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Employing Experiments in Surveys

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Difference between Measurement Validity and Research Design Validity

The goal of social research is to establish and understand CAUSAL RELATIONSHIPS

The 3 properties of a CAUSAL RELATIONSHIP

- 1. Covariation (There is a relationship)
- 2. Temporal order (Identifying the explanatory factor)
- 3. Elimination of rival hypotheses (other possible explanations)

BASIC PRINCIPLES UNDERLYING EXPERIMENTATION

1. Randomization: Consists of making "all other things be equal" as a way of eliminating other explanations.

Accomplished through random assignment.

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- 3. Control: Insuring that there is a group that does not receive the treatment

Design Attributes of Experiments

Conditions for Demonstrating <u>Causality</u>

Randomization
Manipulation
Control

Covariation
Temporal Order
Elimination of
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Difference between Measurement Validity and Research Design Validity

We can evaluate the power and suitability of different research designs (and our confidence in inferring relations observed in them to the real world) by

Internal Validity: How well the 3 conditions are met

External Validity: How well the setting and participants reflect real world situations where we expect to observe the relationship

Comparative Research Design Features

EXPERIMENTS provide advantages in demonstrating causal relationships, the impact of X on Y (Internal Validity)

Key design features include:
Randomization
Manipulation
Control

Experiments often suffer from inferential issues in terms of generalizing to the "real world" because of the lab (External Validity)

Comparative Research Design Features

SURVEYS deal better with issues of External Validity through data collection in a more natural and comfortable setting, based upon probability samples designed to represent a population of interest

They often suffer from inferential issues in terms of establishing confidence that X is the cause of Y (Internal Validity)

Problematic design features (Internal Validity) include:
Self-reported variation on the independent variable
Simultaneous data collection for X and Y
Need for explicit statistical controls in analysis

Differences between Sampling and Recruiting

SAMPLING

Every element in a population has a known non-zero chance of selection (a probability sample)

Statistical laws can be used to estimate the prevalence of something in the population based on its occurrence in the sample

RECRUITING

Subjects are found to participate in the study by a variety of means and then randomly assigned to different treatments (the independent variable)

The dependent variable is measured after the treatment

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STANDARD EXPERIMENTAL DESIGNS

PRETEST-POSTTEST CONTROL GROUP **DESIGN**

R

O_{Y1} O_{Y1}

STANDARD EXPERIMENTAL DESIGNS

POST-TEST ONLY DESIGN

 $R \qquad X \qquad O_{Y1}$

O_{Y1}

Hybrid Designs that Combine Surveys and Experiments

Possible to combine the best features of both designs by embedding experiments in surveys with interviewing at home

Generally classify such designs into 2 categories:

Methodological experiments

Substantive experiments

General approach is to assign different treatments to randomly selected subsamples (not the same as comparing the results from two different surveys)

Experiments can be conducted in a wide variety of survey settings providing excellent opportunities for evaluating reliability and validity of the stimuli as well as effects of the stimuli

General Analysis Strategy

Expect to observe a difference in a statistic (a proportion or mean value) between treatment groups

In a factorial design (more than one treatment condition), researcher may need to combine groups to evaluate effects

Have to evaluate observed differences with tests of statistical significance

Two Different Questions about Barack Obama's Citizenship

Do you think Barack Obama was definitely born in the United States, probably born in the United States, probably born in another country, or definitely born in another country?

CNN/Opinion Research Corporation Poll, Apr, 2011

Do you think Barack Obama was definitely born in the United States, probably born in the United States, probably born in another country, definitely born in another country, or don't you know enough to say?

Gallup Poll, May, 2011

Difference between Observational and Experimental Data

Results from 2 surveys conducted close to each other:

	Gallup	CNN/ORC		
	May 5-8 '11	April 29-May 1 '11		
Definitely born in the US	51%	58%		
Probably born in the US	19	22		
Probably born in another				
country	7	10		
Definitely born in another				
country	5	7		
Don't know enough to say	17	2		
Refused, NA	_2			
	100%	100%		

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PAPER AND PENCIL EXERICSE

TYPES OF STIMULI/ MANIPULATIONS USED IN EXPERIMENTS

This is often related to the MODE of administration

Question wording or order: any mode

Visual stimuli like handouts or "show" cards: Face-to-face or web surveys

Video requires a computer: web, CAPI

Methodological Experiments

Question Wording: How to ask questions?

Question Order: Where to ask questions?

Mode Effects: How to conduct interviews?

Design Effects: Can differences in approaches to respondents affect response rates? Can results from laboratory be reproduced in surveys, or vice versa?

Selected Question Wording Experiments

Open vs. closed questions

Variations in response categories and order

Measuring a middle position

Use of an explicit "Don't know/ Haven't thought much about it" category

EXAMPLE 1: Evaluating Response Alternatives

Do response alternatives in a close-end attitudinal question vary by the direction of the scale, use of a middle alternative, and an explicit "No opinion"?

(8 groups: 2 x 2 x 2)

Science and technology are generally making our lives easier

			_	SA-SE)			SD—SA
		SA—SD	SA—SD	N A/D		SD—SA	SD—SA	N A/D
	SA-SD	No Opn.	N A/D	No Opn.	SD—SA	No Opn.	N A/D	No Opn.
Strongly Agree	31.3%	29.2%	30.0%	48.3%	26.5%	27.1%	22.8%	37.1%
Agree	64.1	52.3	58.3	39.7	63.2	62.5	66.7	45.2
Netiher A/D			5.0	0.0			7.0	0.0
Disagree	3.1	6.2	6.7	1.7	5.9	2.1	3.5	3.2
Strongly Disagree	0.0	3.1	0.0	1.7	2.9	0.0	0.0	0.0
No Opinion		9.2		8.6		8.3		12.9
Other (NA)	1.6	0.0	0.0	0.0	.2	0.0	0.0	1.6
Sample Size	(64)	(65)	(60)	(58)	(68)	(48)	(57)	(62)

No recency / primacy effect; use of middle option, "no opinion" when offered.

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EXAMPLE 2: The Dimensions of Scientific Literacy

FACTUAL KNOWLEDGE OF SCIENCE

Achievement tests to assess knowledge of scientific studies: 18 items, "correct / incorrect," 2 open-ended

PUBLIC UNDERSTANDING OF SCIENTIFIC INQUIRY

Understanding of probability and its role in science: 6 items, "correct / incorrect," 2 open-ended

INDEX OF SCIENTIFIC PROMISE

Attitudes about the benefits of science and technology in our daily lives: 4 items, "strongly agree / strongly disagree"

INDEX OF SCIENTIFIC RESERVATION

Attitudes or concerns about scientific advances: 3 items, "strongly agree / strongly disagree"

Factual Knowledge of Science Items (Michigan Replication)

ITEMS

- 1. The center of the Earth is very hot.
- 2. All radioactivity is man-made.
- 3. It is the father's gene that decides whether the baby is a boy or a girl.
- 4. Lasers work by focusing sound waves.
- 5. Electrons are smaller than atoms.
- 6. Antibiotics kill viruses as well as bacteria.
- 7. The universe began with a big bang. 8. The continents on which we live have
- been moving their location for millions of years and will continue to move in the future.

 9. Human beings, as we know them today.
- developed from earlier species of animals.
- 10. Now can you tell me, does the earth goes around the sun, or does the sun go around the earth?
- 11. How long does it take for the earth to go around the sun one day, one month, or one year?

RESPONSE OPTIONS

True, False, DK, NA True, *False*, DK, NA

True, False, DK, NA True, *False*, DK, NA *True*, False, DK, NA True, *False*, DK, NA

True, False, DK, NA

True, False, DK, NA

True, False, DK, NA

Earth goes around the sun, Sun goes around the earth, DK, NA around the earth, DK, NA One day, one month, one year, other time period, DK, NA

Analysis of the Factual Knowledge of Science Items Before and After a Prime with Religion Items

1. There were no differences in a comparison across 11 questions at the item level, depending upon whether Religion Items were asked before or after, in terms of:

% Refusals
% Don't Knows

2. There were no differences in the % correct answers to the 11 items, depending upon whether Religion Items were asked before or after

Factor Structure Varied with Context

ALL CASES: THREE FACTOR SOLUTION (N = 482)

Factor 1 Earth Center (.562) Radioactivity (.685) Lasers (.688) Electrons (.615) Antibiotics (.553) Factor 2 Universe began (.767) Human species (.829) Continents move (.599) Factor 3 Father's genes (.740) Earth around sun (.640)

Total Variance Explained = 50.0% (Factor 1 = 21.9%, Factor 2 = 17.5%, Factor 3 = 10.6%)

RELIGION ASKED BEFORE: FOUR FACTOR SOLUTION (N = 249)

Factor 1 Radioactivity (.605) Lasers (.686) Electrons (.622) Antibiotics (.585) Earth around sun (.476)

<u>Factor 2</u> Universe began (.766) Human species (.846) Factor 3
Earth Center (.784)
Continent's Move (.843)

Factor 4 Father's genes (.922)

Total Variance Explained = 60.8% (Factor 1=28.1%, Factor 2=12.2%, Factor 3=10.4%, Factor 4=10.1%)

RELIGION ASKED AFTER: THREE FACTOR SOLUTION (N = 233)

Factor 1 Earth Center (.562) Radioactivity (.685) Lasers (.688) Electrons (.615) Antibiotics (.489) Factor 2 Universe began (.767) Human species (.829) Continents move (.599) Factor 3
Father's genes (.740)
Earth around sun (.640)

Total Variance Explained = 50.9% (Factor 1 = 20.0%, Factor 2 = 17.8%, Factor 3 = 13.1%)

Selected Mode Effect Experiments

Many of these results are based on difference in naturally occurring variation resulting from chance covariation as opposed to random assignment to a condition

Telephone vs. face-to-face interviews

Telephone vs. web survey interviews

Land-line vs. cell phone interviews

Substantive Experiments Evaluating American Attitudes about Race

This is a recurring and consistent focus of research by American political scientists, sociologists and psychologists

It has been studied with a variety of research design, including surveys, lab experiments, and experiments embedded in surveys

Stimuli have included contrived news articles with word changes, photos, and video

TESS Experiments on "Us vs. Them" (Brader, Valentino and Suhay 2008)

Manipulation

- Frame on the consequences of immigration (pos/neg)
- Cues about the identity of immigrants (Hispanic/European)
- 2 x 2 design with control group

Data

- Random sample from Knowledge Networks WebTV
- October 21 November 5, 2003
- 354 respondents in 46 states
- Median interview length: 16 minutes
- 46 years old, some college, \$45,000 income
- 52% women, 31% Republicans, 28% Democrats

Evaluating American Attitudes about Race

Hypotheses

H1. The U.S. public is sensitive to group cues in discussions about immigration.

H2. White Americans are anxious about Latino immigrants.

Evaluating American Attitudes about Race

The New Hork Times

Immigration Concerns Governors

Questions Raised About Economic, Cultural Impact of Immigrants

NEW YORK (AP) - During the 1990s, more immigrants entered the United States than in any previous decade, and the growing number of immigrants in the U.S. clearly has some Americans worried. At a state governors' convention in June, many governors called for the Bush restrict the flow of immigrants.

immigrants are driving down the wages of American workers, while taxpavers are forced to meet the rising costs of social and uncooperative - it's not acceptable." services for the newcomers. Governors constituents.

John Baine, shift manager at a large auto parts factory in Cleveland, said he is angered that "a number of friends have been laid-off or forced to take a pay cut" because of the influx of cheap immigrant

Nancy Petrey, a Boulder, Colo. nurse, has seen staff let go for similar reasons. "People give twenty years of their lives to this hospital and then, boom, they're out the door because some foreigner will do their job for half the pay," Petrey said. "It just isn't right."

Governors also say constituents are worried that the country is no longer a "melting pot," because new immigrants are not adopting American values or blending

into their new social world.

Mary Stowe an Omaha-based sales associate, says she is frustrated by the fact that recent immigrants to her area "do not learn English or make any effort to fit in."

Bob Callaway, a construction supervisor in Newark, says he sees similar problems Administration and Congress to step in to with immigrants hired by his company. "These people are totally unwilling to Several governors voiced concern that adopt American values like hard work and responsibility," Callaway said. "I try not to complain, but sometimes they are so pushy

When asked his opinion, Jose Sanchez, say these views are shared by many of their a recent immigrant from Mexico, says he welcomes the chance for a better life in America. "Many of my cousins find work here and now it's my turn. I want a good job and benefits."

"But," Sanchez added, "that doesn't mean I have to change who I am. We love our culture. I'm proud to be from

While there was agreement at the convention that the federal government needs to do more to help states manage the rising tide of newcomers, few governors agree on exactly why immigration levels have increased.

Some blame the Immigration Act passed by Congress in 1990, which loosened federal restrictions on immigration. Others point to the fact that large companies are



Jose Sanchez is one of thousands of new immigrants who arrived in the U.S. during the first half of this year.

attracting immigrants to the U.S. with the promise of prosperity, a practice that has become widespread in recent years.

Still others maintain that, in a world full of turmoil, people are attracted here by the hope of a better way of life.

Whatever is bringing immigrants to these shores in record numbers, everyone seems certain that the numbers will continue to grow



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Continue



SURNAME

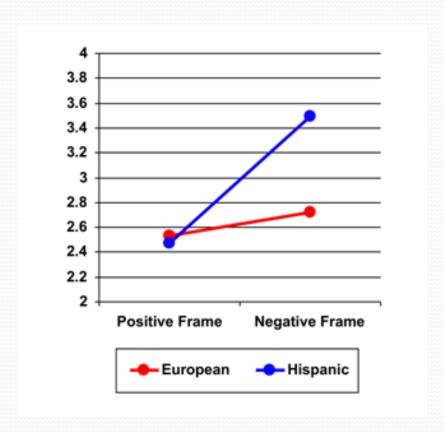
COUNTRY **OF ORIGIN**



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Continue

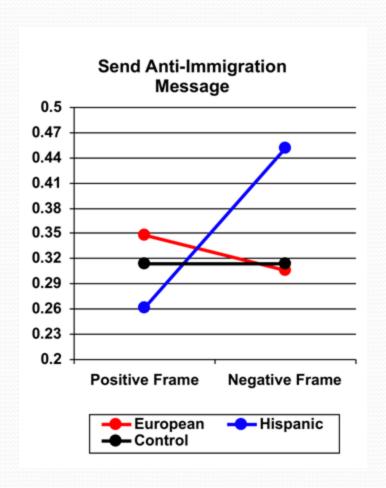
Impact of Racial Cues on Anxiety with Different Frames



Effect of Cues on Political Action

Send Message to Congress: There are currently several proposed laws before Congress that would substantially decrease the number of legal immigrants that come to this country. Would you like us to send an email message to members of Congress indicating either your support or opposition to these reforms? (This message will only contain your name, city and state of residence, and opinion on the proposed reforms.)

Impact of Racial Cues on Political Action with Different Frames



Vignette Experiments

American elections are administered at the local level with significant variation in procedures

Problems with vote tabulation in Florida in the 2000 presidential election raised concerns about confidence in the American electoral system

A major revision in voting procedures occurred, including a move to computerized voting

Would this change or increase confidence in the electoral system?

How to assess Americans' reactions to proposed changes when they are unfamiliar with the alternative devices and procedures?

Vignette Experiments

COLUMBUS (AP) David Chase, the incumbent, narrowly defeated Robert Mason for the sixth congressional district seat in Ohio. The race was tightly fought for the entire campaign, with polls showing that it could go either way.

- (1) Voters indicated their choices with a new voting system that features a paper record the voters can see but not take with them. Some people are concerned that electronic voting may be subject to fraud because it is very hard to know exactly what goes on inside the machine. In response to these concerns, the new system prints a paper copy of each voter's choices and lets the voter confirm that what is printed on the paper corresponds to how the voter intended to vote. Voters leave this record behind so that if there is a problem with the electronic votes, it would be possible to count the paper records that the voters have verified.
- (2) Another new feature is an access card. When voters first arrive at the polls, after they identify themselves as registered voters, they are given an access card that they need to insert into the machine in order to vote on it. The card contains encoded information that indicates they are entitled to vote at that polling station and that they should be presented a particular ballot. Their votes are not recorded until they remove the card. Before they leave, they return the card to the person who gave it to them.
- (3) After the election, officials will conduct an independent check of election procedures to see whether they were followed correctly, whether there was no evidence of tampering, and whether the votes were counted accurately.

Vignette Experiments: Receipt Condition

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Vignette Experiments: Receipt and Audit

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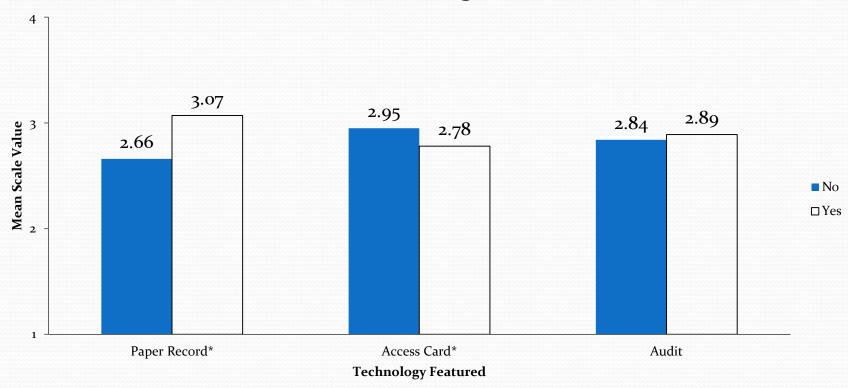
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Vignette Experiments: Control Condition

COLUMBUS (AP) David Chase, the incumbent, narrowly defeated Robert Mason for the sixth congressional district seat in Ohio. The race was tightly fought for the entire campaign, with polls showing that it could go either way.

Impact of Paper Receipt Treatment on Confidence in Accurate Vote Tabulation

Mean Value for Confidence in Accurate Recording of the Vote



Some Useful Citations

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