

12-28-2009

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Recommended APA Citation

Hansen, C. (2009). More Tools for the Synthesist's Toolbag in Harris Cooper's Research Synthesis and Meta-Analysis: A Step-by-Step Approach (4th ed.). *The Qualitative Report*, 15(1), 301-305. <https://doi.org/10.46743/2160-3715/2009.2865>

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More Tools for the Synthesist's Toolbag in Harris Cooper's Research Synthesis and Meta-Analysis: A Step-by-Step Approach (4th ed.)

Abstract

The need for research synthesis grows along with the volume of contemporary published scholarship. Reporting such synthesis warrants rigorous guidelines for preparing these important, information-rich documents that make statements concerning the state of knowledge about a topic, gaps in knowledge, or the aggregation or integration of primary research. Cooper's revised and expanded fourth edition of *Research Synthesis and MetaAnalysis: A Step-by-Step Approach* (2010) provides these needed guidelines with special attention given to the threats to validity at all steps of the research synthesis process.

Keywords

Quantitative, Qualitative, Research Synthesis, Systematic, Guidelines, Meta-Analysis, Synthesist, Validity

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**More Tools for the Synthesist's Toolbag in Harris Cooper's
*Research Synthesis and Meta-Analysis:
A Step-by-Step Approach* (4th ed.)**

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*The need for research synthesis grows along with the volume of contemporary published scholarship. Reporting such synthesis warrants rigorous guidelines for preparing these important, information-rich documents that make statements concerning the state of knowledge about a topic, gaps in knowledge, or the aggregation or integration of primary research. Cooper's revised and expanded fourth edition of *Research Synthesis and Meta-Analysis: A Step-by-Step Approach* (2010) provides these needed guidelines with special attention given to the threats to validity at all steps of the research synthesis process. Key Words: Quantitative, Qualitative, Research Synthesis, Systematic, Guidelines, Meta-Analysis, Synthesist, and Validity.*

Since the 3rd edition of *Research Synthesis and Meta-Analysis: A Step-by-Step Approach* appeared in 1998, "growth in the amount of research [...].rapid advances in computerized research retrieval systems...[and] the introduction of...meta-analysis..." (p. 147) have compelled Harris Cooper to revise and expand his influential book to include additional essential information on a very systematic approach applicable for many types of syntheses. Because a synthesist is at best "thrice" (Sandelowski & Barroso, 2007a) removed from the data, standards to guide this all-important process must be consistent if results are to be credible and relevant.

Research Synthesis is very user friendly. Chapters two through eight contain the contents of Cooper's (2010) seven-step, hence step-by-step, model. These chapters begin with a summary box informing the reader quickly what to think about during that step's development. Each chapter two through eight (steps 1-7) considers these ideas:

Primary Function Served in the Synthesis

Procedural Variations That Might Produce Differences in the Synthesis Conclusions
Questions to Ask When _____ (fill in the blank with chapter topic)

Each of these chapters ends with an exercise box to incorporate interactional learning in the text. Each step is thoroughly explained, the rationale for each step is examined, and validity issues are kept at the forefront because "each stage (step) of a synthesis may enhance or undermine...or...create a threat to the validity of its conclusions" (Cooper, 2010, p. 11). Multiple examples from four research syntheses are included to give readers concrete examples. Chapters two through eight (steps 1-7) also start by focusing the reader's attention with an overarching question to be answered by the chapter's end.

Below is a brief description of each chapter with what captured this reviewer’s attention and an opinion about how the readers’ repertoire of synthesist skills can be enhanced by incorporating Cooper’s (2010) knowledge and wisdom. Cooper discusses the methods of both the quantitative research synthesist and the qualitative research synthesist for compiling data. Both approaches essentially follow the same methodology. The only real difference then is the method or technique used either to aggregate or to interpret the findings and integrate them into the literature. An interpretation of just how closely related the synthesis process is between the two research synthesis disciplines is presented in Table One, which shows how both disciplines create bridges from the evidence to the integration.

Chapter 1. Introduction. The introductory chapter tells us that research synthesis is a kind of literature review, but a special one that requires the rigor of primary research in social science inquiry as well as techniques specific to its purpose. The steps of the research synthesis are summarized here in text and chart form. Many times in this chapter the word validity appears, emphasizing the importance this author places on checking for validity throughout the research synthesis.

Table One
Hansen Interpretation of Synthesis Methodology and Methods.

FROM		METHOD		TO
E V I D E N C E	CAUSAL RELATION INDIVIDUAL STUDIES	A S G T G A R T E I G S A T E C S	-----QUANTITATIVE----- Meta-Analysis -----METASUMMARY----- DATA is qualitative or quantitative topical or thematic descriptive survey.	E V I D E N C E I N T E G R A T I O N
	ASSOCIATED RELATION ACROSS STUDIES	I I N N T F E E R R P E R N E C T	-----QUANTITATIVE----- Metasynthesis DATA is conceptual/thematic description or interpretive explanation -----QUALITATIVE----- Research synthesis	
What kind?	How to synthesize?	Best method to fit purpose		Best meaning

Chapter 2. Step 1. Formulating the Problem. “What research evidence will be relevant to the problem or hypothesis of interest in the synthesis?” (Cooper, 2010, p. 22). A good point is made here regarding the sources of evidence. Is the evidence study generated, which would support causal relationships, or is the evidence synthesis generated, which would support associated relationships? The kind of evidence analyzed--study generated (individual studies) or synthesis generated (associated relationship across studies)--will determine the method used to either aggregate the studies or interpret the studies to create the intended integration of the studies into the literature. Qualitative research syntheses have similar evidence guidelines, as noted in Table 1. Qualitative research syntheses distinguish studies by their level of description or explanation.

Chapter 3. Step 2. Searching the Literature. “What procedures should be used to find relevant research?” (Cooper, 2010, p. 46). This chapter describes how to do an exhaustive search of the literature emphasizing the two targets that need to be considered when doing a research synthesis: topic area and target population. Ultimately, the problem or topic synthesized will then be generalizable to a target population. The chapter provides a lot of up-to-date searching techniques and a very detailed log for tracking the literature.

Chapter 4. Step 3. Gathering Information from Studies. “What procedures should be used to extract information from each study report?” (Cooper, 2010, p. 84). This chapter addresses constructing a coding guide; training the coders; understanding how some studies, depending on how they are included in the coding, will affect the cumulative results and conclusions; and determining what to do about missing data. Although qualitative research often includes interpreting language, perusing Cooper’s coding forms might lend some fresh ideas for coding.

Chapter 5. Step 4. Evaluating the Quality of Studies. “What research should be included or excluded from the synthesis based on (a) the suitability of the methods for studying the synthesis question and/or (b) problems in research implementation?” (Cooper, 2010, p.115). This chapter explains that a “high quality [study] means high correspondence between methods and desired inferences” (p.117). One way to discriminate between studies is to use the Study Design and Implementation Assessment Device or the Study DIAD a mixed-criteria approach created by Valentine and Cooper (2008). This device determines the quality, or validity, of a study design. When studies do not fully meet the tool’s criteria, Valentine and Cooper relate how to decide what to do with these studies: whether to include them or not and how to assign a weight to the study. Qualitative research synthesists are also careful to determine “the degree to which [the studies’] signal (informational value) outweigh[s] their noise (methodological flaws) (Edwards, Elwyn, Hood, & Rollnick, 2000). In other words, great care is taken to determine the trustworthiness of a study in order to include it in the synthesis.

Chapter 6. Step 5. Analyzing and Interpreting Outcomes of the Studies. “What procedures should be used to condense and combine the research results?” (p. 145). Two clear ideas come out of this chapter: one, make sure the methods used are correct for the study type or design; and two, what meta-analysis is and when to use it. Meta-analysis is not always appropriate. Both Cooper (2010) and Sandelowski and Barroso (2007) discuss the necessity of the research synthesist to be familiar with his or her own background.

Cooper describes how rules adopted and carried out by synthesists can differ resulting in a different interpretation of the synthesis results (2010, p. 152). Sandelowski and Barroso remind us that a research synthesis is “an act of re-presenting presentations,” and that each synthesist brings a “...unique configuration of experiences, knowledge, personality traits, and sociocultural orientations” (2007, p. xvii). Summed up, the methods used to analyze data must match the study design and these methods must be clearly described.

Chapter 7. Step 6. Interpreting the Evidence. “What conclusions can be drawn about the cumulative state of the research evidence?” (Cooper, 2010, p. 197). Five points in this chapter address the interpretation of the synthesis results: accounting for the missing data, coherence of assumptions and analysis, generalizability of findings, source of conclusions (study generated or synthesis generated), and care in selecting the adjective used to modify the effect size. As in all the previous chapters, Cooper includes helpful background information and useful examples.

Chapter 8. Step 7. Presenting the Results. “What information should be included in the report of the synthesis?” (Cooper, 2010, p. 218). The Meta-Analysis Reporting Standards (MARS) grew out of the need to “develop reporting standards for the reporting of research syntheses, especially those that contain meta-analysis” (Cooper, p. 219). The MARS resembles a primary research reporting method, and Cooper recommends using it regardless of whether the meta-analysis was used because “there is still much sound advice...” (p. 220) in the MARS guidelines. I would add that in most qualitative research reports, authors discuss how factors such as the researcher’s worldview and theoretical perspective might shape the project. This practice allows the reader to consider the influences that may impact the project.

Chapter 9. Conclusion: Threats to the Validity of Research Synthesis Conclusions. Cooper (2010) has very neatly laid out this chapter by aligning the threats to validity with each of the seven steps, showing how general validity issues as well as specific validity threats can occur at each step. He also emphasizes how a validity threat at any step of the research synthesis can significantly alter the results and the conclusion.

Research Synthesis gives synthesists of all types effective tools to make their syntheses more powerful by using this step-by-step approach. This text also offers synthesists a common language to help them work side by side to provide accurate, relevant syntheses.

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Article Citation

Hansen, C. (2009). More tools for the synthesist's toolbag in Harris Cooper's Research synthesis and meta-analysis: A step-by-step approach (4th ed.). *The Weekly Qualitative Report, 2*(52), 301-305. Retrieved from <http://www.nova.edu/ssss/QR/WQR/cooper.pdf>
