2-5-2017

A Framework for Using Qualitative Comparative Analysis for the Review of the Literature

Anthony J. Onwuegbuzie
Sam Houston State University, tonyonwuegbuzie@aol.com

Rebecca K. Weinbaum
Lamar University, rebecca.frels@gmail.com

A Framework for Using Qualitative Comparative Analysis for the Review of the Literature

Abstract

Onwuegbuzie, Leech, and Collins (2012) demonstrated how the following 5 qualitative data analysis approaches can be used to analyze and to synthesize information extracted from a literature review: constant comparison analysis, domain analysis, taxonomic analysis, componential analysis, and theme analysis. In a similar vein, Onwuegbuzie and Frels (2014) outlined how discourse analysis can be used. Thus, the purpose of this article is to provide a framework for using another qualitative data analysis technique to analyze and to interpret literature review sources—a process that we call a Qualitative Comparative Analysis-Based Research Synthesis (QCARS). Using a real review of the literature, we illustrate how to conduct a QCARS using a qualitative comparative analysis software program.

Keywords

Literature Review, Review of the Literature, Qualitative Comparative Analysis, Qualitative Data Analysis, Qualitative Comparative Analysis-Based Research Synthesis

A Framework for Using Qualitative Comparative Analysis for the Review of the Literature

Anthony J. Onwuegbuzie
Sam Houston State University, Huntsville, Texas, USA
University of Johannesburg, South Africa

Rebecca Weinbaum
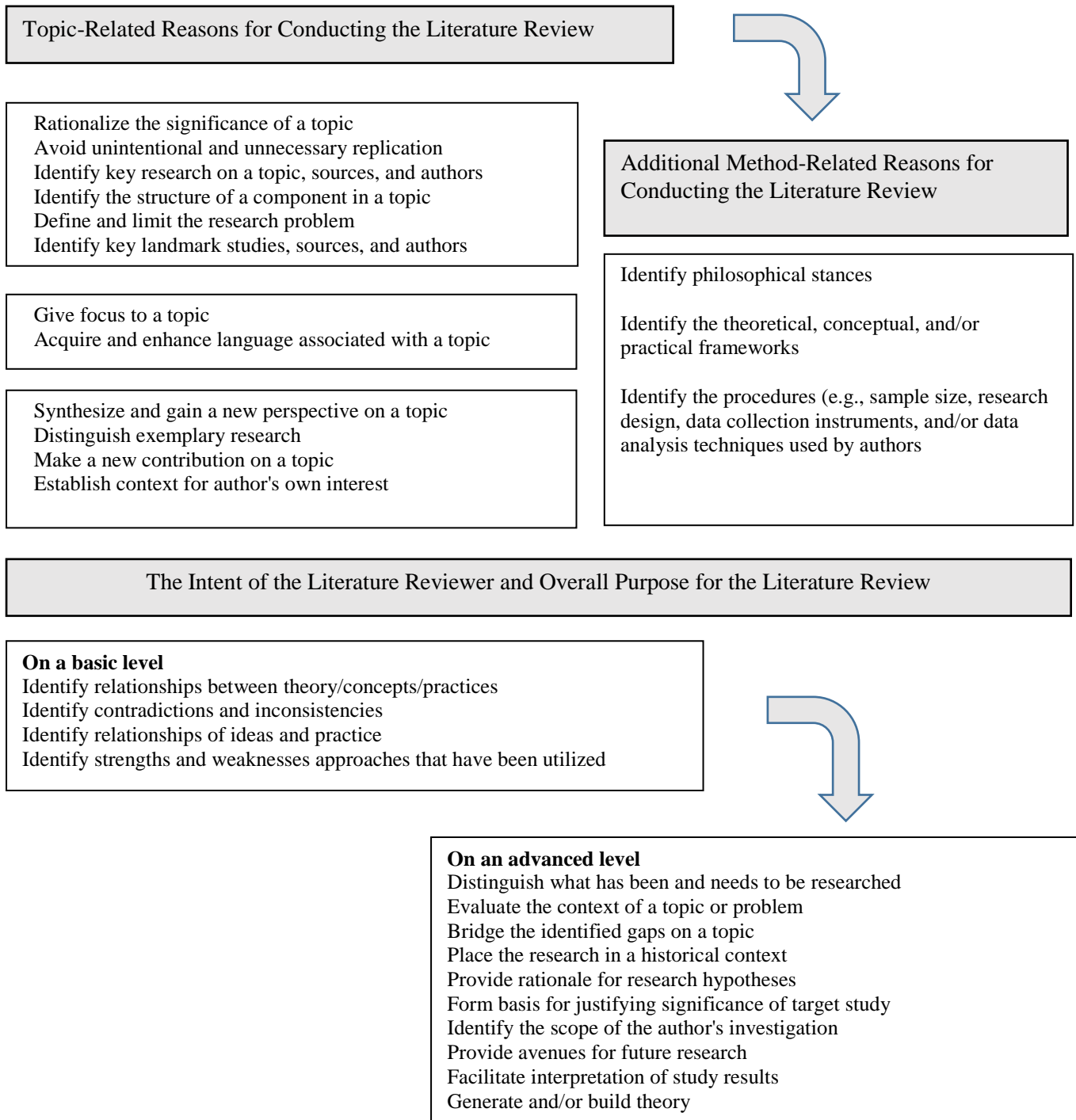Lamar University, Beaumont, Texas, USA

Onwuegbuzie, Leech, and Collins (2012) demonstrated how the following 5 qualitative data analysis approaches can be used to analyze and to synthesize information extracted from a literature review: constant comparison analysis, domain analysis, taxonomic analysis, componential analysis, and theme analysis. In a similar vein, Onwuegbuzie and Frels (2014) outlined how discourse analysis can be used. Thus, the purpose of this article is to provide a framework for using another qualitative data analysis technique to analyze and to interpret literature review sources—a process that we call a Qualitative Comparative Analysis-Based Research Synthesis (QCARS). Using a real review of the literature, we illustrate how to conduct a QCARS using a qualitative comparative analysis software program. Keywords: Literature Review, Review of the Literature, Qualitative Comparative Analysis, Qualitative Data Analysis, Qualitative Comparative Analysis-Based Research Synthesis

The literature review has become the most common way of acquiring knowledge and oftentimes sets the direction for a study. Traditionally, two branches of a literature review have appeared in journals and other works: the narrative literature review and the systematic literature review. The narrative review typically summarizes and critiques literature on a topic, yet also typically does not provide information about how studies were selected. Conversely, a systematic literature review is a critical assessment of all research on a topic and defines in advance ways that the review might be replicated. In common practice, consumers of research and researchers alike rarely acknowledge the type or the amount of weight placed on the literature review in a particular study.

As declared by Boote and Beile (2005), *"*A thorough, sophisticated literature review is the foundation and inspiration for substantial, useful research. The complex nature of education research demands such thorough, sophisticated reviews*"* (p. 3). More specifically, Onwuegbuzie, Collins, Leech, Dellinger, and Jiao (2010) identified reasons for conducting a literature review. Figure 1 presents a typology of reasons for a literature review that comprises some of the most common motives that researchers use to conduct literature reviews.

Unfortunately, many authors have difficulties both conducting and writing quality literature reviews—whether they be beginning researchers (Boote & Beile, 2005) or emergent or even experienced researchers (Alton-Lee, 1998; Onwuegbuzie & Daniel, 2005). For example, Onwuegbuzie and Daniel (2005), who examined 52 manuscripts submitted to a nationally refereed research journal, *Research in the Schools*, over a 2-year period, reported that 40% of the submitted manuscripts contained inadequate literature reviews, and that the authors of these manuscripts were more than six times more likely than were their counterparts to have their manuscripts rejected for publication.

Figure 1. Common reasons for conducting a literature review (Onwuegbuzie & Frels, 2016).

Topic-Related Reasons for Conducting the Literature Review

Rationalize the significance of a topic
Avoid unintentional and unnecessary replication
Identify key research on a topic, sources, and authors
Identify the structure of a component in a topic
Define and limit the research problem
Identify key landmark studies, sources, and authors

Additional Method-Related Reasons for Conducting the Literature Review

Give focus to a topic
Acquire and enhance language associated with a topic

Identify philosophical stances

Identify the theoretical, conceptual, and/or practical frameworks

Synthesize and gain a new perspective on a topic
Distinguish exemplary research
Make a new contribution on a topic
Establish context for author's own interest

Identify the procedures (e.g., sample size, research design, data collection instruments, and/or data analysis techniques used by authors

The Intent of the Literature Reviewer and Overall Purpose for the Literature Review

On a basic level
Identify relationships between theory/concepts/practices
Identify contradictions and inconsistencies
Identify relationships of ideas and practice
Identify strengths and weaknesses approaches that have been utilized

On an advanced level
Distinguish what has been and needs to be researched
Evaluate the context of a topic or problem
Bridge the identified gaps on a topic
Place the research in a historical context
Provide rationale for research hypotheses
Form basis for justifying significance of target study
Identify the scope of the author's investigation
Provide avenues for future research
Facilitate interpretation of study results
Generate and/or build theory

Although virtually all doctoral students are required to complete multiple research methodology courses (e.g., research methodology courses, statistics courses, measurement courses, qualitative research-based courses) as a necessary part of their degree programs (Leech & Goodwin, 2008), very few students are fortunate enough to take a literature review course—as documented, by Onwuegbuzie, Leech, and Collins (2011), who reported that only four of the 175 National Association of School Psychologists (NASP)-approved graduate-level school psychology programs (2.3%) offered a literature review course. This lack of formal and systematic instruction on conducting literature reviews was observed by Cooper (1985), more than one quarter of a century earlier, when he concluded that, "Students in education . . . can take five or six statistics or methods courses without ever directly addressing the problems and procedures of literature review" (p. 33).

In addition to the lack of literature review courses, there are much less published works that focus on the literature review than on any other component of the empirical research process—whether it be the quantitative, qualitative, or mixed research process. For instance, Onwuegbuzie and Leech (2005) documented that whereas virtually every research methodology textbook author allocates no more than one chapter to discussing the literature review process, these very textbook authors devote several chapters to other phases of the research process such as the research design, data collection, and data analysis phases. To make matters worse, as noted by Onwuegbuzie and Frels (2016), it is extremely common for authors of both research methodology textbooks and literature review books to promote one or more myths regarding the literature review process. Indeed, Onwuegbuzie and Frels (2016) identified 10 myths about literature reviews that research methodology textbook authors promote. These 10 myths, which are presented in Table 1, relate to each other through three elements: scope (5 myths), sequence (3 myths), and identity (2 myths).

Table 1. Summary Table of Onwuegbuzie and Frels's (2016) Myths Associated with Conducting the Literature Review

Type		Label
Scope	Myth 10	The Literature Review has One Goal
	Myth 9	The Literature Review Always Varies with the Type of Primary Study
	Myth 8	Literature Reviews are Value Neutral
	Myth 7	The Literature Review is a Summary of the Extant Literature
	Myth 6	The Amount of Literature Determines the Importance of the Topic
Sequence	Myth 5	The Literature Review in Quantitative Research Ends at the Onset of the Primary Study
	Myth 4	The Literature Review is a Linear Process
	Myth 3	The Literature Review is Only One Phase in the Research Process
Identity	Myth 2	The Literature Review Involves the Review of Only Published Works
	Myth 1	The Literature Review Involves Only the Collection of Literature

Of these 10 myths, one of the most prevalent myths is that the literature review merely is a summary of the extant literature. Consistent with this myth, Boote and Beile (2005) surmised that "graduate students could be forgiven for thinking that writing a literature review is no more complicated than writing a high school term paper" (p. 5). Yet, the literature process involves much more than summarizing information. Specifically, in addition to summarizing each piece of information extracted during the literature review process, a reviewer must analyze, evaluate, and synthesize this information. Of these four objectives, it is the objective of *analyzing* that has received the least attention in the literature. Indeed, of the several works that have been published on the literature review process in the last decade (e.g., Combs, Bustamante, & Onwuegbuzie, 2010; Dellinger & Leech, 2007; Fink, 2009; Garrard, 2009; Hart, 2005; Leech, Dellinger, Brannagan, & Tanaka, 2010; Machi & McEvoy, 2009; Onwuegbuzie et al., 2010; Ridley, 2008), as observed by Onwuegbuzie, Leech, and Collins (2012), "none of them provide explicit guidance as to how formally to analyze and interpret selected literature" (p. 2).

To help address this void, Onwuegbuzie et al. (2012) outlined the role that the following five qualitative data analysis techniques can play in the literature review process: constant comparison analysis, domain analysis, taxonomic analysis, componential analysis, and theme analysis. Building on their work, Onwuegbuzie and Frels (2014) outlined how discourse analysis can be used to analyze and to interpret information extracted from a literature review. However, more works of this type are needed to take into account the rich array of qualitative data analysis approaches that are available (see, for e.g., Onwuegbuzie & Denham, 2014). Further, works that are committed to the data analysis process for literature in review become the foundation for building concepts, models, and most importantly theory as it relates to what has been formerly established in research and practice. As illustrated in Figure 1, the literature reviewer might conduct a literature review with one or more purposes, which can be on a basic level such as identifying background information for a topic or which can be on a more integrative level, such as analyzing or synthesizing information of a topic to build theory. For the latter purpose, researchers must become familiar with data analysis techniques from the qualitative tradition for application to the extant literature. With this in mind, the purpose of this article is to extend the works of Onwuegbuzie et al. (2012) and Onwuegbuzie and Frels (2014) by providing a framework for using a popularized qualitative analysis approach, namely, qualitative comparative analysis, via a process that we call a *Qualitative Comparative Analysis-Based Research Synthesis* (QCARS).

Theoretical Framework

Charles Ragin (1987) developed qualitative comparative analysis to provide a technique for systematically analyzing similarities and differences across cases. According to Onwuegbuzie and Denham (2014), qualitative comparative analysis is the 23rd out of 34 formal qualitative data analysis approaches to have been developed since the Hellenic period (circa 323 BC). Historically, qualitative comparative analysis most commonly has been used in macrosocial studies to examine the conditions under which a phenomenon has arisen. Broadly speaking, qualitative comparative analysis is used as a theory-building approach, wherein the analyst makes connections among categories that have been identified previously, as well as to test and to develop these categories further (Miles & Weitzman, 1994). In causal, macrolevel contexts, qualitative comparative analysis often is utilized for reanalyzing secondary data collected by other researchers (e.g., Ragin, 1989, 1994). Thus, because the literature review process primarily involves the collection and analysis of information that have been generated by other people (e.g., researchers, theorists, methodologists, practitioners,

stakeholders), it is a natural extension to use qualitative comparative analysis to analyze information extracted via the literature review process.

Qualitative comparative analysis begins with the construction of a *truth table*, which lists all unique configurations of the study participants and situational variables that have been identified in the data, along with the corresponding type(s) of incidents, events, or the like that have been observed for each configuration (Miethe & Drass, 1999). The truth table delineates which configurations are unique to a category of the construct of interest (i.e., classification variable) and which configurations appear in multiple categories. As a result of comparing the numbers of configurations in these groups, the analyst arrives at an estimate of the degree to which types of events, experiences, perceptions, or the like are unique or similar. Next, the analyst "compares the configurations within a group, looking for commonalities that allow configurations to be combined into simpler, yet more abstract, representations" (Miethe & Drass, 1999, p. 8). This step is undertaken by identifying and removing unnecessary variables from these configurations. Specifically, a variable is considered as being unnecessary if its presence or absence within a configuration has no effect on the outcome that is associated with that configuration. As such, qualitative comparative analysis represents a case-based analysis rather than a variable-based analysis (Ragin, 1989, 1994) or a process-based analysis (Onwuegbuzie, Slate, Leech, & Collins, 2009)—thereby yielding case-based findings. The qualitative comparative analyst repeats these comparisons until it is not possible to make any further reductions. Next, all redundancies that are identified among the remaining reduced configurations are eliminated, thereby leading to the final solution, specifically, a statement of the unique characteristics of each category of the typology or theme.

Qualitative comparative analysts treat each case holistically as representing a configuration of attributes. Moreover, qualitative comparative analysts assume that the effect of a variable may vary from one case to the next, as a function of the values of the other attributes of the case. Further, qualitative comparative analysts undertake systematic and logical comparisons among the cases of interest that are guided by the rules of Boolean algebra with the goal of identifying commonalities among these configurations, thereby deconstructing the typology and, hence, reducing its complexity. Simply put, the goal of qualitative comparative analysis is to obtain a typology "that allows for heterogeneity within groups and that defines categories in terms of configurations of attributes" (Miethe & Drass, 1999, p. 10).

An important goal of qualitative comparative analysis is to distinguish between the idea of a necessary cause and a sufficient cause. According to Ragin (1987, 1989, 1994, 2008):

- A cause is defined as necessary if it must be present for an outcome to occur.
- A cause is defined as sufficient if, by itself, it can produce a certain outcome.
- This distinction is meaningful only in the context of theoretical perspectives.
- No cause is necessary, for example, independent of a theory that specifies it as a relevant cause.
- Neither necessity nor sufficiency exists independently of theories that propose causes.
- Necessity and sufficiency usually are considered jointly because all combinations of the two are meaningful.
- A cause is both necessary and sufficient if it is the only cause that produces an outcome and it is singular (i.e., not a combination of causes).
- A cause is sufficient but not necessary if it is capable of producing the outcome but is not the only cause with this capability.
- A cause is necessary but not sufficient if it is capable of producing an outcome in combination with other causes and appears in all such combinations.

- A cause is neither necessary nor sufficient if it appears only in a subset of the combinations of conditions that produce an outcome.
- In all, there are four categories of causes (formed from the cross-tabulation of the presence/absence of sufficiency against the presence/absence of necessity).

In sum, to apply qualitative comparative analysis to literature collected requires the act of reviewing each work with the goal to distinguish which causes are necessary and/or sufficient. This process is a systematic set of steps that should situate attributes of findings into common categories, thereby yielding a typology.

Mapping Qualitative Comparative Analysis onto the Literature Review Process: QCARS

It is our belief that when the literature review is conducted appropriately, no matter whether the purpose is a basic level of understanding or a more complex level of synthesis, the final product is a creative effort of the author(s). Further, it is our stance that the creative effort is one that cannot be separated from the inherent belief systems and worldviews of the researcher(s). Yet, by utilizing qualitative data analysis techniques such as qualitative comparative analysis, literature reviewers provide greater transparency of both *the process* used in interpreting a foundation for a study as well as *the end product* and related assumptions yielded through this process. It is also our experience that qualitative data analysis techniques applied to the review of literature generates a more thoughtful, organized, and ordered approach to what might be at times a daunting task.

As conceptualized by Onwuegbuzie and Frels (2016), there are three broad levels of qualitative data analysis. These levels represent analytical approaches, analytical methods, and analytical techniques. Specifically, *qualitative data analysis approaches* refer to qualitative data analyses that represent whole systems of analysis. Historically, most systems of analysis either originated from or are linked to specific research designs. For example, constant comparison analysis (Glaser, 1965) is associated with grounded theory (Glaser & Strauss, 1967). Further, domain analysis, taxonomic analysis, componential analysis, and theme analysis, which, as a set, form *ethnographic analysis* (Spradley, 1979), stemmed from ethnographic research (Spradley, 1979). Contrastingly, *qualitative data analysis methods* pertain to qualitative data analyses that represent *part* of a system. Such analytical methods include Miles and Huberman's (1994) 19 within-case analyses (i.e., comprising partially ordered displays [e.g., partially ordered meta-matrix]; case-ordered displays [e.g., case-ordered descriptive meta-matrix]; time-ordered displays [e.g., event listing], and conceptually ordered displays [e.g., effects matrix]) and 18 cross-case analyses (i.e., comprising partially ordered displays [e.g., checklist matrix]; time-ordered displays [e.g., critical incident chart]; role-ordered displays [e.g., role-ordered matrix], and conceptually ordered displays [e.g., variable-by-variable matrix]). Finally, *qualitative data analysis techniques* refer to qualitative data analyses that represent a single step in the qualitative data analysis process. These techniques include Saldaña's (2012) 32 coding techniques (e.g., *values coding*, wherein codes are applied that consist of three elements, namely, value, attitude, and belief, in order to examine a participant's perspective or worldview).

According to Onwuegbuzie and Frels (2016), one or more qualitative analysis techniques and methods can be used alongside any of the 34 qualitative data analysis approaches without affecting the integrity of that approach. For example, time-ordered displays (Miles & Huberman, 1994) can be used alongside ethnographic analysis (Spradley, 1979) by displaying themes that emerge from the ethnographic analysis over time. The analyst here, clearly, would be justified in claiming that he or she (primarily) conducted an

ethnographic analysis. Similarly, values coding (Saldaña, 2012) can be used as part of a constant comparison analysis (Glaser, 1965) without preventing the analyst from claiming that constant comparison analysis took place. Thus, with respect to qualitative data analysis, techniques are nested within methods, which, in turn, are nested within approaches.

Qualitative comparative analysis—representing a qualitative data analysis approach—is particularly useful for the literature review context because it can complement any of the other 33 qualitative data analysis approaches identified by Onwuegbuzie and Denham (2014), any of the qualitative data analysis methods (e.g., Miles & Huberman, 1994), or any of the qualitative data analysis techniques (e.g., Saldaña, 2012). In the context of the literature review, qualitative comparative analysis involves examining potential cause-and-effect relationships that emerge from the literature. More specifically, qualitative comparative analysis provides a means of analyzing the causal contributions of different conditions (e.g., different interventions, treatments, or programs) to an outcome of interest. As such, in using qualitative comparative analysis to inform literature reviews, qualitative comparative analysis serves as a theory-driven approach inasmuch as the selection of conditions to examine is driven by prior theory.

By treating each relevant information source (e.g., articles, book chapters, books, dissertations and theses, monographs, encyclopedias, government documents, trade catalogues, legal and public records information) as a case, a qualitative comparative analysis can be undertaken, even if the number of cases (i.e., information sources) is relatively small, which lends itself to new topics that do not yet have a large body of literature. However, an even bigger appeal of qualitative comparative analysis is that it can be used for a large number of cases, "which generally cripples most qualitative research" (Soulliere, 2005, p. 424). In fact, in certain circumstances, qualitative comparative analysis can be used to inform causal statements about variables and phenomenon that have been studied or identified by researchers. It is these features that render qualitative comparative analysis as a powerful method for analyzing sources that inform a literature review.

Ragin's (1987, 1989, 1994, 2008) qualitative comparative analysis can be mapped onto the literature review process primarily by examining the findings and interpretations presented in each selected empirical research article and then documenting the different configurations of conditions associated with each case of an observed outcome. Once these configurations are identified, the reviewer then can apply the rules of logical inference (e.g., stemming from Boolean algebra) to ascertain the descriptive inferences or implications that are supported by the information sources. We call the mapping of Ragin's (1987, 1989, 1994) qualitative comparative analysis onto the literature review process a QCARS. What follows is a heuristic example.

Heuristic Example of a QCARS

As noted previously, qualitative comparative analysis can be used to analyze sources that have been selected for the literature review by using themes extracted from any of the qualitative data analysis approaches, qualitative data analysis methods, or qualitative data analysis techniques to create a truth table for understanding these themes. As an illustration, we use the work of DuBois, Holloway, Valentine, and Cooper (2002). DuBois et al. (2002) conducted a meta-analytic review of 55 articles (i.e., 55 cases) regarding the effectiveness of mentoring programs for youth. From this review, these authors developed an index of the characteristics of the 11 best practices for mentoring programs. Let us suppose that, as reviewers, we are especially interested in the following three characteristics of best practices: mentoring relationship monitoring, mentor training, and structured activities. Let us suppose further that we are interested in knowing which mentoring programs of these 55 articles were effective in retaining mentors and/or mentees, then we could conduct a qualitative comparative

analysis to determine which of these three characteristics is a necessary and/or sufficient cause of mentoring program effectiveness.

According to Ragin (1987), one of the initial tasks in qualitative comparative analysis is the preliminary coding of all variables selected for the analysis. Because Boolean algebra involves the use of dichotomous values (i.e., 0 and 1), when conducting qualitative comparative analysis, all variables (i.e., conditions) and all outcomes must be dichotomous. This assignment is accomplished by coding the conditions and outcomes using categories such as presence/absence or high/low. In our example, the presence of each of the characteristics, mentoring relationship monitoring, mentor training, and structured activities, is indicated by "1," whereas absence is indicted by "0." Similarly, the presence of an effective mentoring program is indicated by "1," whereas absence is indicted by "0." This coding led to a data matrix that contains 1s and 0s for each of the 55 articles. From the matrix, we could construct a truth table that might resemble Table 2. This truth table summarizes the pattern of outcomes (i.e., whether or not the mentoring program was effective) associated with different configurations of causal conditions (i.e., characteristics of best practices). Fundamentally, a truth table presents the different combinations of causal conditions and the value of the outcome variable for the cases (i.e., articles) conforming to each combination.

Table 2. Truth Table for Selected Characteristics of Best Practices for Mentoring Programs Among 55 Selected Articles

Conditions			Outcome
Mentoring Relationship Monitoring (MRM)	Mentor Training (MT)	Structured Activities (SA)	Mentoring Program Effective (MPE)?
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	3
1	0	0	10
1	0	1	9
1	1	0	12
1	1	1	20
		Total	55

Table 2 indicates some contradictory outcomes. However, what is clear is that when none of the three characteristics (i.e., mentoring relationship monitoring [MRM], mentor

training [MT], and structured activities [SA]) are present, none of the mentoring programs are effective (MPE). At the opposite end of the spectrum, when all three characteristics are present, then 20 of the mentoring programs are effective. An interesting observation is that more mentoring programs are effective when mentoring relationship monitoring is present than when mentoring relationship monitoring is not present. Using the free qualitative comparative software called fsQCA (http://www.u.arizona.edu/~cragin/fsQCA/) to analyze the truth table in Table 2 (i.e., standard analyses) revealed two combinations of conditions linked to the outcome of the mentoring program being effective, yielding the following two logical equations:

(1) MPE = MRM
(2) MPE = MT and SA

The first solution (i.e., Equation 1) indicates that mentoring relationship monitoring is a necessary and sufficient condition for a mentoring program to be effective. That is, the first solution indicates that mentoring relationship monitoring must be present for a mentoring program to be effective, regardless of whether mentor training or structured activities is present. The fsQCA software program revealed a *consistency* score of 1.0 for the first solution, which indicates that this condition did not include any case (i.e., work) that did not display the outcome (i.e., effective mentoring program).

The second solution indicates that neither mentored training nor structured activities is necessary for the mentoring program to be effective. (A cause is both necessary and sufficient if it is the only cause that produces an outcome and it is singular.) However, either one is sufficient for the mentoring program to be effective. (A cause is sufficient but not necessary if it is capable of producing the outcome but is not the only cause with this capability.) The fsQCA output revealed a *consistency* score of 1.0 for the first condition (i.e., Equation 2), which indicates that this condition did not include any case (i.e., article) that did not display the outcome (i.e., effective mentoring program). *Raw coverage* measures the proportion of memberships in the outcome explained by each term of the solution. The finding from the fsQCA output that the raw coverage for the first solution (.94) is higher than is the raw coverage (.43) indicates that the first solution covers more cases (i.e., more of the 55 articles) in the data set.

Solution consistency of qualitative comparison analysis indicates the combined consistency of the causal conditions. That is, solution consistency measures the degree to which membership in the solution (the set of solution terms) is a subset of membership in the outcome. The fsQCA output revealed a solution consistency of 1.0, which indicates that the membership in the solution (the set of solution terms) is a subset of membership in the outcome (i.e., effective mentoring program). *Solution coverage* indicates the proportion of membership in the outcome that can be explained by membership in the causal recipes. The fsQCA output also revealed a solution coverage of 1.0, which indicates that all the articles for which the outcome is present (i.e., effective mentoring program) are a member of either of the solutions and, thus, are explained by the model. That both the solution consistency and solution coverage are 1.0 (i.e., greater than .75; Ragin, 2008) indicates a correctly specified model.

In summary, the qualitative comparative analysis of the truth table in Table 2 suggests, in particular, the importance of mentoring relationship monitoring in securing effective mentoring program. Thus, as can be seen, qualitative comparative analysis, "with its holistic combinatorial logic and emphasis on causal heterogeneity" (Soulliere, 2005, p. 434) lends itself to information extracted during the CLR process.

The example used here involves the use of a conventional (i.e., *crisp*) set. A ***crisp set*** is dichotomous such that a case—in this case, an information source—is either *in* or *out* of a

set. Thus, in the example above, for the set of characteristics, a conventional set is comparable to a binary variable with two values: 1 (*in*; i.e., present) and 0 (*out*; i.e., absent). In contrast, a *fuzzy set* allows membership anywhere in the interval between 0 and 1 while retaining the two qualitative states of full membership and full non-membership. Therefore, the fuzzy set of risk characteristics could include factors that are *fully in* the set (fuzzy membership = 1.0), some that are *almost fully in* the set (membership = .90), some that are neither *more in* nor *more out* of the set (membership = .50, also known as the *crossover point*), some that are "barely more out than in" the set (membership = .45), and so on, down to those that are *fully out* of the set (membership = 0). The onus is on the reviewer to specify procedures for assigning fuzzy membership scores to cases, and these procedures must be both open and explicit (i.e., leaving an audit trail) so that they can be evaluated by other reviewers and researchers. For example, referring back to our DuBois et al. (2002) example, the effect size reported (or computed posthumously by the reviewer if not reported by the researcher[s]) in each of the 55 articles could be used to assign fuzzy membership scores to cases.

Conclusions

In this article, we contended that there is limited guidance regarding how to analyze sources that inform a literature review. Thus, we have provided a framework that we called QCARS for using qualitative comparative analysis to analyze and to interpret information that is extracted from works. We contend that our framework represents a small step in an attempt to help reviewers map the qualitative data analysis process onto the literature review process, thereby yielding a more rigorous review of the literature.

Qualitative comparative analysis is a particularly useful analytical tool for reviewers for several reasons. First, as noted previously, because each relevant information source essentially is a case, using qualitative comparative analysis—a case-based analysis—has logical appeal. Second, qualitative comparative analysis can be used for a diverse range of number of cases; that is, qualitative comparative analysis is justified whether the number of cases is relatively small or relatively large. Third, qualitative comparative analysis is an extremely flexible approach to analyzing information sources because it can be used to analyze literature review sources by using themes extracted from any of the qualitative data analysis approaches, qualitative data analysis methods, or qualitative data analysis techniques. Fourth, increasing its flexibility even further, qualitative comparative analysis can be used to examine potential cause-and-effect relationships that emerge from the literature, particularly by analyzing the causal contributions of different conditions (e.g., different interventions, treatments, or programs) to an outcome of interest. Finally, as outlined by Onwuegbuzie and Hitchcock (2015), qualitative comparative analysis, in effect, represents a mixed analysis approach because it involves the use of both qualitative and quantitative analysis within the same analytical framework. Interestingly, Ragin (2008) declared that qualitative comparative analysis "transcends some of the limitations of conventional quantitative and qualitative research" (p. 2)—as does mixed research. Qualitative comparative analysis, a mixed research-based analysis, then represents an analytical approach that is extremely compatible with the literature review process, which, as described by Onwuegbuzie and Frels (2016), represents a mixed research methodology (see also, Onwuegbuzie et al., 2010).

We contend that our framework represents a small step in an attempt to help beginning and more experienced counselor researchers map the qualitative data analysis process onto the literature review process, thereby yielding a more rigorous and comprehensive review of the literature. As stated in the seminal document developed by the Task Force on Reporting of Research Methods in American Educational Research Association (AERA) Publications and adopted by the AERA Council in 2006, authors should be mindful of reporting criteria as

described in the document "Standards for Reporting on Empirical Social Science Research in AERA Publications" (AERA, 2006). In this document, guidelines are provided that apply to reports of education research grounded in the empirical traditions of the social sciences. These standards have applicability to the literature review process. The standards state two overarching principles:

- First, reports of empirical research should be *warranted;* that is, adequate evidence should be provided to justify the results and conclusions.
- Second, reports of empirical research should be *transparent;* that is, reporting should make explicit the logic of inquiry and activities that led from the development of the initial interest, topic, problem, or research question; through the definition, collection, and analysis of data or empirical evidence; to the articulated outcomes of the study. (AERA, 2006, p. 33)

According to the standards, "Reporting that takes these principles into account permits scholars to understand one another's work, prepares that work for public scrutiny, and enables others to use that work" (AERA, 2006, p. 33). Thus, in addition to making the literature review process more rigorous and comprehensive, conducting a qualitative comparative analysis of the body of knowledge extracted to inform a literature review, is consistent with AERA's (2006) principles of reports being warranted and transparent.

References

Alton-Lee, A. (1998). A troubleshooter's checklist for prospective authors derived from reviewers' critical feedback. *Teaching and Teacher Education, 14*, 887-890. doi:10.1016/S0742-051X(98)90000-2

American Educational Research Association. (2006). Standards for reporting on empirical social science research in AERA publications. *Educational Researcher*, *35*(6), 33-40. doi:10.3102/0013189X035006033

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher, 34*(6), 3-15. doi:10.3102/0013189X034006003

Combs, J. P., Bustamante, R. M., & Onwuegbuzie, A. J. (2010). A mixed methods approach to conducting literature reviews for stress and coping researchers: An interactive literature review process framework. In G. S. Gates, W. H. Gmelch, & M. Wolverton (Series Eds.) & K. M. T. Collins, A. J. Onwuegbuzie, & Q. G. Jiao (Eds.), *Toward a broader understanding of stress and coping: Mixed methods approaches* (Vol. 5, pp. 213-241). Charlotte, NC: Information Age Publishing.

Cooper, H. M. (1985, March). *The literature review: Knowledge synthesis activities in education and psychology*. Invited address at the annual meeting of the American Educational Research Association, Chicago, IL.

Dellinger, A., & Leech, N. L. (2007). A validity framework: A unified approach to evaluating validity of empirical research. *Journal of Mixed Methods Research*, *1*, 309-332. doi:10.1177/1558689807306147

Dubois, D. L., Holloway, B. E., Valentine, J. C., & Cooper, H. (2002). Effectiveness of mentoring programs for youth: A meta-analytic review. *American Journal of Community Psychology, 30,* 157-197. doi:10.1023/A:1014628810714

Fink, A. (2009). *Conducting research literature reviews: From the Internet to paper*. Thousand Oaks, CA: Sage.

Garrard, J. (2009). *Health sciences literature review made easy: The matrix method*. Sudbury,

MA: Jones and Bartlett.

Glaser, B. G., & Strauss, A. I. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago, IL: Aldine.

Hart, C. (2005). *Doing a literature review: Releasing the social science research imagination*. London, UK: Sage.

Leech, N. L., Dellinger, A., Brannagan, K. B., & Tanaka, H. (2010). Evaluating mixed research studies: A mixed methods approach. *Journal of Mixed Methods Research*, *4*, 17-31. doi:10.1177/1558689809345262

Leech, N. L., & Goodwin, L. D. (2008). Building a methodological foundation: Doctoral-level methods courses in colleges of education. *Research in the Schools, 15*(1), 1-8.

Machi, L. A., & McEvoy, B. T. (2009). *The literature review: Six steps to success*. Thousand Oaks, CA: Corwin Press.

Miethe, T. D., & Drass, K. A. (1999). Exploring the social context of instrumental and expressive homicides: An application of qualitative comparative analysis. *Journal of Quantitative Criminology, 15,* 1–21. doi:10.1023/A:1007591025837

Miles, M. B., & Huberman, M. A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.

Miles, M. B., & Weitzman, E. A. (1994). Choosing computer programs for qualitative data analysis. In M. B. Miles & M. Huberman (Eds.), *Qualitative data analysis: An expanded sourcebook* (2nd ed., pp. 311–317). Thousand Oaks, CA: Sage.

Onwuegbuzie, A. J., Collins, K. M. T., Leech, N. L., Dellinger, A. B., & Jiao, Q. G. (2010). A meta-framework for conducting mixed research syntheses for stress and coping researchers and beyond. In G. S. Gates, W. H. Gmelch, & M. Wolverton (Series Eds.) & K. M. T. Collins, A. J. Onwuegbuzie, & Q. G. Jiao (Eds.), *Toward a broader understanding of stress and coping: Mixed methods approaches* (pp. 169-211). Charlotte, NC: Information Age Publishing.

Onwuegbuzie, A. J., & Daniel, L. G. (2005). Editorial: Evidence-based guidelines for publishing articles in *Research in the Schools* and beyond. *Research in the Schools, 12*(2), 1-11.

Onwuegbuzie, A. J., & Denham, M. A. (2014). Qualitative data analysis techniques. In L. Meyer (Ed.), *Oxford bibliographies in education*. Oxford, England: Oxford University Press. Retrieved from http://www.oxfordbibliographies.com/view/document/obo-9780199756810/obo-9780199756810-0078.xml

Onwuegbuzie, A. J., & Frels, R. K. (2014). A framework for using discourse analysis for the review of the literature in counseling research. *Counseling Outcome Research and Evaluation*, *5*, 52-63. doi:10.1177/2150137813515905

Onwuegbuzie, A. J., & Frels, R. K. (2016). *Seven steps to a comprehensive literature review: A multimodal and cultural approach*. London, UK: Sage.

Onwuegbuzie, A. J., & Hitchcock, J. H. (2015). Advanced mixed analysis approaches. In S. N. Hesse-Biber & R. B. Johnson (Eds.), *Oxford handbook of multiple and mixed methods research* (pp. 275-295). New York, NY: Oxford.

Onwuegbuzie, A. J., & Leech, N. L. (2005). A typology of errors and myths perpetuated in educational research textbooks. *Current Issues in Education*, *8*(7). Retrieved from https://cie.asu.edu/ojs/index.php/cieatasu/article/view/1604

Onwuegbuzie, A. J., Leech, N. L., & Collins, K. M. T. (2011). Innovative qualitative data collection techniques for conducting literature reviews. In M. Williams & W. P. Vogt (Eds.), *The Sage handbook of innovation in social research methods* (pp. 182-204). Thousand Oaks, CA: Sage.

Onwuegbuzie, A. J., Leech, N. L., & Collins, K. M. T. (2012). Qualitative analysis techniques for the review of the literature. *The Qualitative Report*, *17*(56), 1-28. Retrieved from

http://nsuworks.nova.edu/tqr/vol17/iss28/2

Onwuegbuzie, A. J., Slate, J. R., Leech, N. L., & Collins, K. M. T. (2009). Mixed data analysis: Advanced integration techniques. *International Journal of Multiple Research Approaches*, *3*, 13-33. doi:10.5172/mra.455.3.1.13

Ragin, C. C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies.* Berkeley, CA: University of California Press.

Ragin, C. C. (1989). The logic of the comparative method and the algebra of logic. *Journal of Quantitative Anthropology, 1,* 373–398.

Ragin, C. C. (1994). Introduction to qualitative comparative analysis. In T. Janoski & A. M. Hicks (Eds.), *The comparative political economy of the Welfare State: New methodologies and approaches* (pp. 299–319). New York, NY: Cambridge University Press.

Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago, IL: The University of Chicago Press.

Ridley, D. (2008). *The literature review: A step-by-step guide for students*. Thousand Oaks, CA: Sage.

Saldaña, J. (2012). *The coding manual for qualitative researchers* (2nd ed.). Thousand Oaks, CA: Sage.

Soulliere, D. M. (2005). Pathways to attrition: A qualitative comparative analysis of justifications for police designations of sexual assault complaints. *The Qualitative Report, 10*, 416-438. Retrieved from http://nsuworks.nova.edu/tqr/vol10/iss3/2

Spradley, J. P. (1979). *The ethnographic interview*. Fort Worth, TX: Holt, Rinehart and Winston.

Author Note

Anthony J. Onwuegbuzie is professor in the Department of Educational Leadership at Sam Houston State University. Further, he is Distinguished Visiting Professor at the University of Johannesburg. He teaches doctoral-level courses in qualitative, quantitative, and mixed research. His research areas include disadvantaged and under-served populations. Additionally, he writes extensively on an array of qualitative, quantitative, and mixed methodological topics. With a current *h-index* of 74, Dr. Onwuegbuzie has secured the publication of more than 400 works, including more than 300 journal articles, 50 book chapters, and 3 books. Additionally, he has delivered more than 750 presentations and 100 workshops worldwide that include more than 50 keynote addresses across six continents. He has received numerous outstanding paper awards. Dr. Onwuegbuzie is former editor of *Educational Researcher* (*ER*), being part of the Editor team (2006-2010) that secured a first impact factor of 3.774. He is currently a co-editor of *Research in the Schools*, and has been guest editor of six mixed research special issues. In addition, he is editor-in-chief of the *International Journal of Multiple Research Methods*. Many of his articles have been the most read and cited among articles in their respective journals. For example, his mixed research article published in *ER* is the most cited *ER* article ever. Currently, he serves as President of the Mixed Methods International Research Association. His overall goal is to be a role model for beginning researchers and students worldwide. Correspondence regarding this article can be addressed directly to: tonyonwuegbuzie@aol.com.

Rebecca Weinbaum is a Licensed Professional Counselor-Supervisor and Counselor Educator at Lamar University, Texas, USA. A former music educator and school counselor, her research and scholarly writing is in the areas of research methodology, mentoring, and student success. She has written or co-authored more than 30 articles and three book chapters. She has served as Production Editor for *Research in the Schools* and Guest Co-Editor for the *International Journal of Multiple Research Approaches*. International experience includes

facilitating research courses for the Organization for Social Science Research in Eastern and Southern Africa (OSSREA) in Kenya, Uganda, and Tanzania and courses with the Universidad de UNIBE, San Jose, Costa Rica and Universidad IberoAmericana in Puebla, Mexico. Recently, she combined her passion of both mixed methods and mentoring creating for *Oxford Handbook for Mixed and Multiple Method Research* a book chapter titled Mentoring the Next Generation of Mixed and Multiple Method Researchers. She and her co-author Anthony Onwuegbuzie have developed the critical dialectical pluralistic approach for mixed research for promoting the voice of participants as decision-makers and co-researchers in the research process. Currently, she is conducting research in the area of peer mentoring in higher education—incorporating outreach through technology and social media. Correspondence regarding this article can also be addressed directly to: Rebecca Weinbaum, Department of Counseling and Special Populations, Box 10039, Lamar University, Beaumont Texas 77701; email: rebecca.frels@gmail.com.

Article Citation

Onwuegbuzie, A. J., & Weinbaum, R. (2017). A framework for using qualitative comparative analysis for the review of the literature. *The Qualitative Report, 22*(2), 359-372. Retrieved from http://nsuworks.nova.edu/tqr/vol22/iss2/1