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INVITED ARTICLE

A process for conducting mixed methods data analysis

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Abstract

The process of mixed methods data analysis has long been understudied and needs clear guidance for researchers. This review article honors Michael D. Fetters' pioneering work on mixed methods data analysis, building on his concepts of integration, joint displays, and metainferences. This review summarizes existing mixed methods data analysis discussions and proposes advanced steps for the analysis process. Our approach involves identifying a research problem, collecting diverse data, selecting a mixed methods design, integrating the data within the design, using joint displays for analysis, and drawing metainferences. We illustrate our methods with a Japanese empirical research study from family medicine. This article contributes to the field of mixed methods research by detailing a practical process approach to mixed methods analysis combining recent procedures in the field of mixed methods research.

KEYWORDS
data analysis, joint display, metainferences, mixed methods design, mixed methods research

1 | INTRODUCTION

Mixed-methods research involves collecting and analyzing both quantitative and qualitative data, placing these two databases in a set of procedures or designs, analyzing results from both forms of data, and then engaging in further analysis by drawing insight from the connection between the two databases.[1] It represents much more than simply collecting and analyzing quantitative and qualitative data—it contains the innovative feature of integration in data analysis by connecting the databases to derive additional information beyond the results learned from each database.

To conduct mixed methods data analysis requires understanding the process of analysis, a topic only recently addressed in the literature. For example, Michael D. Fetters creatively launched a specific discussion about mixed methods data analysis in his 2020 publication, "The Mixed Methods Research Workbook: Activities for Designing, Implementing and Publishing Projects." He viewed data analysis as consisting of six general steps: planning for data analysis, data collection, data preparation, data analysis, interpreting data, and reporting results. While useful as an initial point of discussion, we discuss these steps at a more applied level with the aid of recent procedural developments of integration, joint displays, and metainferences.

This article advances a series of practical steps for mixed methods analysis. Our steps include decisions prior to analysis, such as specifying a research problem, collecting and analyzing quantitative and qualitative data, choosing a mixed methods design, and diagraming its procedures. Following the design phase, mixed methods data analysis begins. It involves analyzing the quantitative and qualitative data separately, identifying the integration or points of intersection for the quantitative and qualitative data in the design, creating a diagram of the design, developing a joint display to facilitate the analysis of integration, and adding metainferences (or drawing insight) from the integration in the joint display. After discussing these steps, we will illustrate the mixed methods procedures by discussing an empirical mixed methods study from

Japan. In this way, we advance a practical process for data analysis and illustrate its steps with a research study.

2 | PRIOR TO MIXED-METHODS DATA ANALYSIS

Before conducting the analysis in mixed methods research, the investigator needs to plan and conduct the study. The planning involves determining the suitability of a research problem for a mixed methods research, collecting quantitative and qualitative data, selecting a mixed methods design for data procedures, and drawing a diagram of the procedures.

2.1 | The research problem

Researchers begin with identifying a research problem (or question) that needs to be examined. A mixed method problem requires multiple sources of evidence to understand the issue and research question. The evidence—quantitative and qualitative data—suggests that both are necessary for a complete understanding of the problem. Furthermore, the problems are complex, requiring multiple levels of analysis, diverse types of participants, and extensive evidence. The problems often require understanding generalization to sample and populations and exploring individual views and experiences.

2.2 | Quantitative and qualitative data

Thus, collecting and analyzing both qualitative and quantitative data becomes necessary. Experimental data and surveys combined with documents, one-on-one interviews, and observations form the substance of data collection. Writers call these data sources many different terms, such as numeric or text data, numbers or stories, quantifiable information, or personal opinions or experiences, statistics or themes, and questionnaires or interviews.[2-4] We believe that quantitative and qualitative data represent different types of evidence, and use different terms than those we mentioned. We view quantitative data as closed-ended data collection, while qualitative data represents open-ended information.[4] Data collected through closed-ended questioning would be where the researcher specifies in advance response options (e.g., strongly disagree to strongly agree), and the participants select an option. Open-ended data would be where the researcher asks a general question and seeks responses from the participants without providing response options. In mixed methods research, we find both close-ended and open-ended data gathered by the investigator. In data collection, rigorous procedures exist, such as the recruitment, the sampling, the sources of data, the instruments or protocols, and the permissions to enter sites. The forms of data analysis also need to be specified in mixed methods research, whether they are quantitative inferential or descriptive statistics and qualitative quotes, code, themes, and a storyline.

2.3 | The mixed methods design and diagram

Following the collection and analysis, the researcher places the two forms of data into a research design, a central feature of mixed methods research. Research designs in mixed methods guide the procedures conducted in a study involving data collection, data analysis, and interpretation. The researcher has many mixed methods design types from which to choose. In mixed methods, for over two decades, writers have advanced the types of designs, provided names, drawn diagrams, and constructed descriptions of them.[5] In the evolution of thinking about designs, names change, diagrams evolve in complexity, and variations expand.[5] While some authors focus their design on the "methods",[6] others highlight components of a "methodology," citing an interactive set of procedures (e.g., questions, data, and data analysis).[7] To see an unfolding of design types makes sense since mixed methods emerged as an approach to research following quantitative designs (e.g., quasi-experiments, random-controlled experiments, single subject, and surveys) and qualitative designs (e.g., descriptive theme-oriented designs and analytic designs such as grounded theory, ethnography, case study, and others).

As many typologies of designs emerged in the literature, the burden of sorting through designs to understand them became a problem. Creswell and Plano Clark[1] simplified design selection by advancing two broad categories: core designs and complex (or hybrid) designs. They represent merging the quantitative and qualitative databases (i.e., a convergent design) and sequencing them with quantitative data either proceeding with quantitative data (i.e., explanatory sequential design) or following the qualitative data collection (e.g., exploratory sequential design). We support the three core designs as a helpful way to consider the major types of procedures used today in mixed methods research, and we find one or more core designs in all mixed methods studies.

In time, the core designs only sometimes captured the procedures investigator used in their projects. Thus, the intersection of core designs with frameworks, processes, and theoretical models has emerged. Writers have struggled with the name of these types of designs, calling them "advanced," "complex," "scaffold," or "hybrid" designs.[8,9] Today we call these types of designs "hybrid" designs.[10] Numerous examples populate the mixed methods literature, such as using core designs in an experiment or intervention trial, in an evaluation process, in participatory research, and in implementation science research.

In summary, prior to mixed methods data analysis, the researcher needs to consider the problem leading to a need for the study, be able to collect and analyze both quantitative and qualitative data, and select a core or hybrid design.

In this discussion, we will work with the three core designs and a few hybrid design possibilities. A common question beginning mixed methods researchers often ask is "What design should I use for my project?" Earlier discussions about design relied on the emphasis or priority of the quantitative or qualitative strand of data for choosing a design, or on the sequence of the quantitative or qualitative data to make this decision.[11] Instead, today we ask researchers to identify

the "intent" of gathering both quantitative and qualitative data and then reflect on the "procedures" used within one of the mixed methods designs.

Table 1 links "intent," "procedures," and the appropriate type of mixed methods design. The "intent" means identifying the purpose for collecting both quantitative and qualitative data. What is the purpose for collecting both quantitative and qualitative data? The "procedures" tell how a researcher connects the two databases within a particular set of steps or phases. To arrive at the appropriate design, a researcher combines the "intent" with the "procedures." In the final column of Table 1, we advance our suggestions for the appropriate design given specific intents and procedures. We should also note that "hybrid" examples offered in Table 1 represent a few possibilities for these designs, and we identify several possibilities (i.e., intervention trials, evaluations, and community-based participatory studies) most suited for the health sciences and family medicine.

For researchers to share their "intent" and "procedures" with stakeholders, team members, and advisors, we recommend drawing a picture or diagram of the procedures. Diagrams have become standard practice in rigorous mixed methods studies. The diagrams of core and hybrid designs vary in design but typically convey the general flow of data collection and analysis, the specific procedures within each phase, and the outcome of research questions addressed at each phase.[12]

3 | MIXED-METHODS DATA ANALYSIS

After the preliminary steps, the researcher enters a mixed methods analysis phase. This phase might also be called "integration analysis" because the intent of this step is to analyze the integration in a study. This phase of analysis consists of analyzing the quantitative and qualitative data separately, locating integration in the design, creating a joint display, and drawing metainferences or insights from the joint display.

3.1 | Analyzing the quantitative and qualitative data separately

Many research methods texts review procedures for analyzing quantitative and qualitative data.[13] Quantitative research analysis involves treating the data to descriptive statistics (mean, mode, variance, standard deviation, and frequency distributions), inferential statistics (hypothesis testing, correlation, and regressional analysis), and often advanced procedures such as multivariate analysis, time series analysis, and predictive analysis.[14] For qualitative research, the analysis typically includes three types of analysis: a thematic analysis,[15] an analytic, interpretive approach,[16] or both.[17] The thematic approach consists of familiarizing yourself with the data, generating codes, collating the codes into themes, and defining and naming the themes. Studies in the health sciences frequently use thematic analysis.[15,18] Analytic, interpretive approaches typically involve qualitative data analysis procedures of interpretation beyond a thematic analysis. For example, a health science study might employ the analytic approach of case studies, phenomenology, or grounded theory. For example, grounded theory involves multiple interpretive coding processes, such as open, axial, and selective coding.[19] A grounded theory study ends with advancing a theory grounded in the data to explain how a process addresses a research

TABLE 1 Key decisions for deciding on the type of mixed methods design to use.

What is your "intent" for collecting both quantitative and qualitative data?	What are your "procedures" for linking the quantitative and qualitative databases?	Here is the mixed methods design we would recommend
To see if results are similar or validated when quantitative and qualitative data are collected	Merging or bringing the two database results together	Convergent design
To explain quantitative results in more depth with qualitative data	Using qualitative data and analysis to explain quantitative results	Explanatory sequential design
To explore before administering quantitative instruments to make them adapted for a sample or population	To gather qualitative data and analyze it, then use the results to design or modify a quantitative assessment before administering the assessment	Exploratory sequential design
To gain personal perspectives by adding qualitative data into a quantitative intervention trial or experiment	To collect qualitative data at different stages of the experiment (before, during, and after)	A mixed methods intervention trial or experiment (hybrid design)
To make a complete evaluation of a program by examining personal qualitative experiences with the program as well as quantitative outcomes	To collect both quantitative and qualitative data during the evaluation process at different stages	Mixed methods evaluation study (hybrid design)
To understand the uptake of an intervention by examining personal experiences and outcomes in an implementation science study	Add both quantitative and qualitative data into an intervention trial	A mixed method intervention study (hybrid design)
To conduct a community participatory action study involving key participants and gathering both qualitative personal perspectives and quantitative outcomes	To add quantitative and qualitative data into one or more of the stages of conducting a participatory action research study	A mixed methods participatory action study

problem. In family medicine, a study by Levitt, et al.[20] illustrates how family physicians integrate mental healthcare and routine patient management using grounded theory.

3.2 | Identifying the integration or points of intersection for the quantitative and qualitative data

Especially in the last 10 years, a robust literature has emerged about integration.[21] Integration involves combining the quantitative and qualitative data where they connect in a mixed methods design. As early as 2006,[22] Bryman identified integration as a challenging procedure not often followed or addressed in mixed methods studies. Fetters and Molina-Azorin[23] indicated how integration can flow into many phases of a research study, such as the design phase, the methods, and the interpretation. In the methods—our primary interest—the types of integration have expanded and contracted over the years. Fetters[8] mentioned three forms: connecting (data from one strand informs another strand), building (data results from one set of results informs the data collection and design from the other), and merging (data from quantitative and qualitative sources are directly combined or compared).[24] In addition, we can see these types in practice by relating integration to types of mixed methods design. For example, Mosehom and Fetters[21] discussed the various forms of integration in convergent designs, Akerblad et al.[25] linked integration into multiple case study designs, and McCrudden and McTigue[26] discussed integration within an explanatory sequential design.

Linking integration to design enables researchers to see, in practice, how integration works. Therefore, we suggest that investigators look closely at the design and see where the quantitative and qualitative data connect. We go as far as placing a box or red arrow in the design,[6] indicating for readers the "integration point(s)." For a convergent design, the connection lies when the two databases merge for analysis. In an explanatory sequential design, this connection resides at two places: between the initial quantitative data results and the following qualitative data collection and at the end of study, when the researcher compares the initial quantitative results with the qualitative findings. In an exploratory sequential design, the primary integration lies between the qualitative initial results and the design (or modification) of a quantitative assessment or feature in the second phase.[10] Integration may also occur by comparing the assessment or quantitative design feature at the end of a study with the initial qualitative results. In "hybrid" designs, integration can occur at multiple points in the research, such as before, during, or after an intervention trial.

3.3 | Creating a joint display to facilitate the analysis of integration

After identifying the integration point(s) in the design, the next step is to design a table for a joint display to aid in analyzing the integration. Illustrations of joint displays for the three core designs are shown in Figures 1–3. As shown in these figures, a joint display often takes the form of a table or a graph; however, we find in the literature creative ways for presentation, such as pictures[27] or text and circles.[28] Undoubtedly, joint displays represent a challenging feature of mixed methods research. The researcher needs to consider the integration point (or points) in the diagram for their design and decide how to present the quantitative and qualitative data side-by-side for analysis. Examples of joint displays linked to types of designs by Guetterman et al.[29] can facilitate visualizing joint display possibilities. Recognizing that iterations of joint displays usually occur in the process of research, we suggest creating a hypothetical template table in the first draft of a joint display and later filling it in after data collection.

Researchers can create this table in a few steps. First, decide where the integration point(s) occur in the design diagram. Next, draw a table with columns that mirror the flow of procedural steps in the design (e.g., first the quantitative results then the qualitative). After collecting the data in the study, place the data into the template cells. The data can be text (quotes, codes, and themes), numbers (scores on instruments), or both. Sometimes the cells may be empty because data are unavailable.

For a convergent design (see Figure 1), create a table with the columns representing themes and the rows, the quantitative data. For an explanatory sequential design (see Figure 2), the first column would be the quantitative scores, and the second, the qualitative codes or themes. For an exploratory sequential design (see Figure 3), the first column would be the qualitative results, and the second column how the results informed the quantitative assessment or feature. For this illustration, we use an exploratory sequential design template to illustrate the design of a questionnaire or instrument. Other options might be the design of a new variable, the identification of activities for an intervention trial, or the design of a new instrument for measurement. For a "hybrid" design, multiple points of integration may exist, and researchers can create multiple joint display tables. Finally, once the table(s) are created, the researcher looks across the rows and columns and draws insight—metainferences—about the integration.

3.4 | Adding metainferences (or drawing insight) from the integration in the joint display

In contrast to the extensive literature on integration, metainferences represent a largely unexplored area. Metainferences are defined in the literature as explanations or conclusions in the form of a narrative, story, or theoretical statement generated at the end of the study from the individual quantitative and qualitative inferences.[30–32] Venkatesh et al.[33] define metainferences as "theoretical statements, narratives, or a story inferred from an integration of findings from quantitative and qualitative strands of mixed methods research." (p. 38). We build on these definitions suggesting that metainferences are insights or conclusions drawn

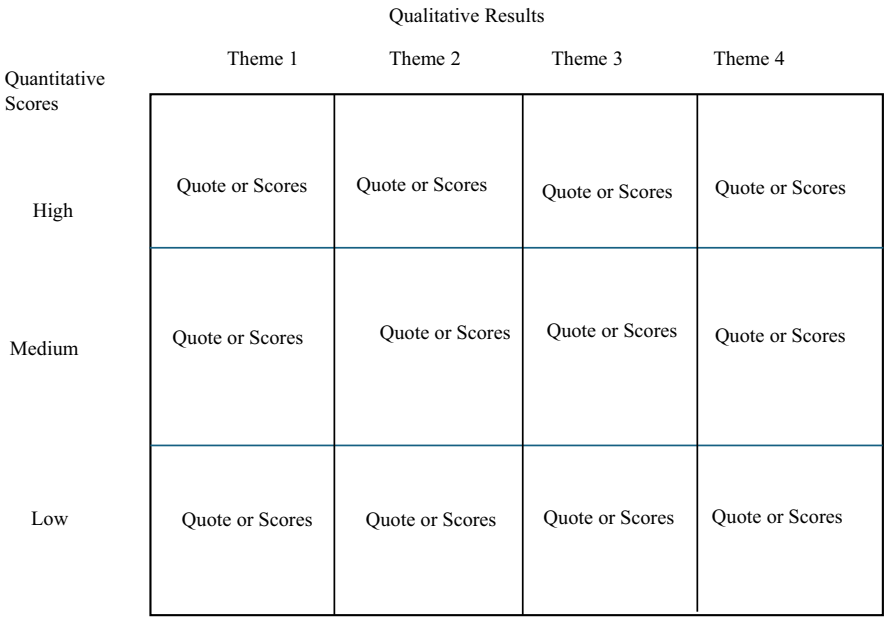

FIGURE 1 Example of a template for a joint display for a convergent design.

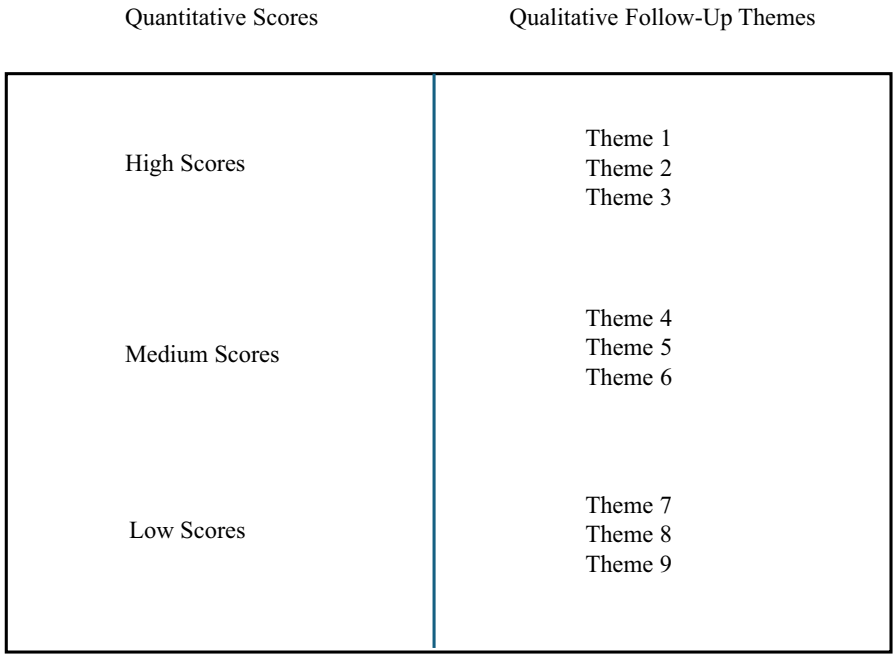

FIGURE 2 Example of a template for an explanatory sequential design joint display.

from analyzing the integration as presented in a joint display. To link three key procedural concepts in mixed methods research, integration occurs in the mixed methods design, a joint display portrays the integration for analysis, and metainferences represent the analysis and insight from the integration.

What is the procedure for drawing metainferences? In generating metainferences, the researcher compares the qualitative and quantitative inferences or findings, looks for additional value, and draws conclusions. Metainferences require researchers to engage in higher-level reasoning and analysis as they provide knowledge that surpasses the sum of each type of finding.[1,34] This process of drawing insight from integration through metainferences gives mixed methods research an innovative feature not found in monomethod research.

We suggest a practical approach for drawing metainferences. Our approach builds on the joint display by adding an additional column and row for metainferences in the table. In Figure 4, we illustrate this type of revised joint display for a convergent design. As shown in this Figure, a final column and a row have been added to the joint display. We have also added arrows in the table to indicate possible ways to draw metainferences by looking across the first row to see how participants responded to the four themes. In this way, the researcher can determine if the participants converge, diverge, or provide new information. Alternatively, the researcher can look down the first column to see how participants in the three scoring brackets differ in views on theme 1. From this analysis of the rows and cells, researchers can insert insights or conclusions drawn from these metainferences into the cells in the joint display.

FIGURE 3 Example of a template for an exploratory sequential design joint display.

Qualitative Data	Design a Survey Instrument	Quantitative Test
Qualitative Quotes	Quantitative Survey Items	Analyze the scores on the survey (variables, scales)
Qualitative Codes	Quantitative Survey Variables	
Qualitative Themes	Quantitative Survey Scales	

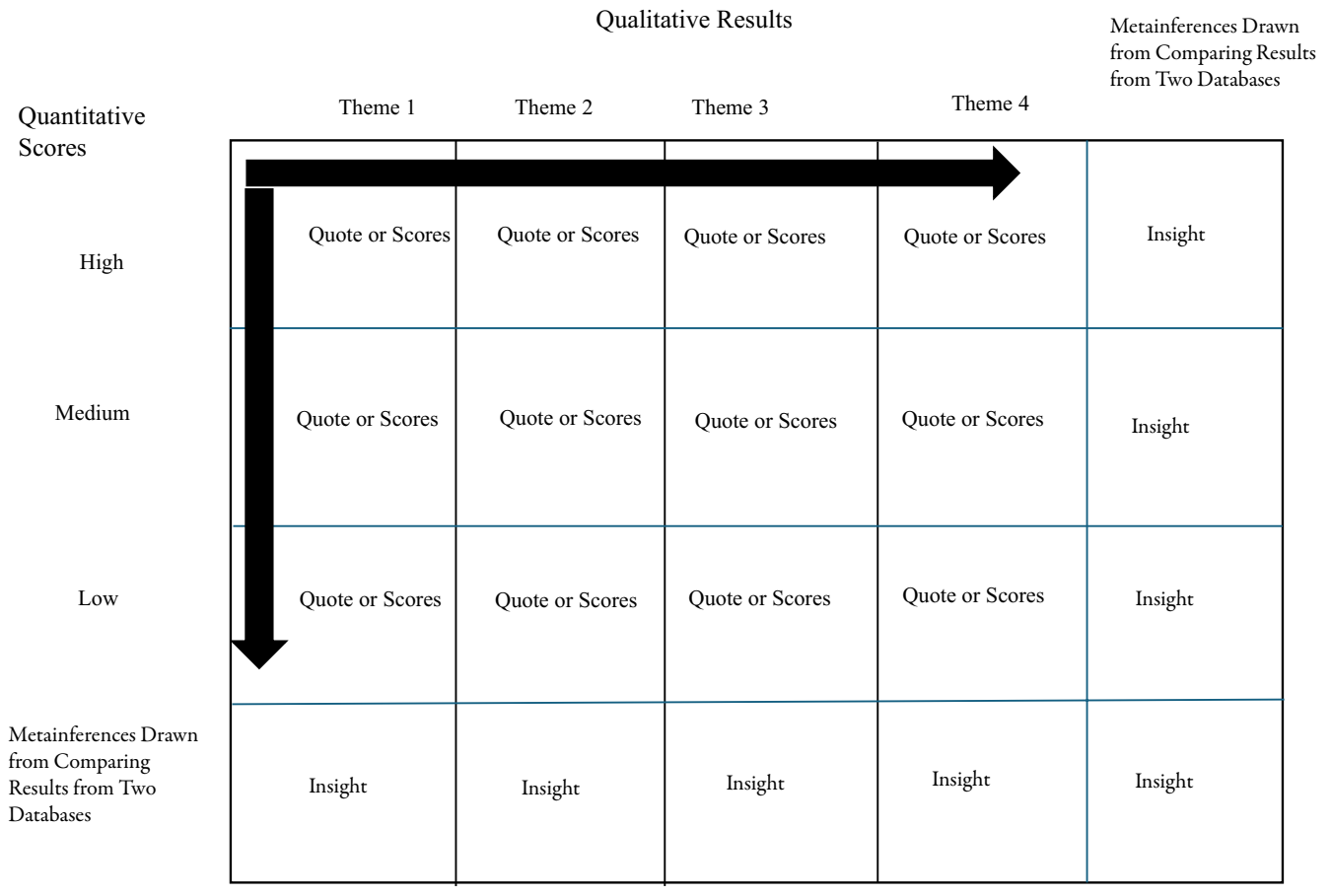

FIGURE 4 Example of a template for a joint display for a convergent design with metainferences added.

This discussion suggests a procedure for drawing metainferences, but what types of insights emerge from comparing the quantitative and qualitative data? Michael D. Fetters[8] provided a recent substantive discussion of metainferences in his workbook. He described metainferences as comparing quantitative and qualitative inferences based on their concordance (they are consistent with each other), expansion (they diverge leading to new understandings), complementarity (they complement each other), and discordance

(they diverge). He referred to the "fit" between the two databases, implying that he used a convergent design for identifying metainferences. Younas et al.[35] also discussed metainferences in terms of a convergent design and illustrated a seven-step procedure involving different types of quantitative and qualitative inferences (knowledge based, experience, and data based), the use of association maps, generating metainferences using a joint display, and working backward as a heuristic. Younes et al.[36] discussed metainferences, expanding the discussion to all three core designs and developed a typology of inference types: relating the two databases to generate a theory, and using one database to predict, establish a causal linkage, or elaborate on one database with the other. Recognizing that metainferences differ by type of mixed methods design, the authors provided empirical illustrations of differing types of metainferences and their relationship to core designs.

Validation is important in all forms of research, and little discussion has occurred around validating the metainferences drawn in a study. An exception is a discussion by Venkatesh et al.[33] who commented about including rigorous quantitative and qualitative validation in a mixed methods study and supporting a high-quality standard for the metainferences based on design and interpretation. This conversation needs to be continued, and investigators might consider taking the metainferences back to participants in a member-checking approach typical of qualitative research.[37]

4 | ILLUSTRATION OF MIXED-METHODS DATA ANALYSIS IN AN EMPIRICAL STUDY

We chose the study by Shibata et al.[38] about the knowledge and practices of preconception care among rural Japanese women to illustrate our steps taken in mixed methods data analysis approach. The problem in the study highlighted the need for more preconception care in rural Japan. To address this problem, the researchers collected 13 qualitative interviews and administered a survey to 232 women in rural Japan. Women were both parous (had prior children) and nulliparous (did not have prior children). The researchers chose an exploratory sequential design, and a diagram presented a three-phase design: qualitative interviews, survey development based on interviews, and an administration of a quantitative survey. Finally, the authors noted the point of integration in their diagram in two places: the survey development was based on the interview results, and an integrated discussion occurred between the survey outcomes and the hypotheses derived from the interviews.

Next, the authors analyzed the qualitative data and the quantitative data separately. The qualitative analysis showed five themes related to preconception care. The quantitative data presented descriptive statistics and chi-square tests. To illustrate how the survey was based on interview results, the authors created a joint display in three columns conveying the qualitative question, hypotheses derived from the qualitative results, and specific items identified in the survey instrument measuring the hypotheses. No joint display was created to present integration of the survey results with initial qualitative interview results (although the authors stated this as a step in mixed methods analysis). The survey items in the joint display could be considered the metainferences (although they were not labeled as such) in this study and they were placed in a separate column in the joint display.

5 | CONCLUSION

In this article, we have set mixed methods data analysis within the larger process of selecting a research problem, collecting and analyzing data, and choosing a mixed methods design. Furthermore, we have joined the concepts of integration, a joint display, and metainferences as central features of mixed methods data analysis. Integration, we propose, consists of linking the quantitative and qualitative data through connecting, building, and merging, A joint display table provides a way to visualize the integration for a side-by-side analysis. Metainferences involve analyzing this integration and drawing insight based on the "fit" of the two databases and relationships, prediction or causality, and elaboration metainferences. An illustration from family medicine in Japan highlights the steps in our process.

Other approaches to mixed methods data analysis will undoubtedly arise in the literature in the future. Also, our process steps do not exhaust the possibilities at each phase (e.g., joint displays may assume many forms beyond a table, and design variations exist for each core design[1]). However, we hope our detailed, practical approach to mixed methods data analysis extends the discussion about analysis, and provides a practical approach linking key concepts such as integration, joint displays, and metainferences. We encourage others to continue the conversation, to add more detail to the steps they use, and to continue to innovate in the field of mixed methods research.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICS STATEMENT

The article does not involve any studies with human participants performed by any of the authors.

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REFERENCES

1. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 3rd ed. Los Angeles, CA: Sage; 2018.
2. Becker HS. Tricks of the trade: how to think about your research while you're doing it. Chicago, IL: University of Chicago Press; 1998.
3. Bernard HR. Research methods in anthropology: qualitative and quantitative approaches. Lanham, Maryland: Rowman & Littlefield; 2017.

4. Creswell JW, Creswell JD. Research design: qualitative, quantitative, and mixed methods approaches. 6th ed. Los Angeles, CA: Sage; 2023.
5. Creswell JW, Plano Clark VL. Revisiting mixed methods research designs twenty years later. In: Poth C, editor. SAGE handbook of mixed methods designs. London: Sage; 2023. p. 623–35.
6. Creswell JW. A concise introduction to mixed methods research. 2nd ed. Los Angeles, CA: Sage; 2022.
7. Maxwell JA. Qualitative research design: an interactive approach. 3rd ed. Los Angeles, CA: Sage; 2013.
8. Fetters M. The mixed methods research workbook: activities for designing, implementing, and publishing projects (mixed methods research series). 1st ed. Los Angeles, CA: Sage; 2020.
9. Plano Clark VL, Ivankova NV. Mixed methods research: a guide to the field. Los Angeles, CA: Sage; 2016.
10. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 4th ed. Los Angeles, CA: Sage; in press.
11. Morgan DL. Practical strategies for combining qualitative and quantitative methods: applications to health research. Qual Health Res. 1998;8(3):362–76.
12. Ivankova NV, Stick SL. Students' persistence in a distributed doctoral program in educational leadership in higher education: a mixed methods study. Res Higher Educ. 2006;47(3):317–56.
13. Creswell JW, Guetterman TC. Educational research: planning, conducting, and evaluating quantitative and qualitative research. 7th ed. New Saddle River, New Jersey: Pearson; 2025.
14. Field A. Discovering statistics using IBM SPSS statistics. 5th ed. Los Angeles, CA: Sage Publications; 2021.
15. Braun V, Clarke V. Thematic analysis: a practical guide. Los Angeles, CA: Sage; 2022.
16. Creswell JW, Poth CN. Qualitative inquiry & research design: choosing among five approaches. 5th ed. Los Angeles, CA: Sage; 2025.
17. Báez JC, Creswell JW. Thematic analysis or analytic approaches: which is better for my qualitative study? in review.
18. Marsh JK, Kibbe MR, O'Donnell MB. The role of perceived risk, anticipated regret, and health beliefs in patient decisions about surveillance imaging. Med Decis Making. 2020;40(4):526–38. https://doi.org/10.1177/0272989X20922603
19. Corbin J, Strauss A. Basics of qualitative research: techniques and procedures for developing grounded theory. 4th ed. Los Angeles, CA: Sage; 2015.
20. Levitt A, Carraccio C, O'Brien KE, Spector ND, Hicks PJ, Schumacher DJ. The alignment imperative in curriculum renewal. Med Teach. 2018;40(5):443–8. https://doi.org/10.1080/0142159X.2017.1395409
21. Moseholm E, Fetters MD. Conceptual models to guide integration during analysis in convergent mixed methods studies. Methodol Innovat. 2017;10(2):1–11. https://doi.org/10.1177/2059799117703118
22. Bryman A. Integrating quantitative and qualitative research: how is it done? Qual Res. 2006;6(1):97–113.
23. Fetters MD, Molina-Azorin JF. The journal of mixed methods research starts a new decade: the mixed methods research integration trilogy and its dimensions. J Mixed Methods Res. 2017;11(3):291–307. https://doi.org/10.1177/1558689817714066
24. Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs—principles and practices. Health Serv Res. 2013;48(6):2134–56. https://doi.org/10.1111/1475-6773.12117
25. Åkerblad L, Seppänen-Järvelä R, Haapakoski K. Integrative strategies in mixed methods research. J Mixed Methods Res. 2021;15(2):152–70. https://doi.org/10.1177/1558689820957125
26. McCrudden MT, McTigue EM. Implementing integration in an explanatory sequential mixed methods study of belief bias about climate change with high school students. J Mixed Methods Res. 2019;13(3):411–30. https://doi.org/10.1177/1558689818762576
27. Peroff DM, Morais DB, Seekamp E, Sills E, Wallace T. Assessing residents' place attachment to the Guatemalan Maya landscape through mixed methods photo elicitation. J Mixed Methods Res. 2020;14(3):379–95. https://doi.org/10.1177/1558689820956401
28. Bustamante C. TPACK and teachers of Spanish: development of a theory-based joint display in a mixed methods research case study. Comput Assist Lang Learn. 2017;33:1–26. https://doi.org/10.1080/09588221.2018.1564333
29. Guetterman TC, Creswell JW, Fetters MD. Integrating quantitative and qualitative results in health science mixed methods research through joint displays. Ann Fam Med. 2015;13(6):554–61. https://doi.org/10.1370/afm.1865
30. Creamer EG, Tendhar C. Using inferences to evaluate the value added of mixed methods research: a content analysis. Int J Multiple Res Approaches. 2015;9(1):57–72. https://doi.org/10.1080/18340806.2015.1129286
31. Hitchcock JH, Onwuegbuzie AJ. The Routledge handbook for advancing integration in mixed methods research: an introduction. In: Hitchcock JH, Onwuegbuzie AJ, editors. The Routledge handbook for advancing integration in mixed methods research. London: Routledge; 2022. p. 3–28. https://doi.org/10.4324/9780429432828-2
32. Tashakkori A, Teddlie C. Quality of inferences in mixed methods research. In: Bergman MM, editor. Advances in mixed methods research: theories and applications. Los Angeles, CA: Sage; 2008. p. 53–65.
33. Venkatesh V, Brown SA, Bala H. Bridging the qualitative-quantitative divide: guidelines for conducting mixed methods research in information systems. MIS Q. 2013;37(1):21–54.
34. Bazeley P. Integrating analyses in mixed methods research. Los Angeles, CA: Sage; 2018.
35. Younas A, Fàbregues S, Creswell JW. Generating metainferences in mixed methods research: a worked example in convergent mixed methods designs. Methodol Innovat. 2023;16(3):276–91.
36. Younas A, Fàbregues S, Creswell JW. Framework for types of insight from metainferences in mixed methods research. under review.
37. Creswell JW, Báez JC. 30 essential skills for the qualitative researcher. 2nd ed. Los Angeles, CA: Sage; 2022.
38. Shibata Y, Abe M, Narumoto K, Kaneko M, Tanahashi N, Fetters MD, et al. Knowledge and practices of preconception care among rural Japanese women: findings from a mixed methods investigation. BMC Pregnancy Childbirth. 2023;23:667. https://doi.org/10.1186/s12884-023-05940-8

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