Applying a "Total Error" Perspective to All Qualitative and Quantitative Research Methods

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Ames, Iowa, USA

Overview

- Background
- Modified TE Framework
- TE and TQF for Qualitative Research
- Tailoring TE to Any Research Method
- Applying the TE Perspective

Research Quality

- My Premises:
  - A great many research studies are poorly conceptualized, conducted, and/or interpreted
  - The quality of most research studies could be improved with few, if any, cost implications
    - "Getting a Better Bang for the Buck"
  - Using a **Total Error** approach could help change this

Total Error (TE) Background

- I have spent a good deal of my 40+ year research career conducting surveys (planning, implementing, and interpreting) for my organizations, my clients, and myself
- I also have spent a good deal of my career carrying out methodological studies to try to improve the quality of the data gathered by surveys
- But I also have done a good deal of qualitative work, including qualitative research as part of program evaluations of public policy social interventions
- Reading Groves' (1989) seminal book, *Survey Costs and Survey Errors*, was the first time I began to think about the value of using a "Total Error" framework/perspective/mindset as a way to organize the planning, implementation, and analysis of any research study, *be it qualitative or quantitative in nature*

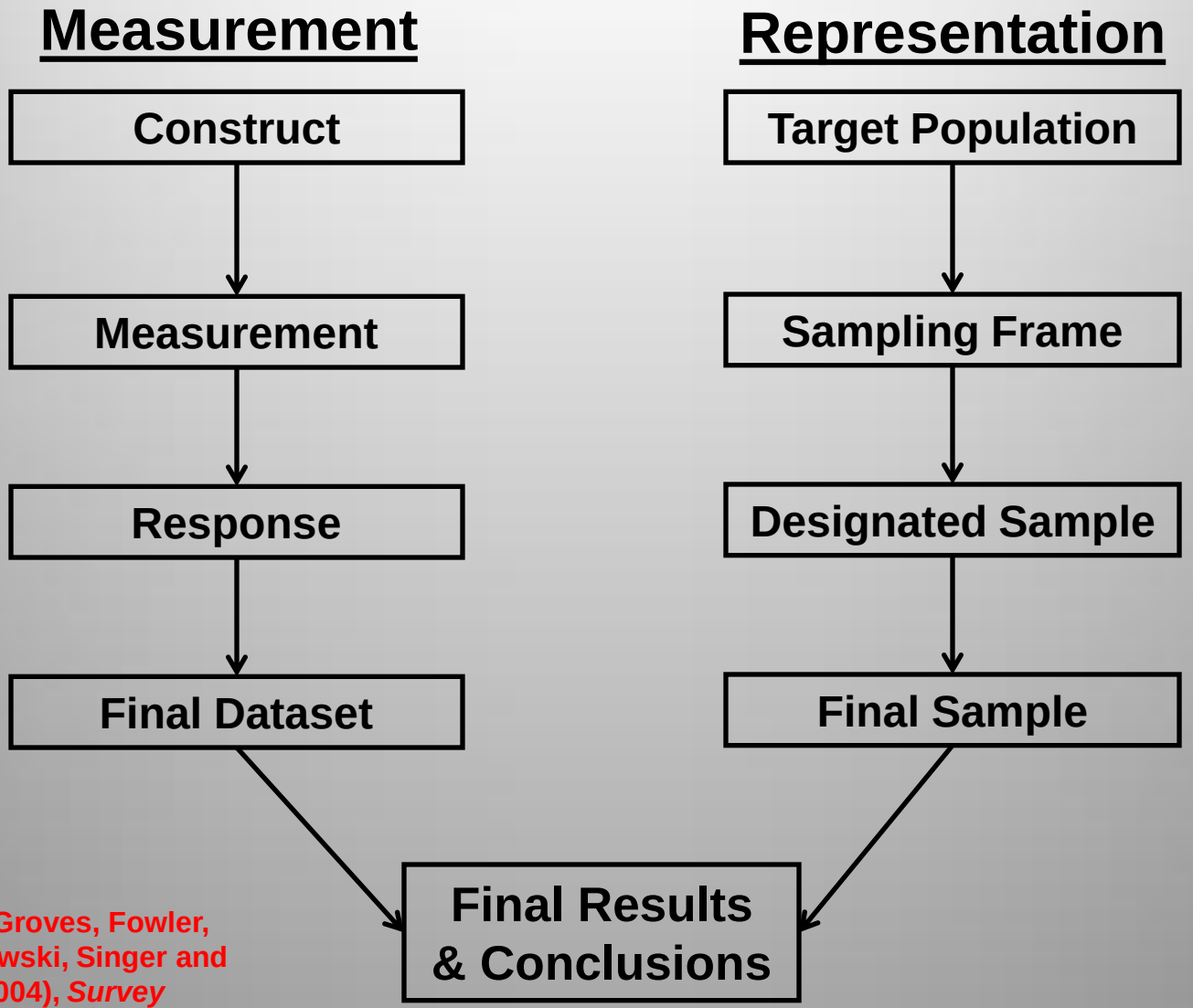
Total Error (TE) Background

- For the past 20+ years, I have used the TE perspective to guide all the research-related activities in which I have engaged
  - As a tenured full professor at Northwestern U., Ohio State U. and now as a visiting scholar and lecturer at Northern Arizona U.
  - As founding faculty director of the Northwestern U. Survey Lab and the Ohio State U. Center for Survey Research
  - As VP and chief methodologist for the Nielsen company
  - As an independent consultant for a number of public sector and private sector organizations
- In all my work, I have tried to impart my belief in the value of using a TE perspective to my students, employees, clients, and even my colleagues
- I also have done this, in part, in the way I have organized the content of most of my courses, technical reports, publications, and presentations

TE Background

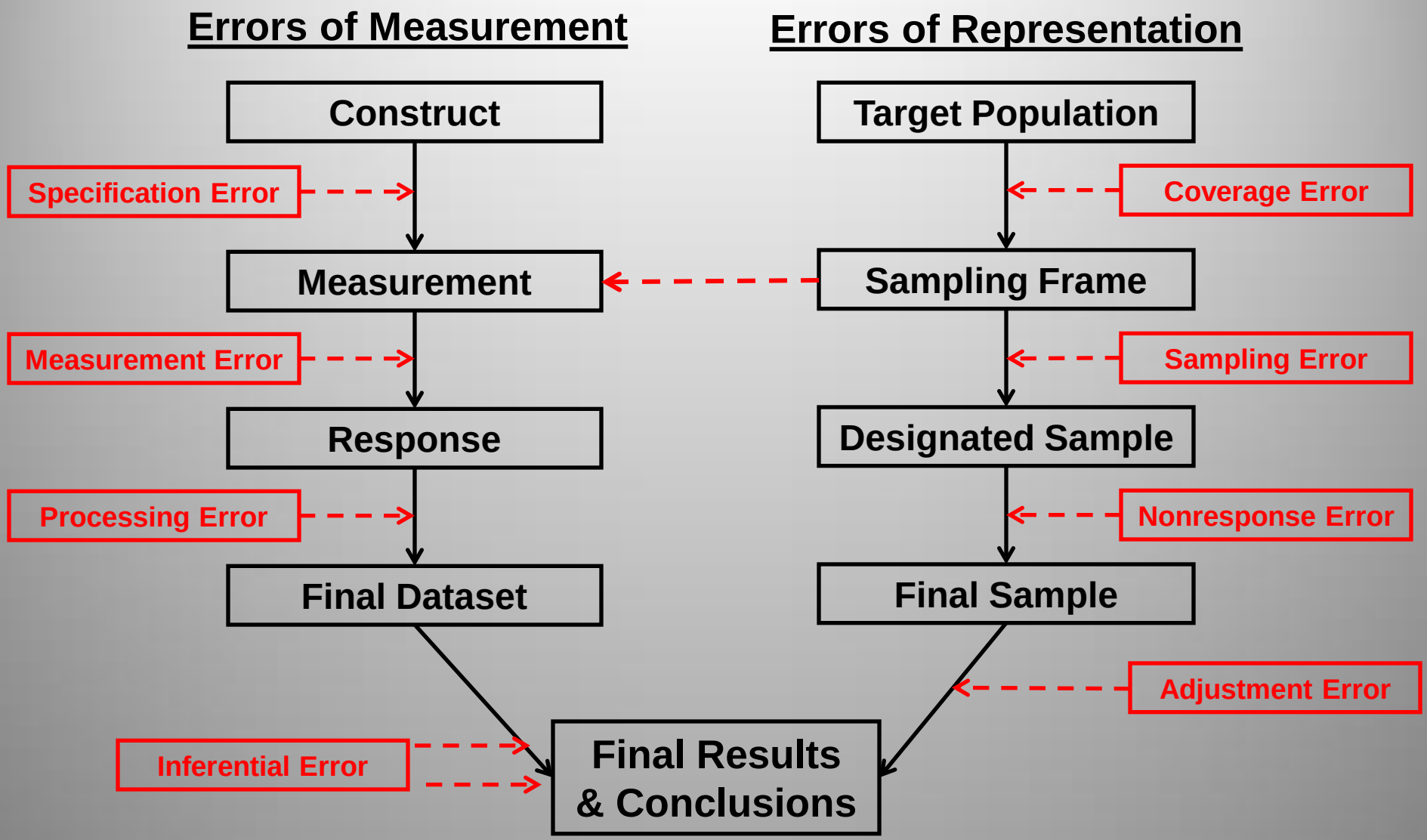
- What is the **Total Error** Perspective?
  - "Total Error" refers to all the problems that can make the information gathered in a research study and the conclusions drawn from that study WRONG (i.e., unreliable and/or invalid)
  - It applies to any research study, be it Qualitative or Quantitative in nature
  - Total Error, refers to anything that causes the information gathered in a research study to be of questionable/limited value
    - It helps one determine when research-based information **is or is not Fit for Purpose**

Research Process

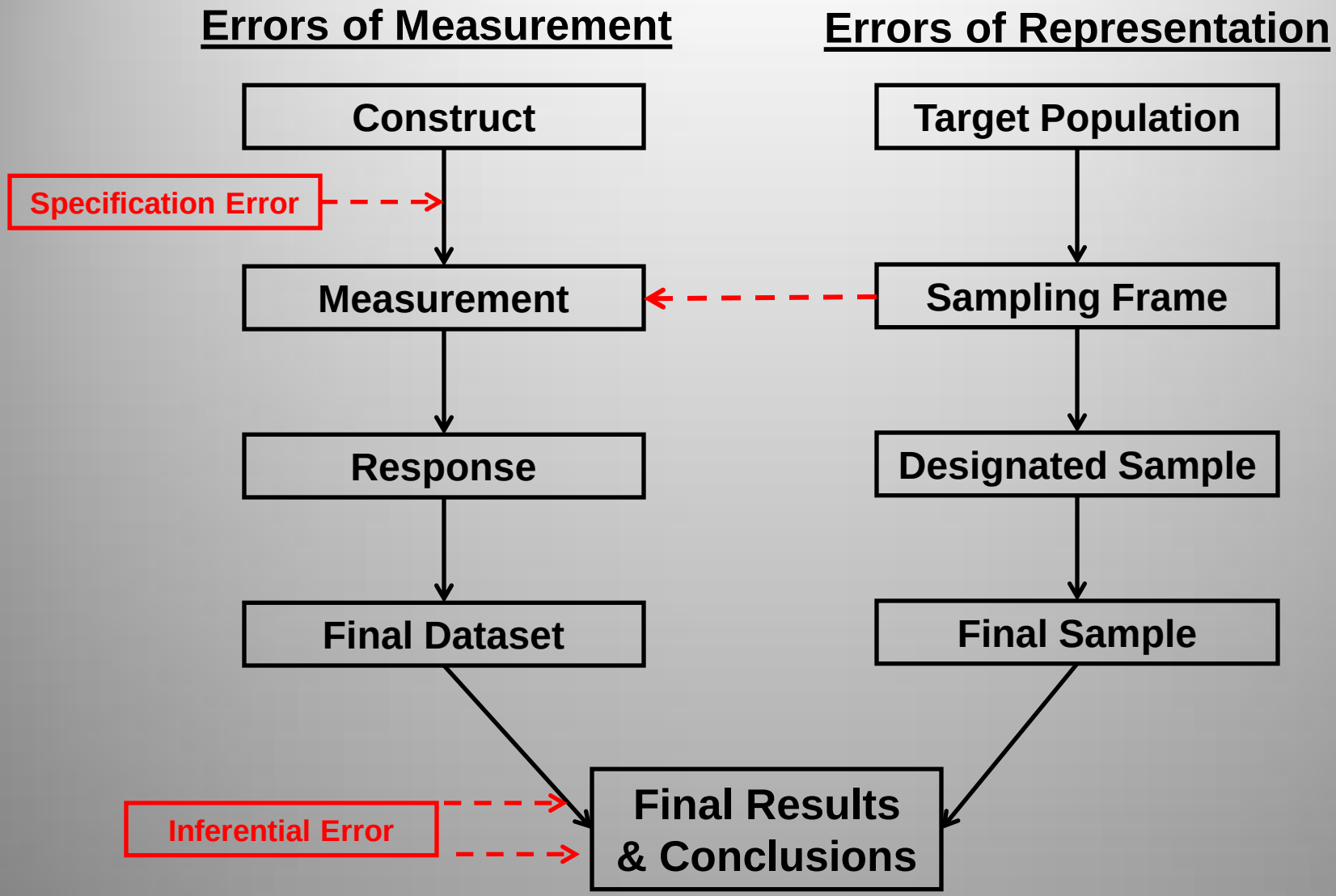


Adapted from Groves, Fowler, Couper, Lepkowski, Singer and Tourangeau (2004), *Survey Methodology;* Wiley.

Total Error Framework



Total Error Framework



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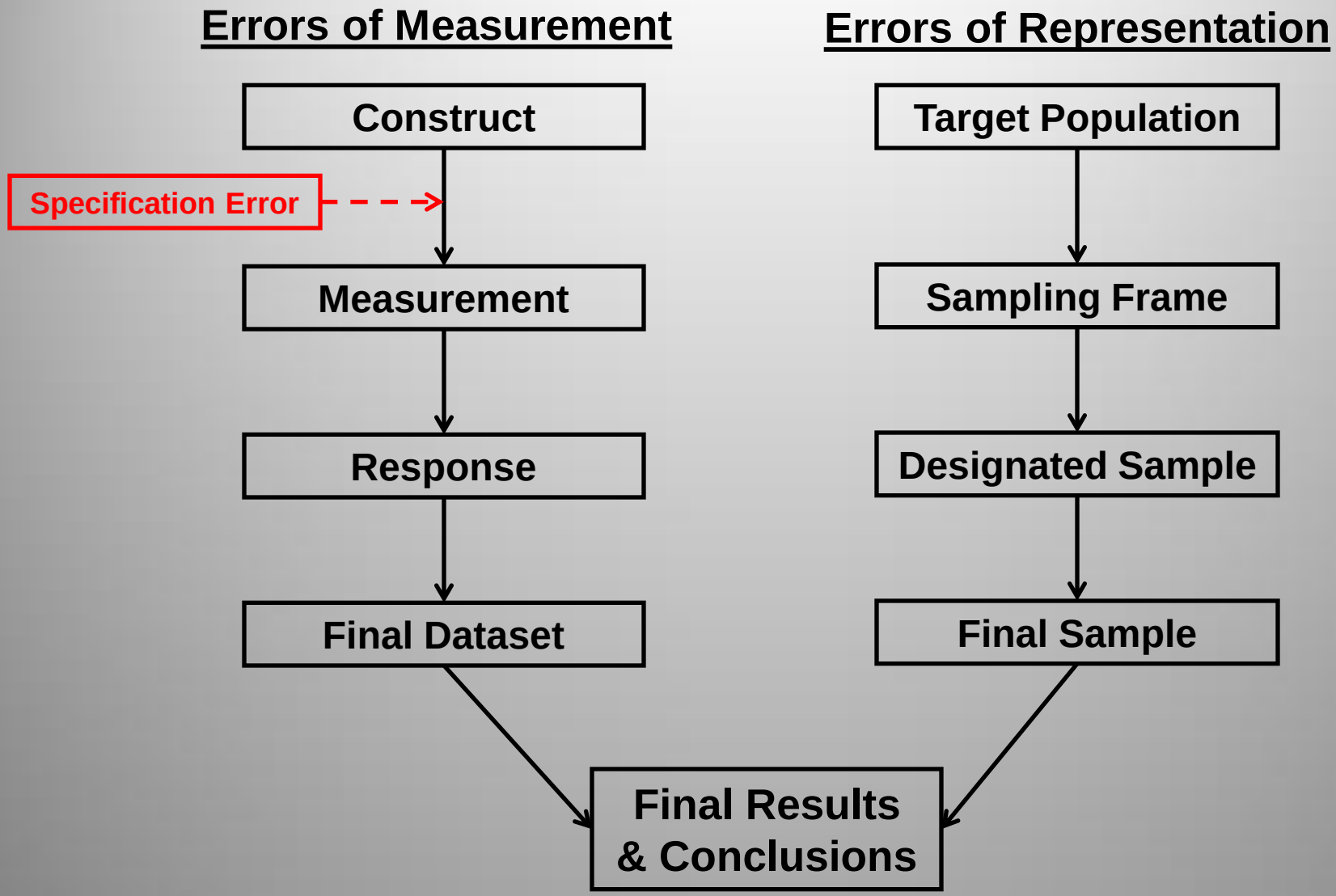


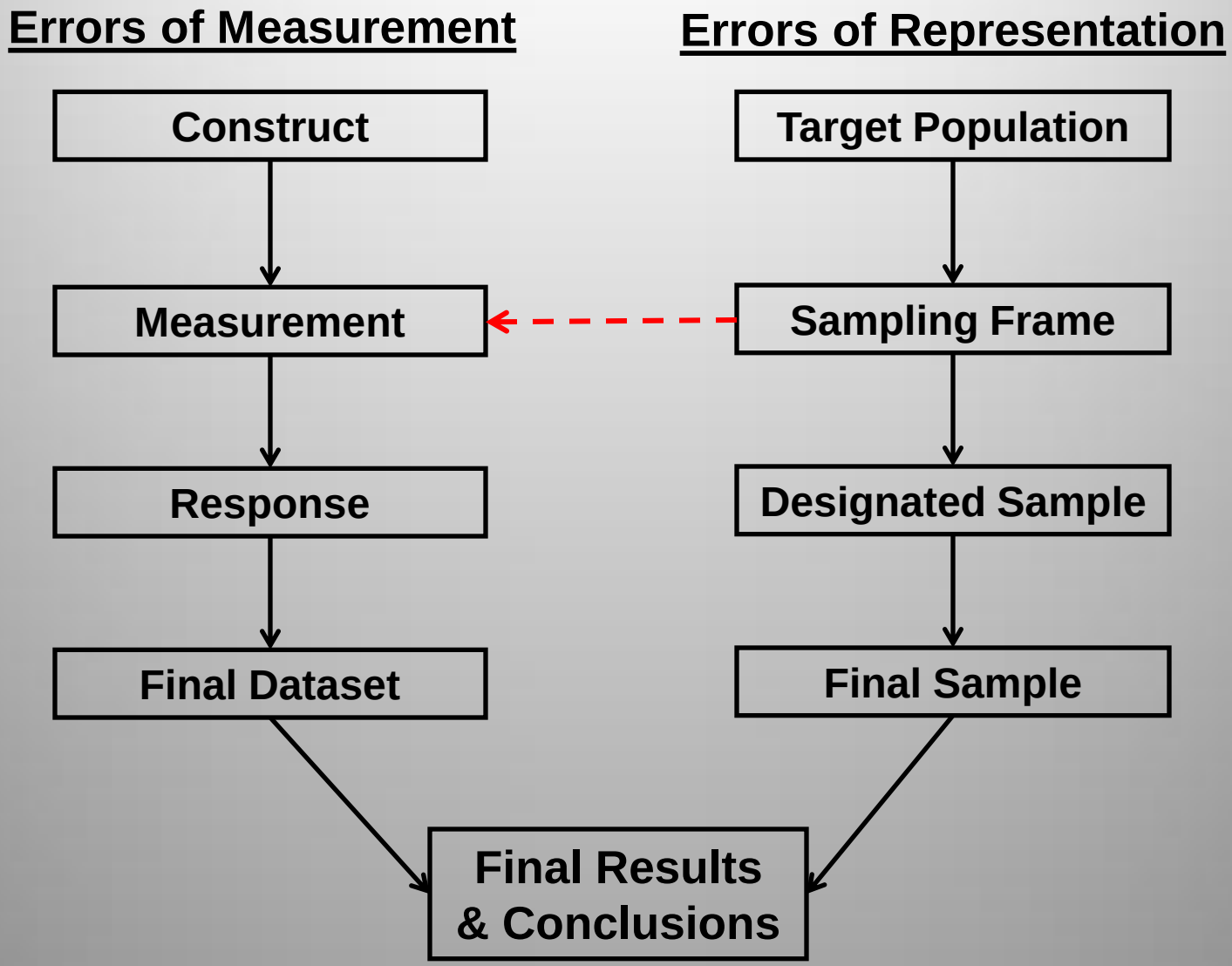
Specification of Constructs

- Research studies are conducted to shed light on problems/issues/topics that are judged to be important
- The topics of interest are represented by the constructs the researchers choose to study
- Constructs typically are multi-faceted
- Thus, an early key step in planning one's research is to decide what are the facets of the constructs that will be measured
  - One of the reasons this is so important is that it guides the choices made about exactly what information needs to be gathered for/about the selected units/elements

Specification Error

- To the extent that no information is gathered about important facets that help define a construct of interest, a Specification Error has resulted
- Of note, this is a special problem when secondary analysis is used with an existing dataset that was gathered for some purpose other than the new purpose(s) towards which the researcher now wants to put the information
  - In these cases, the information being used for the secondary analysis may simply not be “fit for purpose” because it does not sufficiently specify (measure) the constructs of interest
- It also may be a problem with the auxiliary data (including covariates) appended to one’s dataset
- Specification Error is linked to what Campbell and Stanley (1966) termed *Construct Validity*

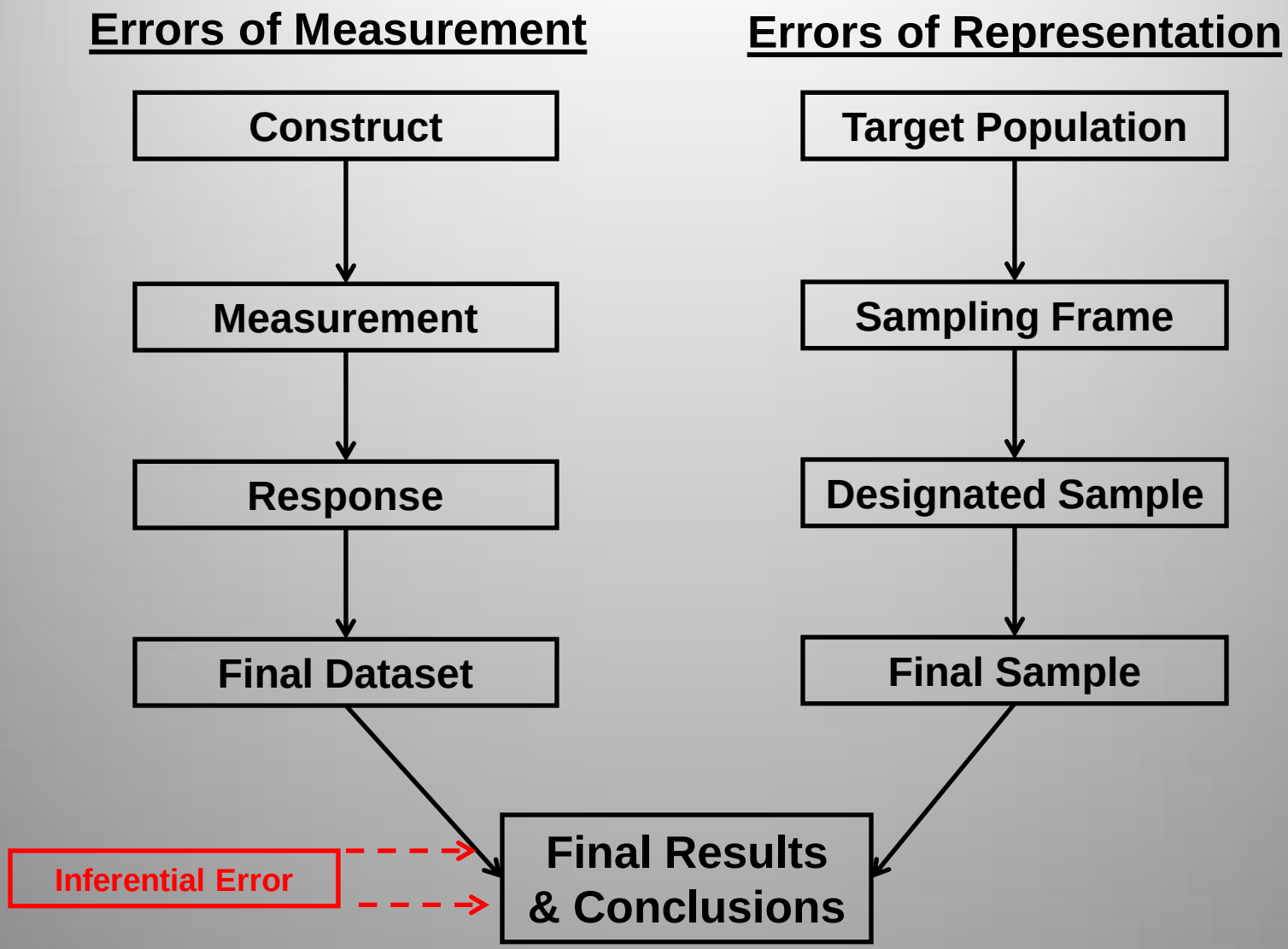
Total Error Framework



Interrelationship Between Sampling Frame and Measurement

- Generally, a researcher decides early on about the list (frame) that will be used to sampling the target population
- This decision will determine the mode(s) of data collection that can be used to measure the constructs of interest, for example:
  - An RDD frame will allow data collection to be done via telephone, and/or via mail or in-person for those numbers that can be matched to addresses, or via Internet if respondents have Internet access and are given a URL
  - An ABS frame will allow data collection to be done via mail and in-person and/or via telephone for those persons whose addresses can be matched to a phone number, or via Internet if respondents have internet access and are given a URL
- Furthermore, the frame chosen may restrict the constructs that can be measured in the study

Total Error Framework



Errors of Inference

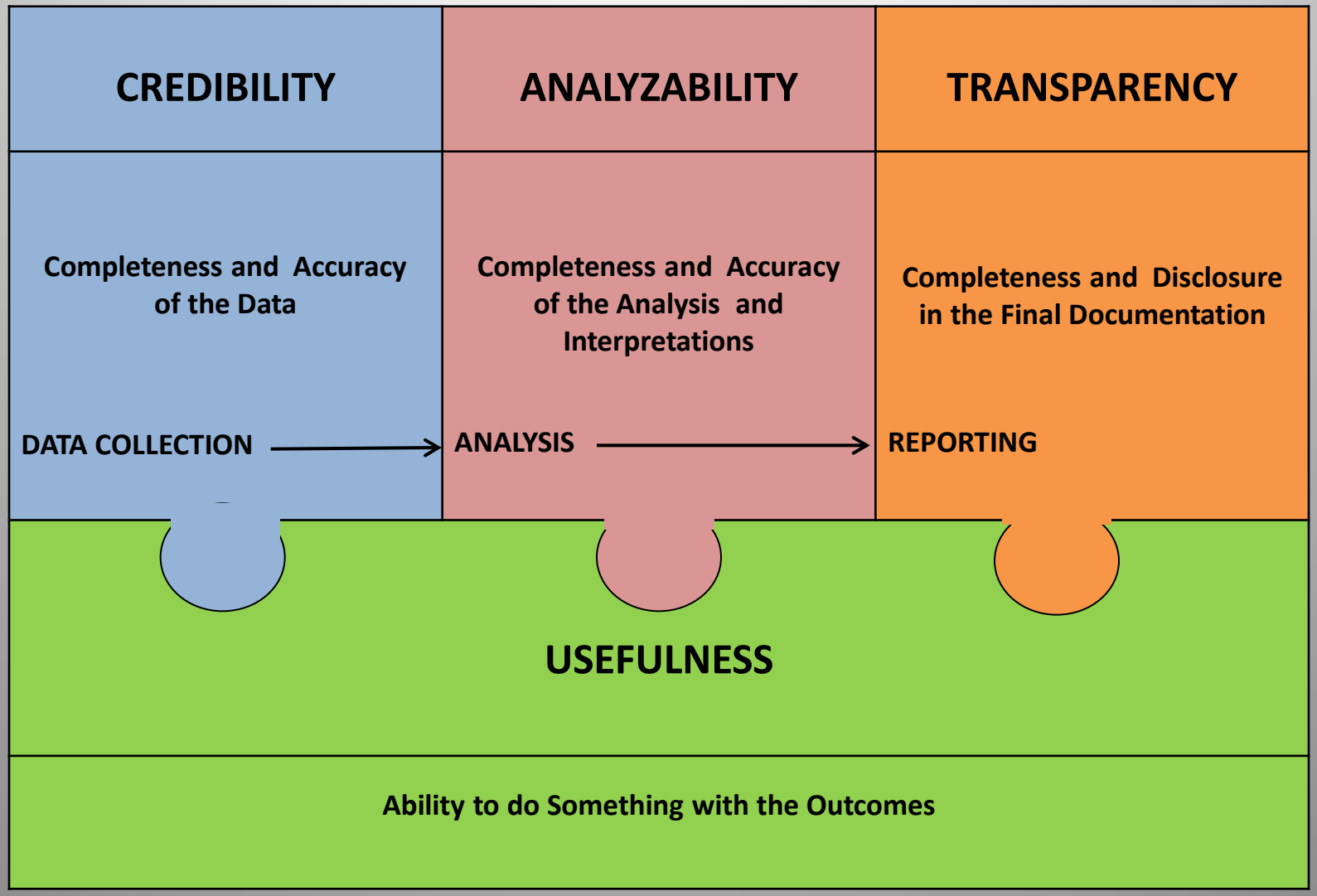
- When the information gathered in a research study is analyzed – i.e., when "sense" is made of the data – the researcher(s) may not use the best or even correct analytic "tools"
  - This is related to what Campbell and Stanley termed *Statistical Conclusion Validity*
- Furthermore the researcher(s) may draw inferences that are not supported by the nature of the research design that was used
  - In particular, cause-and-effect conclusions may be drawn when the research design was something other than an unconfounded experiment to test what was studied
    - This is related to what Campbell and Stanley termed *Internal Validity*

Qualitative Research and the TE Perspective

From the Quantitative to the Qualitative

- I am primarily a quantitative researcher, but often have used a variety of qualitative methods and I do value them
- Although the language I have been using is primarily associated with quantitative research, I believe the concepts apply as well to qualitative research
- To that end, for more than a year, I have been engaged in a rewarding adventure working with Margaret Roller, a qualitative researcher and fellow AAPOR member, writing a qualitative methods book due to be publish in 2014 by Guilford
- Our book uses terminology about Research Quality that is more familiar to qualitative researchers

Total Quality Framework (TQF) for Qualitative Research (Roller & Lavrakas, Forthcoming)



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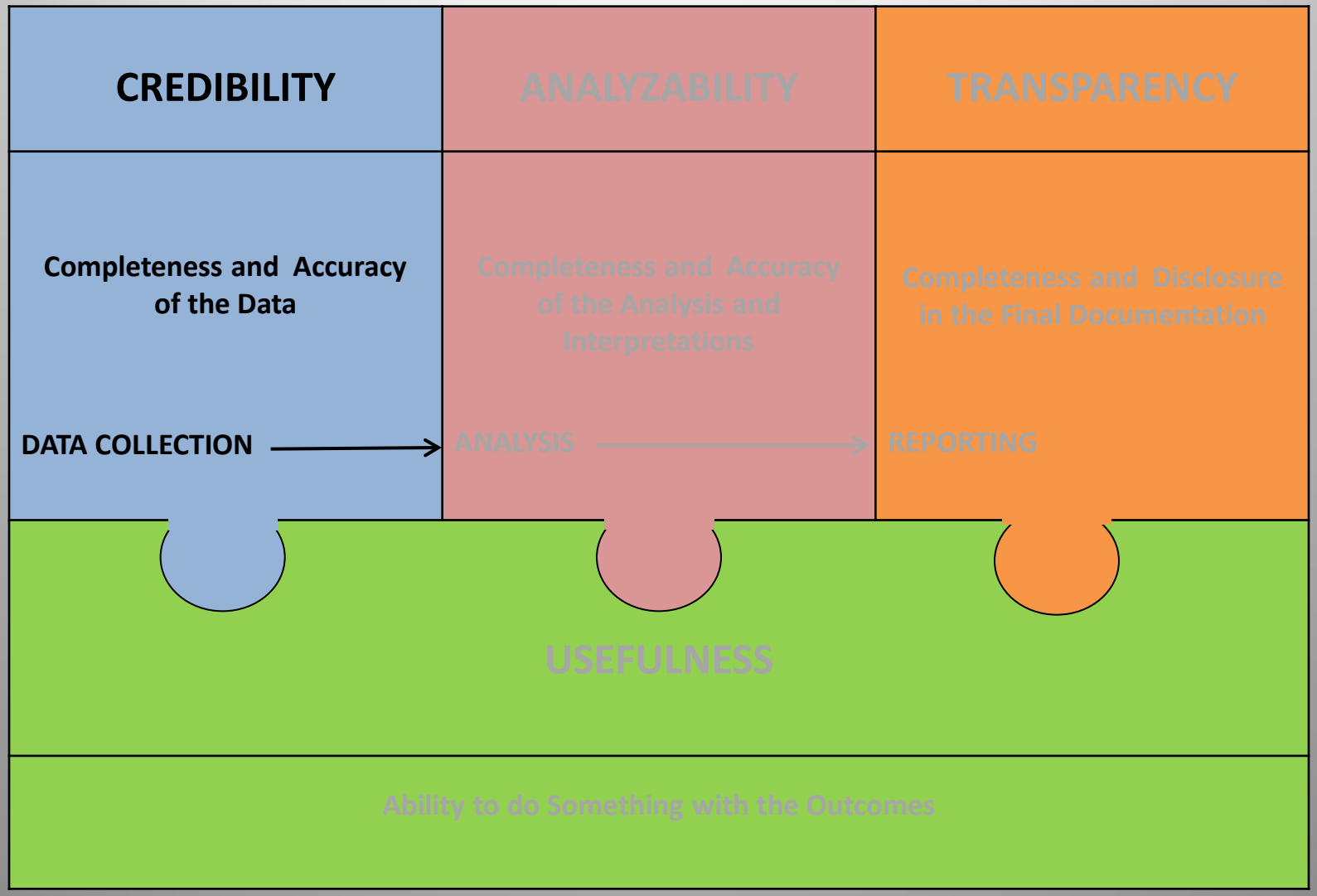

TQF: Credibility

- Completeness and Accuracy of Data
  - Scope (representation; external validity)
    - Coverage Error
    - Sampling Error
    - Unit Nonresponse Error
  - Measurement (construct validity)
    - Specification Error
    - Instrument-related Measurement Error
    - Respondent-related Measurement Error
      - Item Nonresponse Error
    - Interviewer-related Measurement Error
    - Mode-related Measurement Error

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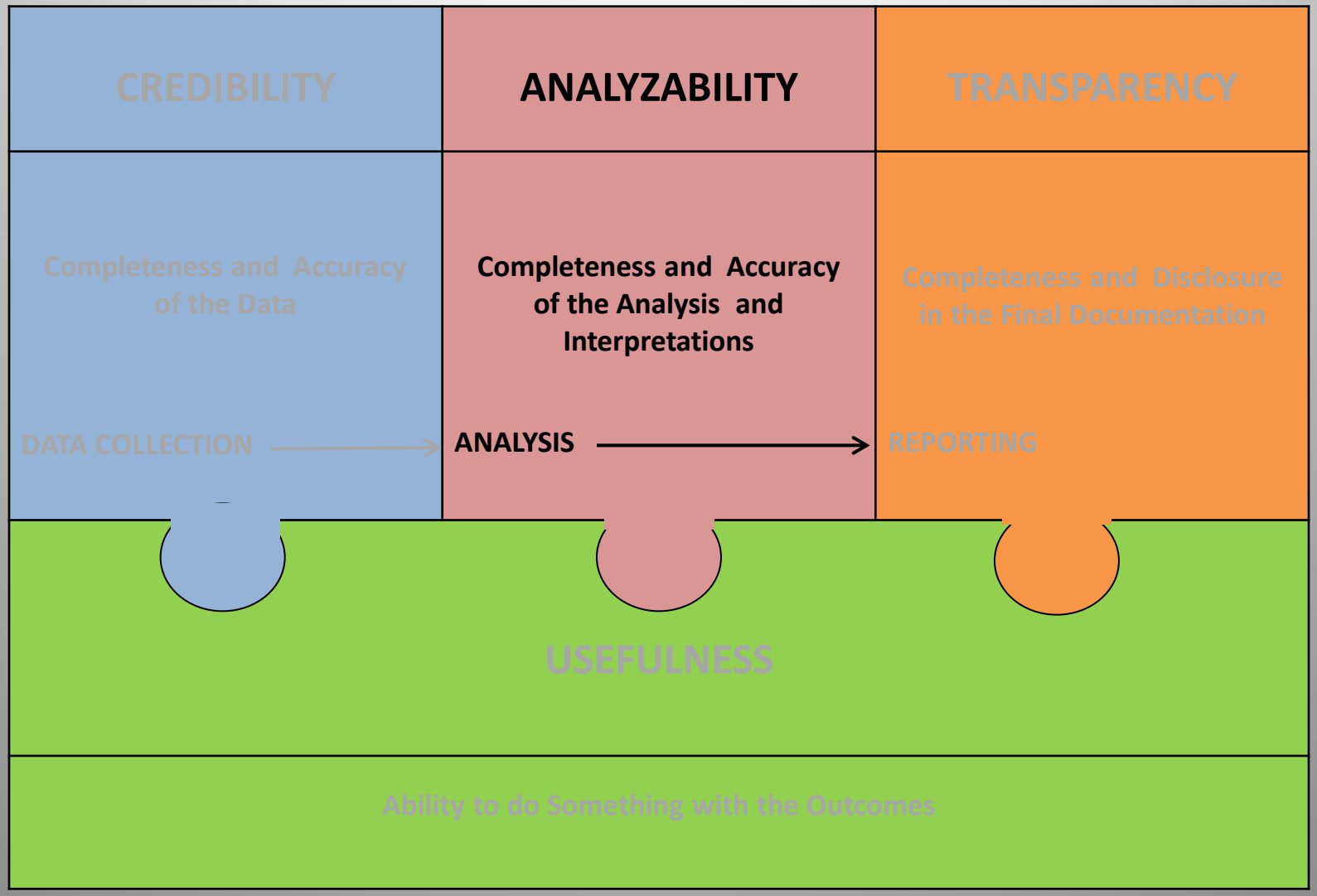

TQF: Analyzability

- Completeness and Accuracy of Analysis and Interpretations (Sense-Making)
  - Processing Error
  - Adjustment Error
  - Inferential Error
    - Verification
      - Peer Debriefings, Reflexive Journals, Deviant Cases, Triangulation
    - Cause-and-Effect Reasoning

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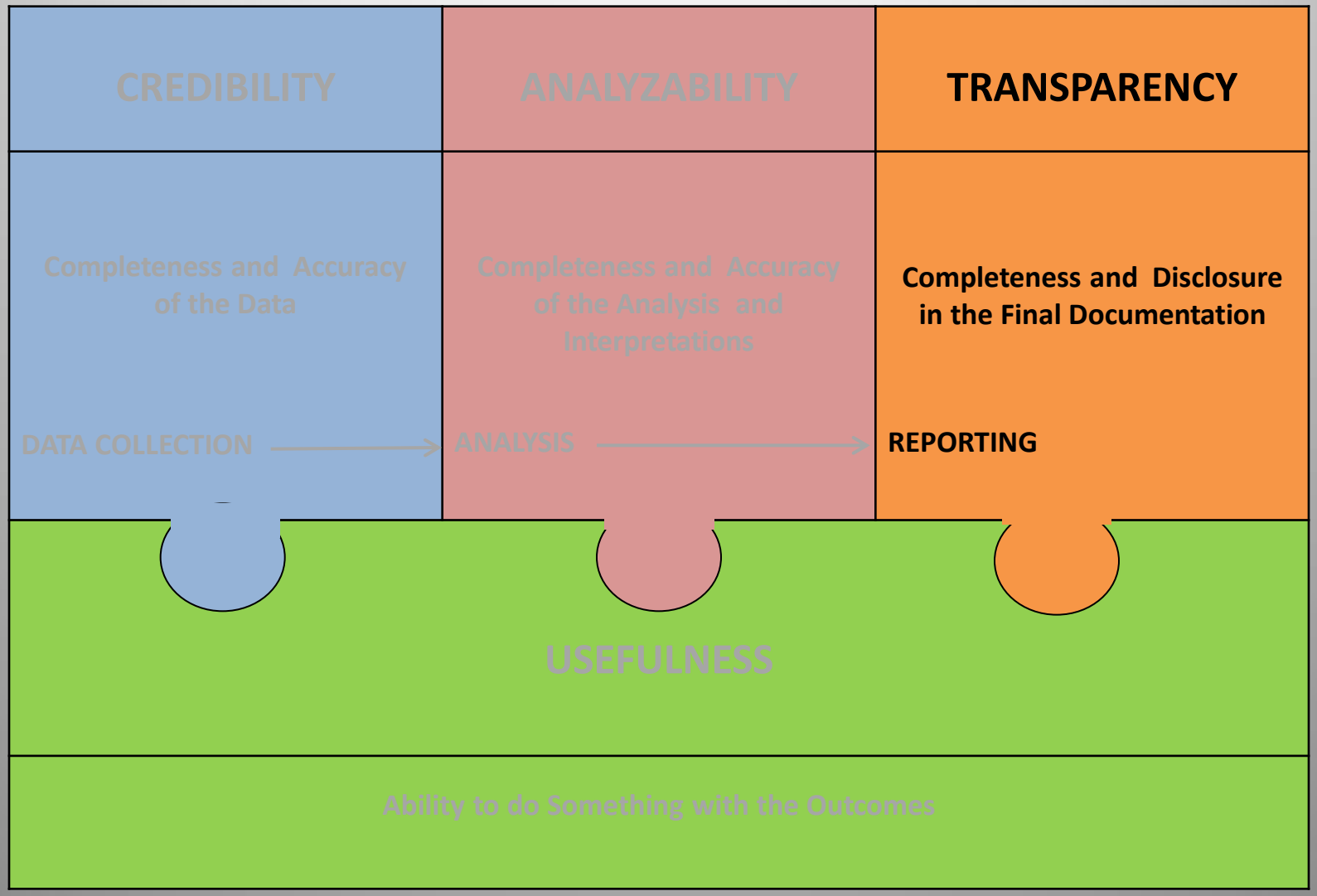

TQF: Transparency

- Completeness and Disclosure in Final Documents
  - Thick Descriptions
  - Rich Details
  - Applicability/Transferability to Other Contexts

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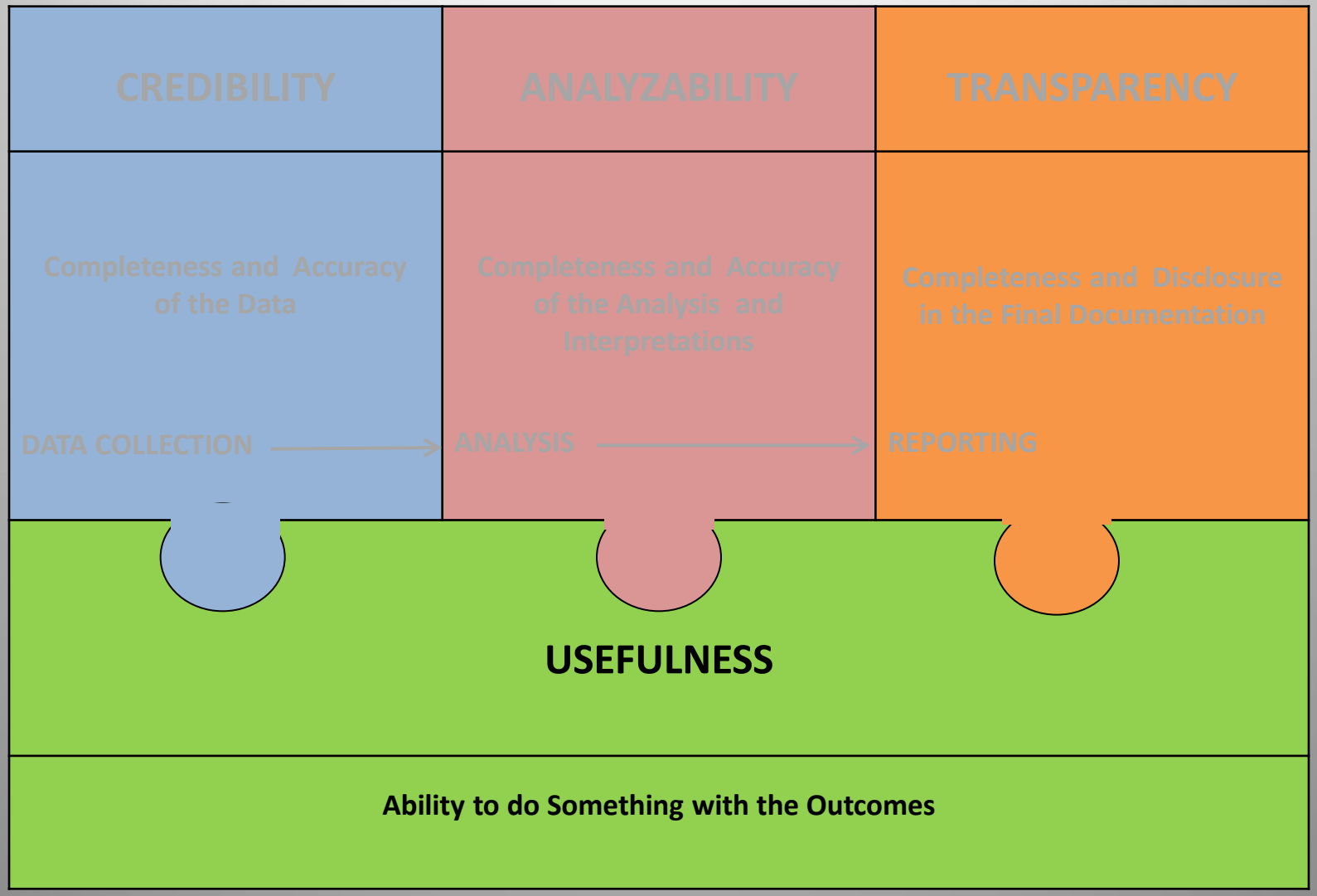

TQF: Usefulness

- Ability to “Do Something” with the Outcomes
  - Support/Refute Hypotheses
  - Refine Hypotheses
  - Generate New Hypotheses
  - Make Decisions
  - Take Action

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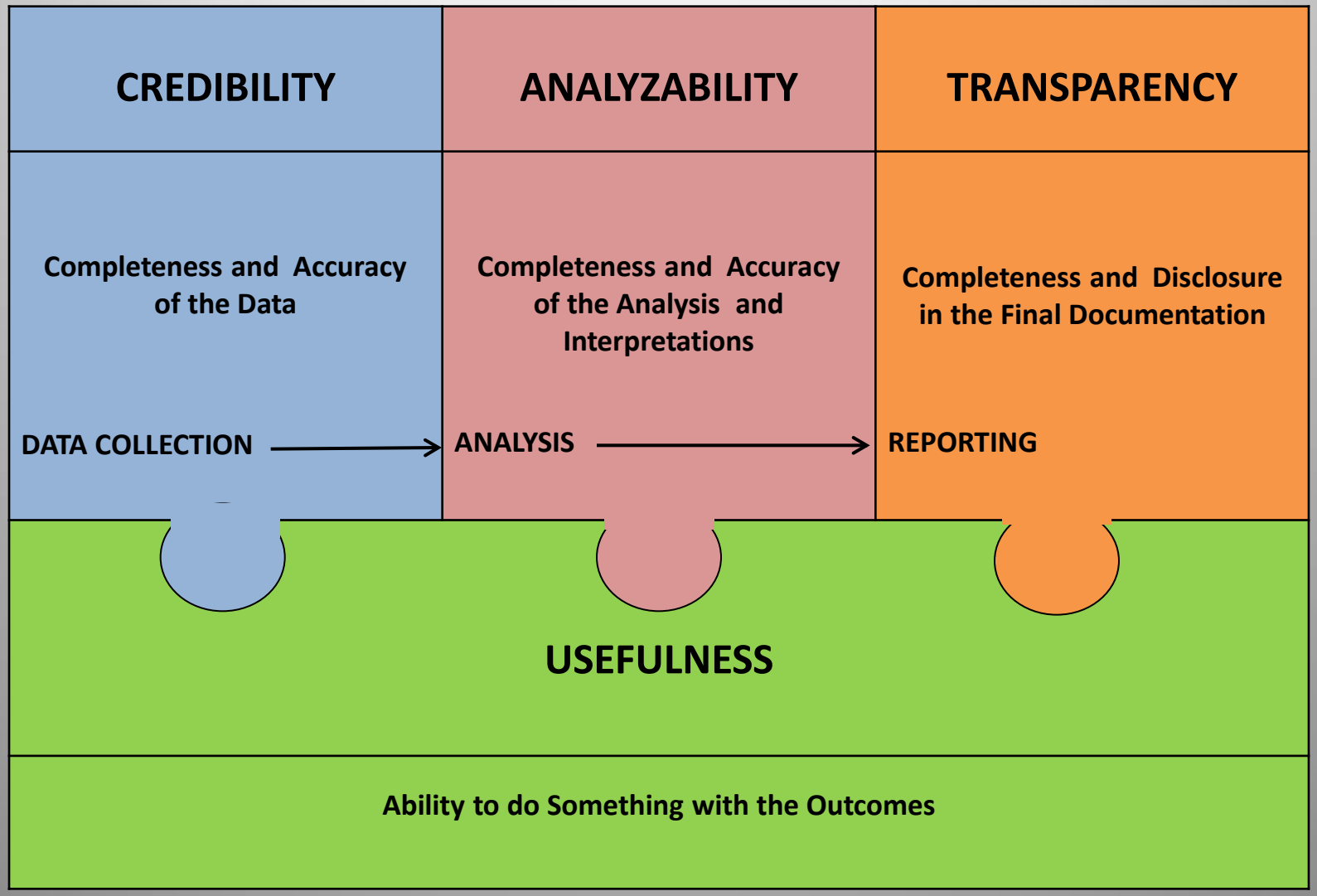

Tailoring the TE Perspective to Different Research Methods

TE and Experimental Design

Errors of Representation	
Error Type	**Key Considerations**
Coverage	To what population is the experiment meant to generalize; what subject pool will be used to represent this population; what will be the nature and effects of noncoverage
Sampling	**How will subjects be recruited from the subject pool and how will they be randomly assigned to the different experimental conditions**
Nonresponse	What strategies will be used to minimize noncooperation; will any consideration be given to whether noncooperators differed from cooperators and thus does this limit external validity
Adjustment	Should any such adjustments be made

TE and Experimental Design

Errors of Measurement	
Error Type	**Key Considerations**
Specification	What are the key dependent variables, independent (treatment) variables, and covariates to measure
Questionnaire	How will the dependent variables, independent variables and covariates be operationalized; what pilot testing will be done
Respondent	**How will respondents be equally motivated to provide fully accurate data across experimental conditions**
Interviewer	Usually not relevant unless experiment is embedded within a survey questionnaire
Mode	May be relevant as experimental treatments may be administered via any mode
Processing	How will data be cleaned and new variables derived (e.g., creating a scaled variable)
Inferential	Are there confounds undermining the integrity of the experiment

TE and Content Analysis

Errors of Representation	
Error Type	**Key Considerations**
Coverage	What population of content will be studied; what will be the source/archive for this content; how will that source be accessed; what will be the size and nature of noncoverage
Sampling	How will the individual units/elements of that content be selected for study
Nonresponse	**What are the chances that sampled content will not be available for study from the content archive; what will happen when this occurs**
Adjustment	Unlikely to be an issue unless a complex sampling design is used

TE and Content Analysis

Errors of Measurement	
Error Type	**Key Considerations**
Specification	What are the key constructs that will be measured/coded
Questionnaire	How will the constructs be operationalized on the coding form; what pilot testing will be done
Respondent (aka the Content)	Not Applicable, unless the condition of the content is such that it is hard to decipher (e.g., illegible)
Interviewer (aka the Coder)	**Who will do the coding, how will they be trained, how will their coding reliability be determined**
Mode	Computerized or paper and pencil coding
Processing	How will data be cleaned and new variables derived (e.g., creating a scaled variable)
Inferential	Not likely to be applicable, as the method is descriptive

TE and In-Depth Interviewing

Errors of Representation	
Error Type	**Key Considerations**
Coverage	What population of persons will be interviewed; what will be the list(s) for this population; how will that list(s) be accessed; what will be the nature of noncoverage on the list
Sampling	How will the individual persons on the list(s) be selected for interviewing; if all are selected, is this actually a "census," and if so sampling error is not applicable
Nonresponse	What strategies will be used to minimize noncooperation; how will possible nonresponse bias be assessed
Adjustment	**Relevant if researchers will mentally "weight" the information gained from some interviewees differently than that from other interviewees**

TE and In-Depth Interviewing

Errors of Measurment	
Error Type	**Key Considerations**
Specification	What are the key constructs that will be asked about in the interviews
Questionnaire	**How structured and scheduled will the questions be within the interview; what pilot testing will be done**
Respondent	How will interviewees be motivated to provide fully accurate information
Interviewer	How will interviewers develop rapport with interviewees; how will bias be avoided
Mode	Which mode(s) will be used for interviewing; how will interviews be captured/recorded
Processing	How will interviews be transcribed and sense made of them
Inferential	How will objectivity be maintained in drawing conclusions

TE and Focus Groups

Errors of Representation	
Error Type	**Key Considerations**
Coverage	What population of persons will be represented; what will be the list (s) for this population; how will the list(s) be accessed; what will be the nature of noncoverage on the list(s)
Sampling	How will the individual persons on the list(s) be selected to participate
Nonresponse	**What strategies will be used to minimize noncooperation; how will possible nonresponse bias be assessed**
Adjustment	Not applicable

TE and Focus Groups

Errors of Measurment	
Error Type	**Key Considerations**
Specification	What are the key constructs that will be discussed
Questionnaire	How structured and scheduled will the discussion guide be; what pilot testing will be done
Respondent (aka Participant)	How will participants be motivated to provide fully accurate information and not to feel inhibited in expressing themselves
Interviewer (aka Moderator)	How will the moderator develop rapport with group and within the group; how will bias be avoided
Mode	Which mode(s) will be used for the group "discussion;" how will the discussion be captured/recorded
Processing	**How will the discussion(s) be transcribed and analyzed**
Inferential	How will objectivity be maintained in drawing conclusions

TE and Observational Research

Errors of Representation	
Error Type	**Key Considerations**
Coverage	What population of persons will be represented; what will be the list of locations to observe this population; how will that list be accessed; what will be the nature of noncoverage on the list; during what dates and times will observations be made
Sampling	**How will the individual places and/or times of observation from the list(s) be selected**
Nonresponse	To what extend were persons or behaviors that "normally" would have been present not present during the selected locations and times; how can this be assessed and what will be done about it
Adjustment	Not applicable, unless a complex sampling design is deployed

TE and Observational Research

Errors of Measurment	
Error Type	**Key Considerations**
Specification	**What are the key behavioral constructs that will be observed and what are the facets of each; what covariates should be gathered**
Questionnaire	How will the observational information and covariates be collected
Respondent	Will people know they are being observed and if so how will this affect them
Interviewer (aka Observer and/or Coder)	Will the observer also be a participant in the behavior(s) being observed; how will bias be avoided; if coders are used, who will do the coding, how will they be trained, how will their coding reliability of determined
Mode	Which mode(s) will be used for gathering the observations
Processing	How will observational data be transcribed and analyzed
Inferential	How will objectivity be maintained in drawing conclusions

Applying the TE Perspective

When Consuming Research Findings and Other Information

- TE is a way of thinking about research and many other types of information in one's life
- It offers a crucial set of questions to ask yourself about the likely accuracy (reliability and validity) of any research study you come across
- TE issues can be used to evaluate the likely accuracy of any information upon which you are thinking about basing a decision
  - How much confidence can I place on this information being correct "enough" for the decision I need to make?

When Writing Your Own Research Reports

- TE can be used as an organizational framework for an Appendix detailing the methodology of your study
- TE can be used as a roadmap for a self-critique of the strengths and weakness of your research
- Any research literature review can be enhanced by using TE to structure your critique of that body of knowledge
  - Far too often, literature reviews do not include an evaluation of the reliability and validity of the literature being reviewed
- Any review of a research study proposal or a manuscript can be enhanced using the TE approach

Creating RFPs and Evaluating/Scoring Submitted Proposals

- RFPs for research to be conducted are a perfect venue for explicitly applying the TE framework
  - This forces the funding agency to think carefully about what they are requesting
  - It forces those submitting a proposal to think explicitly about how to improve the quality of the information that will be gathered in the study and articulate what they think should be done to address the important sources of error that could threaten the entire value of the research
  - The system used by reviewers scoring the proposals can be structured to coincide with TE, so that an objective, logical, and comprehensive evaluation is carried out in identifying the best vendor

Expert Legal Reports and Testimony

- Attorneys and Judges are, for the most part, unfamiliar with the TE perspective
- But once it is explained to them, they find it very appealing because it is logical and comprehensive
  - Stec & Lavrakas chapter in *Handbook of Litigation* (forthcoming)
- TE is appropriate whether an expert is planning a research study to gather evidence for her/his client or if the expert is critiquing a research study the opposing party is using as evidence

Explaining Why a Particular Research Method Should be Deployed

- TE helps one structure any meeting with a potential client to explain why a particular research method is the most cost-effective one
  - Helps showcase the study's strengths
  - Allows one to be up front (Transparent) about the study's limitations/weaknesses

Creating Your Own TE Checklist

- TE is a comprehensive and systematic way for a researcher to engage in a rigorous process of self-evaluation and improvement
- Take the time to use the TE framework to think back through your research plans, proposals, oversight of the field period, and reports
- If you have not already done so, why not create an explicit TE checklist for yourself and use it until the TE way of thinking becomes second nature to you…

Transparency and Disclosure

- TE provides you with an explicit, logical, and comprehensive way to:
  - Think critically about any research you are planning
  - Structure how you monitor your research while it's being fielded
  - Think critically about what implications and recommendations can be made with confidence from your findings
- Even if you do not disclose this detailed level of thinking to anyone else, you will benefit by holding yourself to a higher standard
  - And those you work with/for also will benefit from you doing this

Total Error Article in POQ

- 2013 AAPOR Presidential Address two weeks ago
- An article based on the address and today's presentation will appear in AAPOR's flagship journal, *Public Opinion Quarterly*, in the fall 2013 issue

Thank You

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