Conceptualization

ESP178 Research Methods
Dr. Susan Handy
1/7/16
Research gives us knowledge of how the world works.

Knowledge of how the world works gives us the power to fix things.
Factor: Pollution, Driving, Sprawl
Outcome: Health, Pollution, Driving
Do cul-de-sacs promote children’s outdoor play?
Factor

- Living on a cul-de-sac

Independent variable

Outcome

- Outdoor play

Dependent variable
The Research Cycle

Inductive
= Theory building

Empirical Generalizations

Observation

Hypothesis

Theory

Deductive
= Theory testing

What is a theory?
Types of Explanation

Idiographic

Nomethetic
The Research Cycle

**Inductive**

=  
Theory building

**Deductive**

=  
Theory testing

**Empirical Generalizations**

**Theory**

**Hypothesis**

**Observation**

---

**Exploratory**  
**Explanatory**
The Research Cycle

Inductive = Theory building

Deductive = Theory testing

Inductive Generalizations

Hypothesis

Observation

Usually... Qualitative

Usually... Quantitative
At the most basic level...

Quantitative

Qualitative
How things (usually) go together...

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Explanatory</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Research</td>
<td>Deductive</td>
<td>Inductive</td>
</tr>
<tr>
<td>Type of Data</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
</tbody>
</table>

Explanatory  

Exploratory
How things (usually) go together...

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Explanatory</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Research</td>
<td>Deductive</td>
<td>Inductive</td>
</tr>
<tr>
<td>Type of Data</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td><strong>Sampling</strong></td>
<td>Probabilistic</td>
<td>Non-probabilistic</td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Convenient, purposeful</td>
</tr>
<tr>
<td></td>
<td>Representative</td>
<td>Illustrative</td>
</tr>
<tr>
<td></td>
<td>Larger</td>
<td>Smaller</td>
</tr>
</tbody>
</table>
## How things (usually) go together...

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Explanatory</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Research</td>
<td>Deductive</td>
<td>Inductive</td>
</tr>
<tr>
<td>Type of Data</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Sampling</td>
<td>Probabilistic</td>
<td>Non-probabilistic</td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Convenient, purposeful</td>
</tr>
<tr>
<td></td>
<td>Representative</td>
<td>Illustrative</td>
</tr>
<tr>
<td></td>
<td>Larger</td>
<td>Illustrative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smaller</td>
</tr>
<tr>
<td><strong>Data Collection</strong></td>
<td>Surveys</td>
<td>In-depth interviews</td>
</tr>
<tr>
<td></td>
<td>Available data</td>
<td>Focus groups</td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>Observation</td>
</tr>
</tbody>
</table>
# How things (usually) go together...

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Explanatory</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Research</td>
<td>Deductive</td>
<td>Inductive</td>
</tr>
<tr>
<td>Type of Data</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Sampling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probabilistic</td>
<td>Random</td>
<td>Non-probabilistic</td>
</tr>
<tr>
<td>Representative</td>
<td>Representative</td>
<td>Convenient, purposeful</td>
</tr>
<tr>
<td>Larger</td>
<td>Larger</td>
<td>Illustrative</td>
</tr>
<tr>
<td>Smaller</td>
<td>Smaller</td>
<td>Smaller</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Surveys</td>
<td>In-depth interviews</td>
</tr>
<tr>
<td>Available data</td>
<td>Available data</td>
<td>Focus groups</td>
</tr>
<tr>
<td>Observation</td>
<td>Observation</td>
<td>Observation</td>
</tr>
<tr>
<td><strong>Data Analysis</strong></td>
<td>Statistical analysis</td>
<td>Content analysis</td>
</tr>
</tbody>
</table>
### How things (usually) go together...

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Explanatory</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Research</td>
<td>Deductive</td>
<td>Inductive</td>
</tr>
<tr>
<td>Type of Data</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Sampling</td>
<td>Probabilistic</td>
<td>Non-probabilistic</td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Convenient, purposeful</td>
</tr>
<tr>
<td></td>
<td>Representative</td>
<td>Illustrative</td>
</tr>
<tr>
<td></td>
<td>Larger</td>
<td>Smaller</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Surveys</td>
<td>In-depth interviews</td>
</tr>
<tr>
<td></td>
<td>Available data</td>
<td>Focus groups</td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>Observation</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>Statistical analysis</td>
<td>Content analysis</td>
</tr>
<tr>
<td>Other Qualities...</td>
<td>Nomothetic explanation</td>
<td>Idiographic explanation</td>
</tr>
<tr>
<td></td>
<td>Focus on proving</td>
<td>Focus on understanding</td>
</tr>
<tr>
<td></td>
<td>Dissective</td>
<td>Holistic</td>
</tr>
</tbody>
</table>
What is the distribution of the factor? Is there a relationship? How big is it? What is the distribution of the outcome? What share of streets are cul-de-sacs? What share of households live on cul-de-sacs? How much more time do children spend playing outdoors if they live on a cul-de-sac? How much time do kids play outdoors on average? What share of kids play outdoors at least once per week?
**Qualitative...**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the nature of the factor?</td>
<td>What is the nature of the outcome?</td>
</tr>
<tr>
<td>Are there others?</td>
<td>Are there others?</td>
</tr>
<tr>
<td>What is the nature of the relationship?</td>
<td>What is it about cul-de-sacs that influences children’s outdoor play?</td>
</tr>
<tr>
<td>How does it work?</td>
<td>How do they use the street versus sidewalks?</td>
</tr>
</tbody>
</table>

- **Are there different kinds of cul-de-sacs?**
- **What are key characteristics of cul-de-sacs?**
- **What kinds of things do children do when playing outside?**

**DESCRIPTIVE** | **EXPLORATORY** | **DESCRIPTIVE**
Thinking like a researcher
Unit of Analysis vs. Unit of Observation

Unit of Analysis

INDIVIDUAL
Children

GROUP
Households

GEOGRAPHIC UNIT
Neighborhoods

vs. Unit of Observation

INDIVIDUAL
Children

INDIVIDUAL
Children

INDIVIDUAL
Children

INDIVIDUAL
Children
From Conceptual to Operational

Theoretical Plane

Construct A

Proposition

Construct B

Empirical Plane

Independent Variable

Hypothesis

Dependent Variable
From Conceptual to Operational

**Concept**
- Cul-de-sacs

**Proposition**
- leads to more

**Concept**
- outdoor play for children

**Variable**
- Living on a cul-de-sac

**Hypothesis**
- is positively associated with

**Variable**
- number of days children play outside
“Explanations require development of **concepts** or generalizable properties or characteristics associated with objects, events, or people. While objects such as a person, a firm, or a car are not concepts, their specific characteristics or behavior such as a person’s attitude toward immigrants, a firm’s capacity for innovation, and a car’s weight can be viewed as concepts.”

“A **construct** is an abstract concept that is specifically chosen (or “created”) to explain a given phenomenon. A construct may be a simple concept, such as a person’s **weight**, or a combination of a set of related concepts such as a person’s **communication skill**, which may consist of several underlying concepts such as the person’s **vocabulary**, **syntax**, and **spelling**. The former instance (weight) is a **unidimensional construct**, while the latter (communication skill) is a **multi-dimensional construct** (i.e., it consists of multiple underlying concepts).”
## Note: Variables by Unit of Analysis

<table>
<thead>
<tr>
<th>Unit of Analysis</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDIVIDUAL</td>
<td>Number of days child played outside per week</td>
</tr>
<tr>
<td>Children</td>
<td></td>
</tr>
<tr>
<td>GROUP</td>
<td>Share of children in household who played outside at least once per week</td>
</tr>
<tr>
<td>Households</td>
<td></td>
</tr>
<tr>
<td>GEOGRAPHIC UNIT</td>
<td>Share of households in neighborhood who had children who played outside</td>
</tr>
<tr>
<td>Neighborhoods</td>
<td>at least once per week</td>
</tr>
</tbody>
</table>
Conceptual Model = Nomological Network
It’s all relative...
It’s all relative...

sprawl -> driving

pricing

pricing -> driving

sprawl
Theory versus Conceptual Model

**Theory of Planned Behavior**

- **Attitude**
- **Subjective Norms**
- **Perceived Behavior Control**

  ![Diagram](Diagram.png)

**Conceptual Model**

- **Attitude about outdoor play**
- **Is outdoor play is normal?**
- **Can my kid do it?**
- **Intention to have kid play**
- **Outdoor play**

Note: could do kid’s perspective or parent’s perspective or both
Do cul-de-sacs promote children’s outdoor play?
Matt’s research:

Climate change adaptation policy networks in the Lake Victoria region
Study setting: Lake Victoria region, East Africa
Motivation

Why is it worthwhile to do this research?

High exposure and sensitivity to climate change effects

• Population pressure, poverty, poor infrastructure, high participation in climate-sensitive sectors
Question

How do policy institutions build adaptive capacity to climate change in the Lake Victoria region?

*Policy institutions = task forces, steering committees, venues, etc.*
Conceptual model

Dynamics of policy networks → Effects of CC adapt. policy → Resilience of communities
Model again, zoomed in

Dynamics of Policy Networks

- Network structure
- Learning
- Cooperation

Effects of CC adapt. policy

Collaborative decisions and other CC adapt. policy outcomes
For the class exercises: Bicycling!
Benefits of a Bicycle

Puts a big fat smile on your face

.shapes up that boodie

zero emissions

slows global warming

Whizzes past traffic jams

Gives you legs of steel

it carries your goodies home

it Feels like flying

faster and easier than walking

it's as quiet as a mouse

No need to pay for gas, parking fees, or auto insurance...hurray!

the Earth sends a lil extra luv to those on bicycles (this is scientifically documented)

12 November 2015

By the Institute for Transportation & Development Policy and the University of California, Davis
Jacob Wasser, Lew Fulton, Zane McDonald

Research commissioned by the Union Cycliste Internationale (UCI), the European Cyclists' Federation (ECF), and the Bicycle Product Suppliers Association (BPSA)

https://www.itdp.org/the-benefits-of-shifting-to-cycling/
If we shift to a modest
23% of trips taken by bicycle
or e-bikes by 2050 as part of a comprehensive shift toward
sustainable transport (mass transit, walking, and biking),
and away from cars, then...

We could avoid
~300 megatonnes of global CO2 emissions,
a 7% reduction in urban transport emissions
over BAU due to cycling, as part of a 47% total
reduction in the comprehensive HSC scenario

And save cities
$25 trillion USD
over the next 35 years due to cycling
Percent of Trips by Bicycle

Source: Pucher and Buehler 2008
**Boom in Cycling to Work**

<table>
<thead>
<tr>
<th>City</th>
<th>1990 (USA) / 1996 (Canada)</th>
<th>2011 (USA and Canada)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>0.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Chicago</td>
<td>0.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Boston</td>
<td>0.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Toronto</td>
<td>0.8</td>
<td>2.4</td>
</tr>
<tr>
<td>New Orleans</td>
<td>0.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Denver</td>
<td>0.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Washington</td>
<td>0.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>1.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Seattle</td>
<td>1.5</td>
<td>3.7</td>
</tr>
<tr>
<td>San Francisco</td>
<td>1.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Montreal</td>
<td>1.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Vancouver</td>
<td>1.7</td>
<td>4.4</td>
</tr>
<tr>
<td>Portland</td>
<td>1.1</td>
<td>6.8</td>
</tr>
</tbody>
</table>

*2011 figures for Canadian cities are preliminary estimates*

Percent Biking to Work in Smaller Cities

* has major university

Source: Handy, Heinen, and Krizek, 2012
Bicycling in Davis

Source: Handy, Access, 2012
Not Bicycling in Davis

- Davis workers bicycle commuting
- UCD staff in Davis bicycle commuting
- UCD faculty in Davis bicycle commuting
- UCD students in Davis bicycle commuting
- Davis residents bicycling >=1 per week

Source: Handy, Access, 2012
Policy question:
How do we get more people bicycling?

Research question:
Why do or don’t people bicycle?
To do

• Read proposal assignment – overall and stage 1
• Think about possible topics for proposal
• Readings – read Schneider article for Tuesday
• Attend section tomorrow!