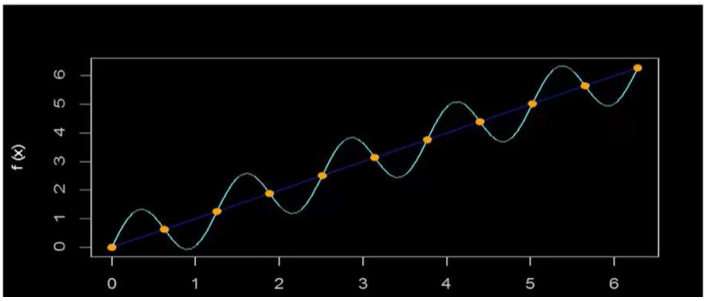
Framework for Data Collection and Analysis

Week 2 Measurements and Analysis Plan

Two Problems with Induction

1 Equivalent models
If theory p explain q1, q2 but what if p2 also explains p1 and p2?

e.g. A linear line explain the orange data points but the sinus curve (green) also perfectly explains the relationship between x and f(x) for these orange data points



2 Infinite numbers
Hempel's raven
Raven 1 is black
Raven 2 is black
Raven 3 is black
……
But there is no guarantee that raven 4 is going to be black, so we can't say ALL RAVENS ARE BLACK (although all the ravens that we have seen SO FAR were BLACK)

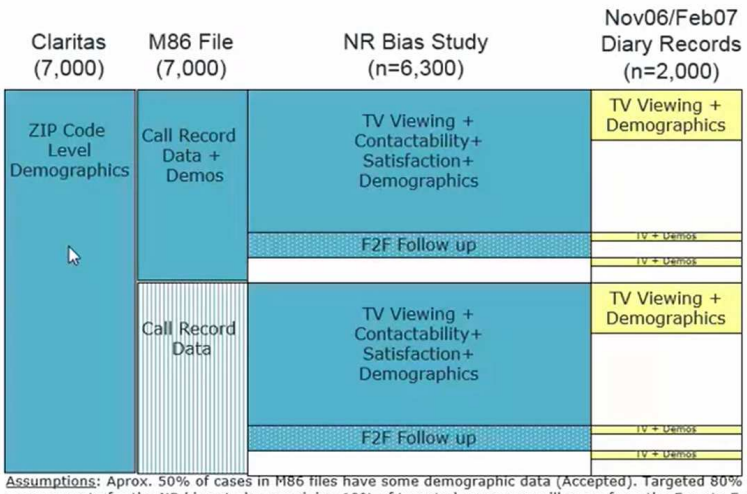
Planning on what you want to observe

What is our research question?
How do you envision the results to look like?
Are you covering everything you need?
Translate concepts into questions/measures/features!
Check the fit!

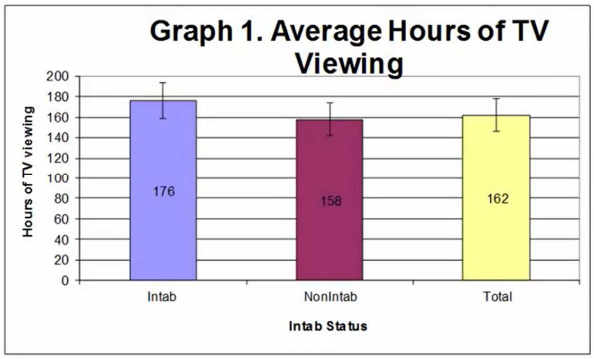
Example 1) Nielson Media Research: Non response bias in Nielson Media Research services
Nielsen asked respondents to fill out a diary on their TV viewing behavior, and then install little recording devices to actually log the tune-in behavior. So when the TV is, which channel is on, you can see that there. But not everybody participates. There's an issue of non-response. And the question is, for this project here, would there have been any meaningful difference between those that cooperated and those that did not?

1 Mailing address available (n=7000)
- 2,000 intabs (respondents)
- 3,000 that did return sampling but it wasn't of good quality
- 2,000 that didn't return anything
➔ self-administered questionnaire, multiple mail outs, and the target was to really get 90% of our respondents in this specific non-response study. So they're really trying to get everybody incentivized to participate here. The questionnaire had about 100 questions (tv viewing patterns and equipment, leisure activities, Nielsen diary completion task, attitudes towards research, demographics etc.)

2 Mailing address not available (n = 2000) ➔ phone numbers used and fielded
- 2000 unmailables



Assumptions: Aprox. 50% of cases in M86 files have some demographic data (Accepted). Targeted 80% response rate for the NR bias study, remaining 10% of targeted responses will come from the Face to Face Follow up Study. (Nielsen Memo 02/12/06)



Question: Do households that Nielsen samples – but from which no data is gathered – spend more or less time watching TV than those that complete the Nielsen Diary?

Note 1: Overall sample of targeted 7,800 respondents (= 6,300 mailables + 1,500 Unmailables).
Note 2: Nonintab group includes No Good, No Return and Unmailable cases, whereas Intab includes only Intab cases.

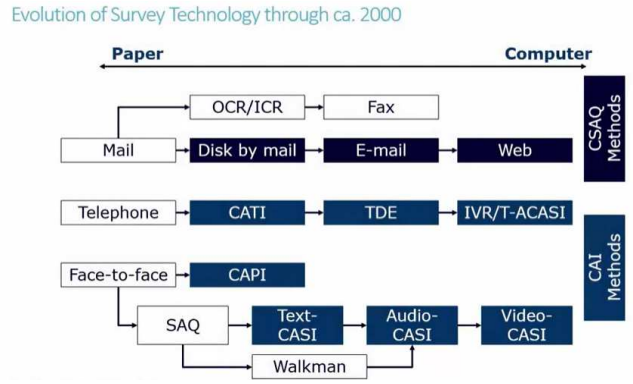
Planning on How to Collect Data

In Surveys, "how" often relates to **mode**

What is mode?
One of the highest impact decisions to be made in implementing research design
Requires considerations of all sources of error and cost
Decision should be based on theory and empirical evidence
➔ affects sampling decisions, interviewing (process) and responses

In the earlier days, there were only few main modes of data collection:
- face to face or personal visit surveys
- mail or postal surveys
- telephone surveys

Recent years…. We see proliferation of methods



survey administration v.s. medium

	Medium	
Administered by	Paper	Computer
Self	Mail-out questionnaire, SAQ	Web, TDE, IVR*, CASI*, ACASI*
Interviewer	Telephone	CATI
	FTF/Personal visit	CAPI

*Interviewer administers non-sensitive questions

- CATI – Computer-Assisted Telephone Interviewing
- CAPI – Computer-Assisted Personal Interviewing
- TDE - Touchtone Data Entry
- IVR - Interactive Voice Response
- CASI - ComputerAssisted Self Interviewing
- ACASI - Audio Computer-Assisted Self Interviewing

Emerging Nodes

- Mobile Web: Brower or app based, self-administered questionnaires
- Text (SMS): self-administered (automated agent) or interviewer-administered
- Video (e.g. skype, google hangout, facetime)
- Virtual Interviewers (e.g. computer-animated interviewing agents)

Other Modes of Data Collection

Diary Surveys
Administrative Records
Direct Observation
Biological and physical measurements within surveys

➔ **Application Programming Interface (API)**

e.g. Census Bureau – American Community Survey – API token

➔ **Access Panels**

Good panels often try a variety of recruitment strategies so that the set of people, and the composition of the people, is quite diverse.

➔ **Google Survey (or some web survey of this sort)**

SurveyMonkey, Qualtrics, LimeSurvey….
It's very few questions spread out to the respondents

Choosing a Mode

What's the theme of this module? You have the research question at the very beginning. You try to get all the relevant target information. You decide on what other specific variables that I need based on your **analysis plan**. So now you have a set of requirements, a set of constraints, and you will know how much money you have available.

Analysis Plan ➔ planning what you want to observe at the outset of the study; include creation of mock graphs and tables (e.g. using fictitious data)

What is the impact of a particular method of data collection on survey errors and costs?

➔ Most often asked at analysis/evaluation stage
➔ Given a particular mode, what effects to expect, and how to overcome them

➔ how to maximize benefits of a particular mode?
e.g. given that one has decided on a telephone survey, what decisions should be made regarding the design of the questionnaire

Implications of mode
➔ affects sources and types of survey errors that can occur (both errors of observation and non-observation; both variable errors and biases)
➔ affects other constraints, such as costs, time, mix of personnel

Plurality of Modes….?
➔ Need to be more explicit about which modes are being used
➔ Harder to make broad generalizations about mode
    May depend on particular combinations of methods used
    Research literature does not (yet) cover all variations
    Need theory to form expectations about effects
➔ Increasingly, combinations of modes being used (e.g. mixed-mode surveys or hybrid designs)

Mixing survey modes…
➔ Can be applied for the contact phase, the response phase, or the follow-up phase
➔ can affect all source of survey error and costs

[Article] Going Online with a Face-to-Face Household Panel: Effects of a Mixed Mode Design on Item and Unit Non-Response

- The incorporation of web into a mixed mode design has potential both to reduce survey costs and improve quality, so a lot of UK government agencies are considering this design
- But in the context of academic or government longitudinal surveys, this design very limited…

e.g. (2001) experiment on the American Community Survey (ACS) in which web was offered as an additional mode in an otherwise mail-CATI-CAPI sequential mixed-mode design. The inclusion of web reduced the overall response rate and it was unclear whether cost savings would accrue, so it was decided not to include web in the ACS design.

The longitudinal survey context introduces some specific issues
- Response rates are arguably more important than in a cross-sectional survey; high response rates, at least from wave 2 onwards, are essential in order to maintain the sample available for longitudinal analysis; Non-responding sample members cannot be replaced by adding new samples as it would not be possible to collect data equivalent to those already collected at previous waves
- In the case of an existing survey, sample members will have prior experience of being interviewed in another mode and prior knowledge of the survey content. Conceivably, this familiarity might improve the chances of response in the absence of interviewer explanation and persuasion.

Possible effects of measurement error are an important concern when considering the introduction of a mixed mode design in any context (Bowling, 2005), including when the mix consists of web and face-to-face. In the longitudinal context, the possibility of individuals responding in different modes at different waves introduces concerns about measurement error affecting within-unit measures of change as well as affecting between-unit differences, which is the usual concern with cross-sectional surveys.

In mixed mode survey design, a common characteristic to most household panel surveys is that all other adult members of the household are required for each wave interviews. If one or more household member does not respond by web, it is necessary to send a face-to-face interviewer to visit the household to seek the remaining interview(s). In so far as the main motivation for introducing web interviewing is to save costs, a central interest is therefore the extent to which whole-household participation by web is possible. This is a demanding target and may make cost savings harder to achieve than in a simple survey of individuals.

This study has demonstrated that transitioning from a face-to-face longitudinal survey to a mixed mode web and face-to-face survey is not straightforward. Cost savings appear possible but avoiding increased attrition and increased item nonresponse is challenging. Targeting the web invitation to a subset of the sample is likely to be more effective than inviting all sample members to the web