overall goal**. (What is the purpose, the goal of this study?)

7

What can be Sources of Research Problems?

- Clinical experience
- Nursing literature
- Social issues
- Theory
- Suggestions from external sources (e.g., priority statements of national organizations or funders)



8

Question:

- Which is not a source for the development of a research problem?

1. Nursing literature
2. Theories
3. Codes of ethics
4. Clinical experience

9

Research Problems and Paradigms

- **Quantitative studies**: usually involve concepts that are well developed and for which methods of measurement have been (or can be) developed
- **Qualitative studies**: are undertaken because a researcher wants to develop a rich, context-bound understanding of a poorly understood phenomenon

Examples of good research problems (in the form of questions)

- Does client-centered therapy produce more satisfaction in clients than traditional therapy? (experimental design)
- Does behavior modification reduce aggression in autistic children? (single-subject experimental design)
- Are the descriptions of people in social studies discussions biased? (grounded theory design)
- What goes on in an elementary school classroom during an average week? (ethnographic design)
- Do teachers behave differently toward students of different genders? (causal-comparative design)
- How do parents feel about the school counseling program? (survey design)
- How can a principal improve faculty morale? (interview design)

10

Research Problems and Questions

Needs to be:

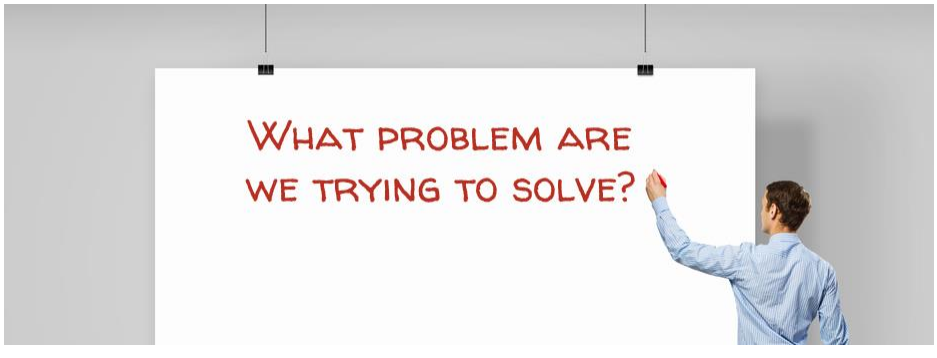
- Broad enough to include central concerns
- Narrow enough to serve as a guide to study design

Problem Statement in Interrogative Form

Research focus	Problem statement
Factors that influence adaptation of preadolescents and adolescents with diabetes	What are the influences of age, coping behaviour and self care on psychological, social and physiological adaptation in preadolescents and adolescents with insulin dependent diabetes mellitus (Grey Cameron and Thurber 1992)
Effect of group therapy on cognitive functioning and depression in elderly nursing home residents	What is the effect of group therapy on cognitive functioning and depression in elderly nursing home residents (Abraham Neundorfer, Currie, 1992)
Spiritual health, coping responses, and devastating physical illness	What role does spiritual health play in the coping responses of patients to devastating physical illness (Mickley, Socken and belcher 1992

11

- Every study needs a problem statement that articulates what is problematic and what must be solved.



12

Components of a Problem Statement

- **Identification of the problem** (What is wrong with the current situation?)
- **Background** (What is the nature or context of the problem?)
- **Scope** (How big is the problem, and how many people are affected?)
- **Consequences** (What are the consequences of not fixing the problem)?
- **Knowledge gaps** (What information about the problem is lacking?)
- **Proposed solution** (How will the study contribute to the problem's solution?)

Example:

Chronic pain is a major health problem in the US, with greater than 116 million Americans affected (Institute of Medicine, IOM, 2011). More than 70 million annual visits to healthcare providers for pain have been reported at a cost of more than $635 billion per year in medical treatment and lost work productivity (IOM, 2011). Patients with chronic pain and their families suffer from intangible costs related to pain, such as decreased quality of life (QOL) and interpersonal stress (Savvakis & Kolokouras, 2019).

……

This study was designed to……

13

Statement of Purpose: (in Quantitative Studies)

- Identifies key study variables
- Identifies possible relationships among variables
- Indicates the population of interest
- Suggests, through use of verbs, the nature of the inquiry (e.g., to test . . ., to compare . . ., to evaluate . . .)

- *Example:* "This study was designed to describe and compare the levels of chronic pain, specifically pain severity and pain interference, pain catastrophizing, and the associated factors in elderly Koreans living in Korea and Korean Americans (KAs) living in the US."

14

How can you tell a problem statement?

- Problem statements are rarely explicitly labeled.
- the first sentence of a research report is often the starting point of a problem statement. The problem statement is usually interwoven with findings from the research literature.
- Prior findings provide evidence supporting assertions in the problem statement and suggest gaps in knowledge.
- In many articles, it is difficult to disentangle the problem statement from the literature review, unless there is a subsection specifically labeled "Literature Review" or something similar.

15

Examples of a PROBLEM STATEMENT:

Each year, more than 1 million people are diagnosed with cancer, which remains one of the top causes of death among both men and women. Numerous studies have documented that a diagnosis of cancer is associated with high levels of stress. …… These stressful outcomes can, in turn, adversely affect health, long-term prognosis, and medical costs among cancer survivors.

A variety of alternative/complementary therapies have been developed in an effort to decrease the harmful effects of cancer-related stress on psychological and physiological functioning, and resources devoted to these therapies have increased in recent years. However, many of these therapies have not been carefully evaluated to assess their efficacy, safety, or cost-effectiveness. For example, the use of humor has been recommended …….

16

Statement of Purpose (in Qualitative Studies)

- Identifies the central phenomenon
- Suggests the research tradition (if QL => ex: grounded theory, ethnography)
- Indicates the group, community, or setting of interest
  - In QN study=> PIO
- Suggests, through use of verbs, the nature of the inquiry (e.g., to describe . . ., to discover . . ., to explore . . .)

17

Example of a statement of purpose from a QN study:

- The purpose of this study was to examine the effects of an education-support intervention delivered in home settings to people with chronic heart failure, in terms of their functional status, self-efficacy, quality of life, and self-care ability (Clark et al., 2015).

Example of a statement of purpose from a QL study:

- The purpose of this study was to explore the influence of religiosity and spirituality on rural parents' decision to vaccinate their 9- to 13-year-old children against human papillomavirus (HPV) (Thomas et al., 2015).

18

Question

The statement of purpose for a qualitative study would include:

a. Identification of the key study variables
b. Suggestions for the research tradition
c. Indication of the population of interest
d. Identification of the relationship among variables

19

Answer

b. Suggestions for the research tradition

Rationale: The statement of purpose for a qualitative study would include a suggestion for the research tradition.

Identification of key study variables, indications for the population of interest, and identification of the possible relationships among the variables are included in the statement of purpose for a quantitative study.

20

Research Questions:

- Are sometimes direct rewordings of statements of purpose, worded as questions
- Are sometimes used to clarify or lend specificity to the purpose statement
- In quantitative studies, typically pose queries about the relationships among variables (not all QN studies → Some are descriptive, correlational, etc.)

Example:

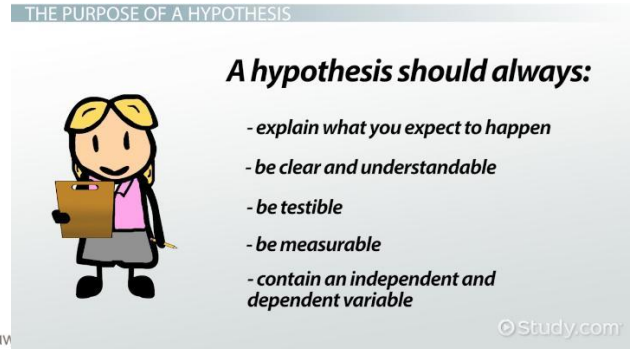
- *Purpose: The purpose of this study is to assess the relationship between the functional dependence level of renal transplant recipients and their rate of recovery.*
- *Question: Is the functional dependence level (I) of renal transplant recipients (P) related to their rate of recovery (O)?*

Research Questions—(cont.)

- In qualitative (QL) studies, research questions often pose queries linked to the research tradition:
  - Grounded theory: **process** questions
  - Phenomenology: **meaning** questions
  - Ethnography: **cultural description** questions

Research Hypotheses:

- States an expectation, a predicted answer to the research question
- Should almost always involve two or more variables
- Suggests the predicted relationship between the independent variable and the dependent variable



23

Research Hypotheses—(cont.)

- A hypothesis:
  - Must contain terms that indicate a relationship (e.g., more than, different from, associated with)
  - Is articulated almost exclusively in quantitative (not qualitative) studies
  - Is tested through statistical procedures

24

Question

Tell whether the following statement is True or False.

A hypothesis most commonly involves one variable.

a. True

b. False

25

Answer

b. False

Rationale: A hypothesis should always involve at least two variables and possibly more.

26

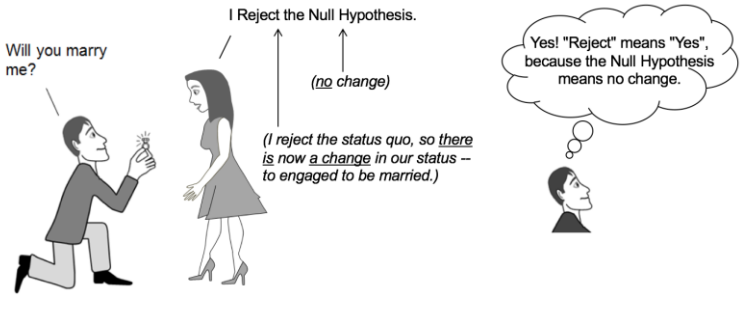
Directional Versus Nondirectional Hypotheses

- **Directional hypothesis**
  - Specifies the expected direction of the relationship between variables
- **Nondirectional hypothesis**
  - Predicts the existence of a relationship, not its direction

27

Research Versus Null Hypotheses

- **Research hypothesis**
  - States the actual prediction of a relationship
- **Null hypothesis**
  - Expresses the absence of a relationship (used only in statistical testing)

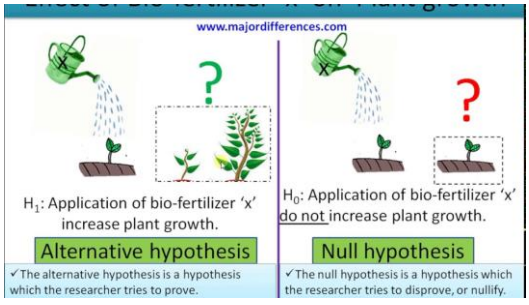


Reproduced by permission of John Wiley & Sons, Inc.
From the book *Statistics from A to Z – Confusing Concepts Clarified.*

28

Hypotheses and Proof

- Hypotheses are never **proved** or **disproved**.
  - Statistical hypothesis testing cannot provide absolute proof—only probabilistic information to support an inference that a hypothesis is **probably correct** (or not).
- Hypotheses are **supported**, or **rejected**, by the study data.

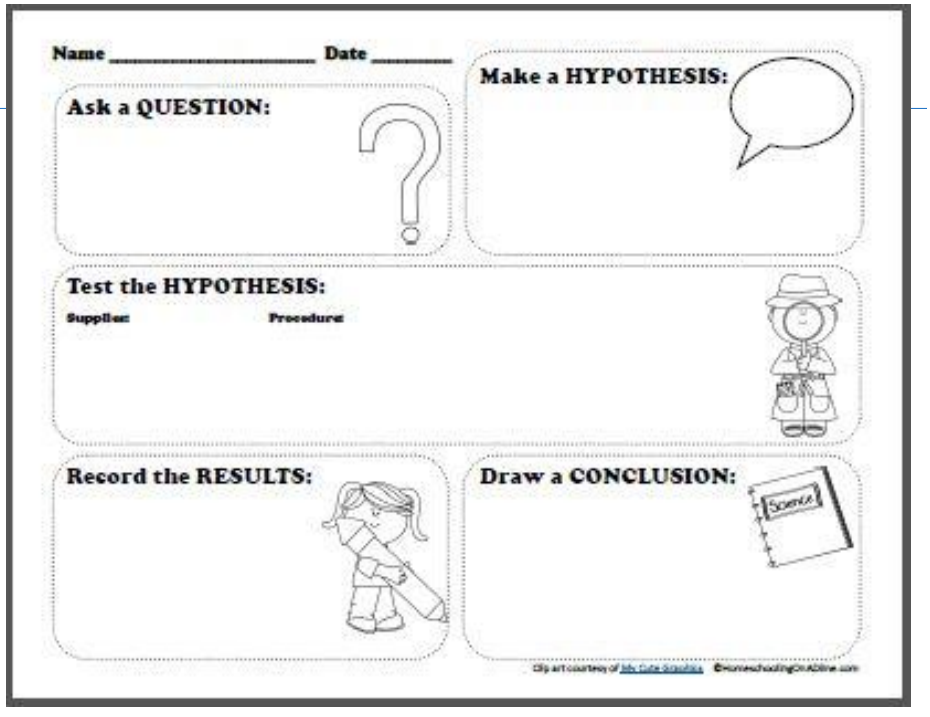


29

Critiquing Research Problems, Questions, and Hypotheses

- Evaluate whether researchers have adequately communicated their research problem.
- Consider whether the problem has significance for nursing and evidence-based practice.
- Determine whether the research problem is compatible with the chosen research paradigm and its associated methods.
- Evaluate whether the statement of purpose or research questions lend themselves to research inquiry.

30



31

Which statement is true?

1. A research hypothesis is always stated directionally
2. A null hypothesis can sometimes be proved
3. A null hypothesis is used in statistical hypothesis testing but is rarely stated in research reports
4. A research hypothesis predicts no relationship between two variables

32