Quantitative Methodology ~ Chapter 3

NOTE: *Not intended to be all-encompassing, but a general overview of the Methodology section.*

The methodology section is a map of exactly what you're going to do and how you're going to do it. Flaws in the methodology can lead to weak, invalid, unreliable, and unusable results. The guiding principal is to provide enough detail so that a researcher could replicate the study. It should also serve as the protocol that you will follow to conduct the study.

Typical sections, 1) Participants, 2) Instruments, 3) Procedures, and 4) Statistical Analyses. While these sections may vary, they generally appear in the order presented here.

Where to begin. The first few paragraphs should provide a road map, or overview, of the chapter. These paragraphs should provide the reader with a good idea of what will be found in each section.

Participants. This section should inform the reader as to 1) who will be the participants in the study, 2) where you will obtain the participants, 3) the number of participants, and 4) the representativeness of the sample and thus the external validity or generalizability. In selecting your sample, it is essential that it is representative of the population of interest (i.e. target population). Once you identify the target population, you need to identify a group of individuals who are accessible, and fit within the target population. This group is technically called your participant pool. Be sure to fully describe how you will be selecting these individuals from the target population. Specific selection procedures (random, nonrandom) should be described in detail. Be mindful of specific participant parameters that may be of interest to your study. Finally, document any limitations of your sample.

Sample size. Determining the appropriate sample size assures adequate power to detect statistical significance. It is very important to estimate the appropriate sample prior to (*a priori*) conducting your study. One way of determining an appropriate sample size is by examining past studies that are similar to your current study. Previous research can often times provide evidence and results that can lead you to an appropriate sample size. Another way of determining sample size is conducting a statistical procedure called a power analysis. To conduct a power analysis, you need, 1) type of statistical analysis you will conduct, 2) effect size of the variables of interest (achieved in previous studies similar to your own), 3) alpha level, and 4) power. Computer programs such as g*power are available to help simplify power analysis procedures.

Apparatus. Include in this section any hardware or software equipment. If it's a marketed product, include the manufacturer name, product make, and model number. If you constructed a device, be sure to provide adequate detail for the reader to judge the design and build of the apparatus.

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Materials. The basic task in this section is to describe the psychometric adequacy of the materials (typically printed) in your study. There are typically 11 points that should be included in the description of each instrument, 1) instrument name, 2) acronym, 3) author(s), 4) key reference(s), 5), a brief description of the construct the instrument assesses, 6) number of items, 7) types of items (e.g., Likert), 8) factors or subscales and their definitions, 9) indication of the direction of scoring and what a high score means, 10) reliability estimates, 11) validity estimates. While you will generally include the material (e.g., survey) in the appendix, you should provide example items and response formats in this section.

Procedures (data collection). The procedures section should describe chronologically the exact steps for all phases of the study from preliminary pilot testing to contacting participants and administering the instruments or intervention. There should be a great amount of detail in this section. When procedures are complex, consider incorporating a procedure flow chart. In essence, all aspects of the study should be documented so that another investigator could effectively replicate your study.

This section may also serve as a manual for your data collection process. A high quality data collection plan will ease some of the burden during actual data collection. In some research environments (e.g., clinical research), a data management plan (DMP) is created. A DMP specifies the work to be performed, the responsible individuals for aspects of the work, and the actual documentation to be collected or produced. In addition, a DMP will include details such as database design and build, edit check specifications, database testing and release, query management, managing various forms of data (e.g., lab, paper, electronic), coding reported terms, transferring data, and database lock.

Statistical analyses. This section should describe the data analyses that will be used to test your hypotheses. You should carefully write each of your hypotheses and identify all independent (IV) and dependent variables (DV), and the planned statistical analysis. It may be helpful to use a table to document the details of each hypothesis and all appropriate variables. The table should contain the research question(s), details of the IVs and DVs such as scale of measurement, range, and the instrument or apparatus that the IVs and DVs will be obtained.

Contact Michael A. DeDonno Ph.D. to discuss your research interests. Florida Atlantic University, 777 Glades Road, Boca Raton, FL. 33431, mdedonno@health.fau.edu

References & Further Readings

Heppner, P. P., & Heppner, M. J. (2004). *Writing and publishing your thesis, dissertation, and research: A guide for students in the helping professions*. Belmont, CA: Thomson/Brooks/Cole.

Prokscha, S. (2011). *Practical guide to clinical data management*. Boca Raton, FL: CRC Press.

Szuchman, L. T. (2013). *Writing with style: APA style made easy*. Belmont, CA: Cengage Learning.