UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

Survey Research Methods: Question Development and Validation

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What is a survey?

- A method of gathering information from a sample of individuals.
- The sample is usually just a fraction of the population being studied.
  - Census = whole population studies

General Survey Research Process

- Your research question is clearly defined
- The data collection process is systematic and well-defined
- Information is gathered by asking questions of individuals (questionnaire or interview)
- Your study generates results on the sample
- These results are generalizable to the population of interest

Components to think about…

- WHAT
- WHO
- HOW
- WHEN
- WHERE

WHAT

- What is your topic of interest?
- What is your research question?
- What are your primary study variables?

Most Important Step

- What is your research question?
  - What domains/constructs will you capture?
- Study design flows from research question
  - Cascade of questions

WHO

- Who is your target population? How will you identify and select the participants in the sample?
  - Proxies?
- Who will be compared?

HOW

- How will you operationally define your variables of interest?

- How will you collect your data?

WHEN

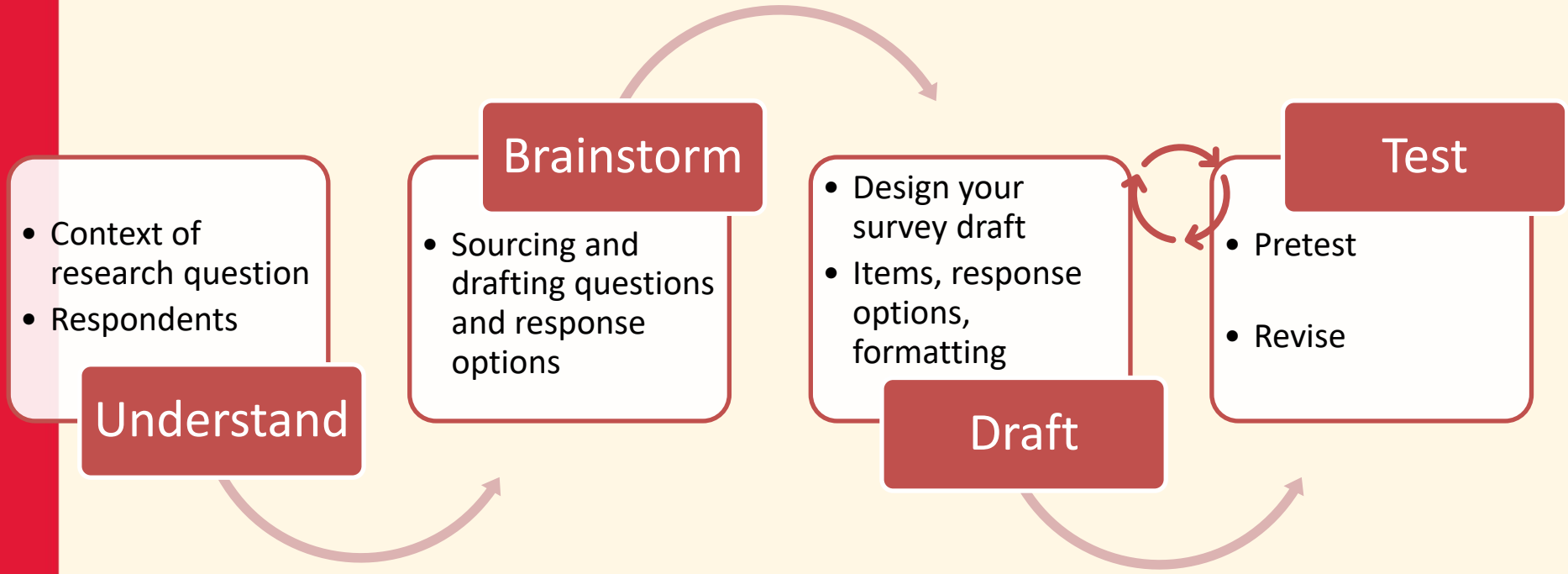
- When will you collect your data?
  - Are there seasonal variations to be concerned about?
  - Are there temporal variations to be concerned about?
  - Cyclical events?
  - Latency for intervention?

WHERE

- Where will you recruit your participants?
- Where will you actually interview or survey participants?

QUESTION DEVELOPMENT

What process do we use for item generation?



Robinson & Leonard (2018)

Designing Your Own Questionnaire

- How will you phrase the question?
  - Consider reading level
  - Positive vs. negative phrasing
  - Open vs. closed ended
- What level of measurement?
  - Nominal, ordinal, interval, ratio
- Ordering of questions
- Interactive, visual, and/or auditory elements?

Generating Questionnaire Items

- Open-Ended questions
  - More time
  - Less constrictive and will allow for a wide range of responses beyond the discrete researcher-provided ones
  - Different skills needed to code and analyze
  - Can lead to future, improved closed ended questions

Generating Questionnaire Items

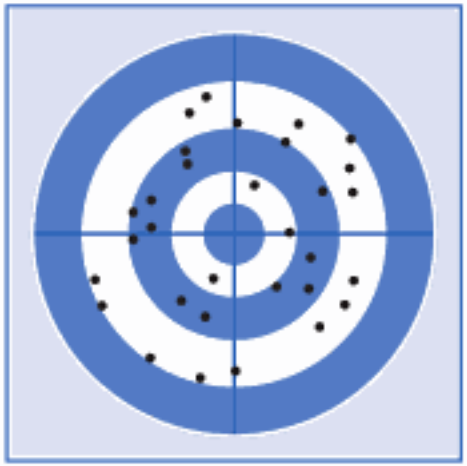
- Closed-ended questions
  - Conversely, more constrictive but streamlined coding and analysis
  - Allow for ranking, rating
  - Strength of opinion can be quantified – agree vs. disagree

Variability in Response

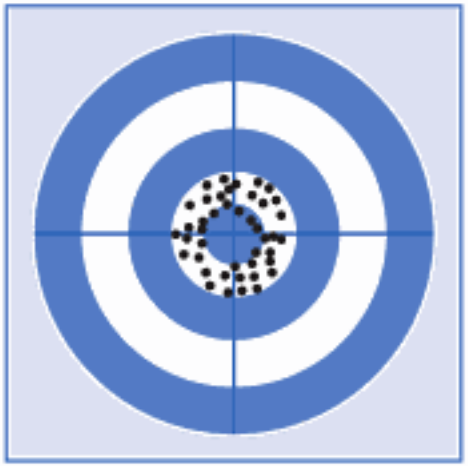
- A well written item produces variability in response
- What do you think about this course? (check one)
  - It is the worst course I have ever taken
  - It is somewhere between the worst and best
  - It is the best course I have ever taken
- Respondents are likely to choose the second category – no variability

Psychometric Properties

Reliable but not valid



Valid but not reliable



Valid *and* reliable

FIGURE 5-2

An Analogy to Validity and Reliability. A good measurement technique should be both valid (measuring what it is intended to measure) and reliable (yielding a given measurement dependably).

Babbie, E. (2010). The Practice of Social Research 12th ed.

Psychometric Properties

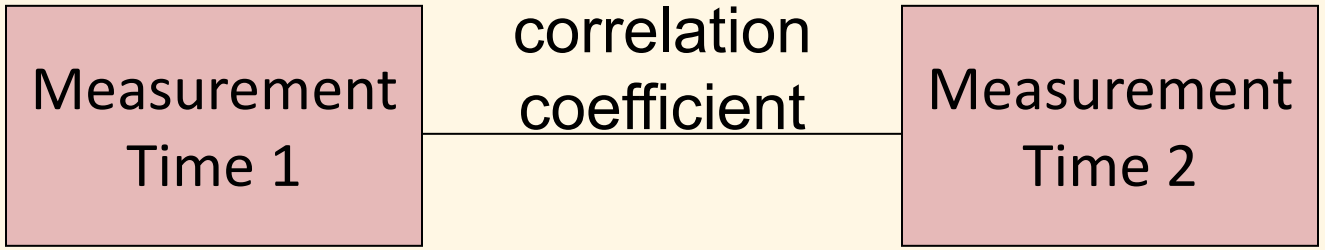
- Reliability
  - Internal consistency
  - Test-retest
  - Inter-/Intra-rater reliability
- Validity
  - Face
  - Content
  - Construct
  - Criterion

Internal Consistency

- Cronbach's Alpha – interrelatedness of all items with each other
- Are the items in your survey measuring the same concept?
  - Aim is for coefficient value close to 1.00
  - ≥.70 is adequate
- May be sample dependent

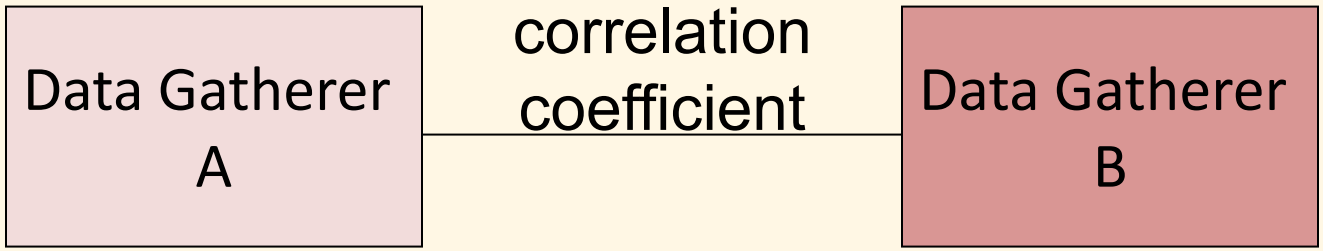
Test-Retest (Stability)

- Correlation between time points
- What is the duration between assessments?



Inter-Rater Reliability

- Also have intra-rater (same rater at different time points)
- Kappa coefficient
- Goal is to standardize the training and administration of questionnaires to limit variation between gatherers



Face Validity

- Ability of the survey to be understandable and relevant to the target population
  - Relevant and representative of the topic
  - Free from common errors
- Does the survey look like it measures what it is supposed to measure?

Content Validity

- How representative the items are of the underlying concept being measured
  - Based on appropriate selection of the items
  - Item selection based on:
    - Review of the literature
    - Items from similar instruments
    - Expert panel
    - Feedback from the target population

Construct Validity

- Theory driven and examines the extent to which the survey demonstrates the hypothesized relationships with other concepts/constructs
  - Essential for more abstract concepts such as attitudes and psychological distress
  - Factor Analysis

Criterion Validity

- Extent to which the survey predicts or agrees with a criterion measure (similar concept) or “gold standard”

A FUN EXAMPLE FROM THE LITERATURE

Article

Reliability and Validity of Seven Feline Behavior and Personality Traits

Salla Mikkola [1,2,3], Milla Salonen [1,2,3], Emma Hakanen [1,2,3], Sini Sulkama [1,2,3] and Hannes Lohi [1,2,3,*]

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- Online personality questionnaire completed by cat owners
- 4300 cats
- Internal consistency, test-retest reliability, inter-rater reliability, convergent validity, discriminant validity
- Factor analysis

Developing a cat personality questionnaire

- 138 Likert-type scaled questions, presented in randomized order
- 3 sections – behavior, background, and health
- Pretested with 9 experts on cat behavior, health, and welfare
- Data cleaning – excluded cats <3 months and >17 years of age; excluded if missing 20%+ responses in the behavior section

Developing a cat personality questionnaire

- 7 factors emerged: fearfulness, activity/playfulness, aggression toward humans, sociability toward humans, sociability toward cats, excessive grooming, litterbox issues
- Internal consistency: 0.60-0.90
  - Low scoring factors are behaviors and not personality traits
- Test-retest – after 1-3 months, n=127
  - 0.69-0.92, mean: .83
- Inter-rater – adult living in same household, n=41
  - Mean correlation: .83

Developing a cat personality questionnaire

Strengths

- >4300 cats
- Simplified # of factors over prior research (7 vs. 23)
- Assessed test-retest

Limitations

- Self-report
  - Owners may have breed-specific expectations
- Advertised exclusively on social media
- Two factors represent behaviors and not traits

Other Concepts Important for Survey Research

- Sampling
- Sample Size
- Response Rates
- IRB
- Budget

Sampling

- Random
  - Simple or complex in its execution
- Non-random
  - Convenience

Sample Size

- Related to
  - Who you are sampling
  - Your research question
  - Your questionnaire

- “Easy” way – use numbers similar to prior studies
- Better way – do your own power calculation

Response Rate

- The proportion of people selected as eligible to complete the questionnaire that actually complete the questionnaire
  - Potential for bias

IRB

- Survey research ≠ exempt IRB approval
  - Could contain confidential information
  - Survey content could be embarrassing if it became public
  - Could result in harm if responses or even participation were known in the community
- Consent process
  - Proxies
  - Assent

Budget

- Survey costs…
  - Materials
  - Personnel
  - Mode of administration (e.g., interview, postage, server space)

What to do with your data

- Data preparation
- Data analysis
  - Descriptive
  - Associations/Relationships
- Dissemination
  - Who is your audience?
  - What form of communication?

Closing Comments

- Development of a questionnaire and conducting survey research is…
  - A major undertaking
    - Time & Resources
  - Requires a systematic approach
    - Methodological
    - Analytical
  - Requires a skillset not commonly taught in research or clinical training programs

Closing Comments

- Educate yourself
  - Existing questionnaire strengths & weakness
  - Psychometric methods and analyses
- Find collaborators with skillsets that augment your own
  - Item development, questionnaire format
  - Administration - data collection, focus groups
  - Analytics

Benefits of Working with CTRIC

- Multidisciplinary expertise
  - Research design
  - Survey methodology
  - Evaluation
  - Biostatistics
  - Epidemiology
  - Public health
- Efficiency of study conduct
- **Cost-savings**

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Questions