Research Skills: How to develop a research question

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What makes a good research project?
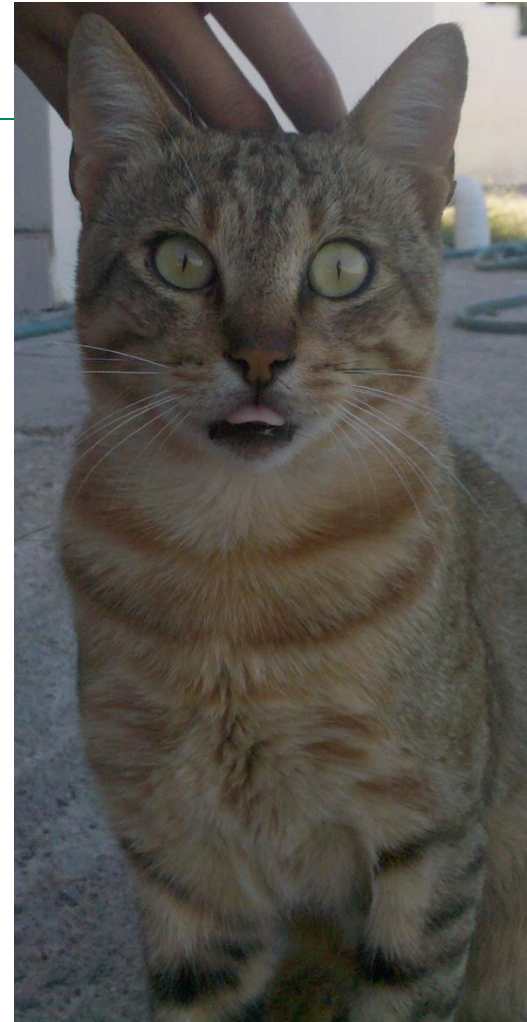
- Share your answer with the person sitting next to you

What makes a good research project?

- Share out what you heard from your neighbor and comment

- E.g. Eva's idea was … , I agree because, I disagree because

What is a research question?

- Why did the cat cross the road?

- How many cats crossed Marchioninistrasse on May 26, 2015?

- What are the environmental factors that occurred in May 2015 that would cause cats to cross Marchioninistrasse?

- Is there an association between the establishment of a construction site at Marchioninistrasse and the increase of cat mortality in that area?

Finding a research question: Don't

Data ➡️ Question

Finding a research question: Do

??*

method

analysis

→ Question ⟹ Data ⟹ Answer

Finding a research question: Do

??*

method → analysis →

Question ➡ **Data** ➡ **Answer**
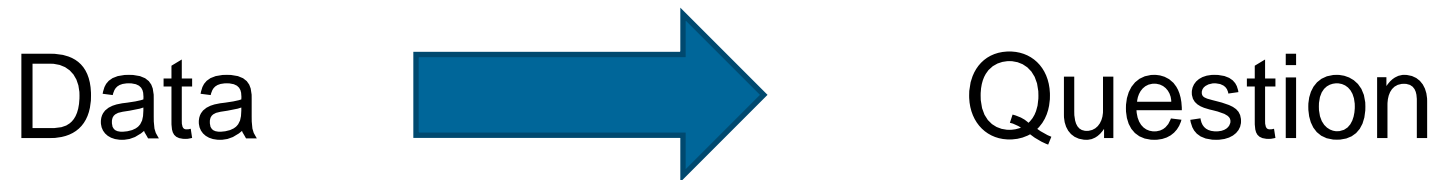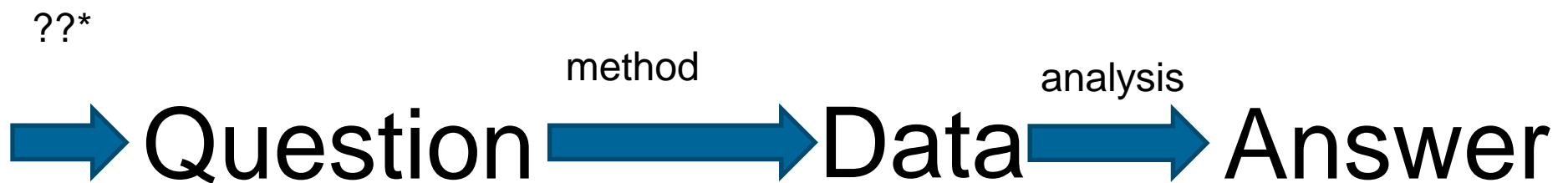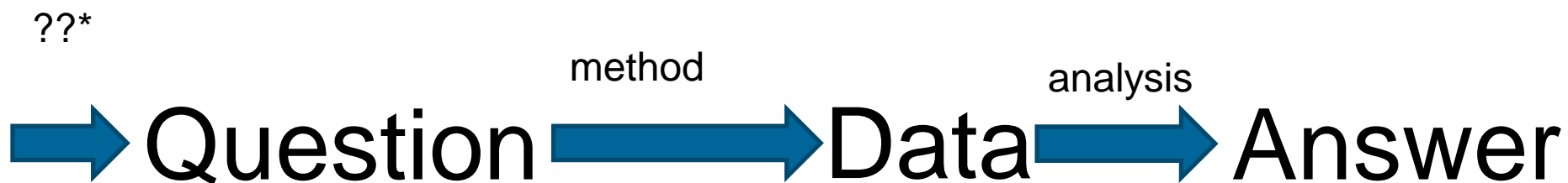
*Personal interest and experience
*Literature and theory

Finding a topic of research

- Do I know the field and its literature well?

- What are the important research questions in my field? What areas need further exploration?

- Could my study fill a gap? Has a great deal of research already been conducted in this topic area?

- Has this study been done before? If so, is there room for improvement?

- Is the timing right for this question to be answered? Is it a hot topic, or is it becoming obsolete?

- Would funding sources be interested?

- Will my study have a (significant) impact on the field?

Impact

- Is it important? (to whom?)
  - Burden of illness
  - The research community
  - Costs of research vs. Benefits
  - Research fashion

The process from interest to research question

- Find a topic that is specific enough

- Ask questions about this until you find one that interests you

- What kind of evidence do you need to answer this question?

- Which sources do you need for this data?

- Try mind mapping …

Hypotheses - objectives

- Specific predictions about the relationship between two variables

The latent prevalence pool of prostate cancer is underestimated in studies modelling effectiveness of screening …

"Our objective was to investigate how predicted harms and benefits of prostate cancer screening are affected by the size of the latent prevalence pool" Mühlberger Med Decis Mak 2015

Do you want to accomplish one of these goals …

- Define or measure a specific fact or gather facts about a specific phenomenon.

- Match facts and theory.

- Evaluate and compare two theories, models, or hypotheses.

- Prove that a certain method is more effective than other methods

What is PICO?

P = Population

I = Intervention

C = Comparison

O = Outcome

P I C O

Sackett, 1997, Evidence-based medicine; how to practice & Teach It, (p. 27.)
http://www.mclibrary.duke.edu/subject/ebm?tab=questiontable

P I C O

P = Identify

- Population w/ (health) condition of interest
- Participants
- Principal person or thing
- Problem
- Predicament

Straus, 2010, Evidence-based medicine; how to practice and teach it, (p. 15 - 18)
Melnyk, 2011, Evidence-based practice in nursing & healthcare: A guide to best practice, (p. 31)

P **I** C O

I = Identify
Intervention, therapy, treatment, tests

OR
- Issue of interest
  - Diagnoses - select, interpret
  - Risk, prevention – screen, reduce
  - Etiology – cause, risk factors
  - Exposure
  - Prognosis

P I **C** O

C = Identify
Comparison

- Another intervention

- True control placebo

- Standard operation

- Standard of care

P I C O

O = Identify
Outcome

- Measurement of comparisons

Formulating a PICO question: Begin by asking two kinds of questions

Background Question

Asks about general topical elements:

1. who, what, where, when, why, how and a verb.

1. lays foundation for PICO.

Foreground Question

Asks about research elements:

1. what is population, intervention, comparison, outcome
2. formulates research question and search strategy

Straus, 2010, Evidence based medicine; how to practice and teach it, (p. 15)

PICO Question | Healthcare

Background | 5 Ws
What can prevent falls in elderly?

Foreground | PICO
In *elderly at risk of falls* (P), how does *tai chi* (I) compared to *risk assessment* (C) affect *fall prevention/reduction* (O)?

PICO Question | Healthcare

Foreground
In *elderly at risk of falls* (P), how does *tai chi* (I) compared to *risk assessment* (C) affect *fall prevention/reduction* (O)?

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☐ **Comparison of telecommunication, community, and home-based Tai Chi exercise programs on compliance and effectiveness in elders at risk for**
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Age (Dordr). 2009 Jun;31(2):163-70. Epub 2009 May 5.
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☐ **Lack of effect of Tai Chi Chuan in preventing falls in elderly people living at home: a randomized clinical trial.**

PICO Question | Healthcare

Foreground

In *older people at risk for disability*(P), how does *sarcopenia* (I) compared to *healthy muscle function*(C) affect *incident disability*(O)?

Searches in PubMed

SS1 sarcopenia disability

SS2 sarcopenia [ti] disability [ti]

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PICO Question | Across Disciplines

Background	5 Ws	Foreground	PICO
Who, What Problem	Population,
How, Why	Intervention, Cause

Straus, 2010, Evidence-based medicine; how to practice and teach it, (p. 15)
Melnyk, 2011, Evidence-based practice in nursing & healthcare: A guide to best practice, (p. 31)

My experience...

- Master Thesis

- PhD application process

  – Research Proposal Plan

- Publications

- Specificity

- Goal/Research oriented

- But, there is a process...!

References

Ellen Welty
Sheila Hofstetter