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THE EARLY HISTORY OF MIXED METHODS RESEARCH

This chapter discusses the development of mixed methods research in historical perspective. The practice of integrating qualitative and quantitative concepts and methods has a much longer history than has usually been acknowledged in the mixed methods literature. Mixed methods research has also been practiced far more widely in the recent past than this literature has generally recognized, as I describe in Chapter 2.

I agree with the statement by Creswell and Plano Clark (2018), in their textbook on mixed methods research, that “a historical overview is not an idle exercise in recapping the past. Knowing this history helps researchers justify their approach . . .” (p. 24). However, they also stated that

We often date the beginnings of mixed methods research back to the late 1980s with the coming together of several publications all focused of describing and defining what is now known as mixed methods. . . . All of these individuals were writing . . . on an approach that moved beyond simply using quantitative and qualitative methods as distinct, separate strands in a study. (2018, p. 22)

Similarly, Teddlie and Tashakkori (2003), although they mentioned a “substantial degree of important mixed methods research” (p. 5) that took place between 1900 and 1950, said almost nothing about what was “important” in these studies, and argued that the “emergence of the first explicit multimethod designs” did not occur until after 1950 (p. 6). Tashakkori, Johnson, and Teddlie (2021), although they likewise acknowledged that “throughout the 20th century, social and behavioral scientists frequently employed MM in their studies” (p. 8), said nothing further about this earlier research or what it might contribute to our understanding of how to integrate qualitative and quantitative methods. And Hesse-Biber (2010) traced mixed methods back even further, to the mid-1800s (p. 2), but likewise provided no details about this use.

In the present chapter, I identify the origin of combining qualitative and quantitative methods as taking place much earlier than most contemporary mixed methods researchers have acknowledged, from Babylonian and Greek astronomers, through work in the physical and biological sciences (Al-Haythem, Galileo, Lyell, Darwin) and pathbreaking studies in the social sciences in the late 19th and early 20th

centuries, to the origin of the term *mixed methods*, including fields (anthropology, archeology, and linguistics) that were explicitly combining methods long before this term was coined.

Johnson, Onwuegbuzie, and Turner stated that “It is interesting to browse the books written by these earlier social scientists to see how they blended qualitative and quantitative data as they studied their communities” (2007, p. 113). However, they say nothing about what is “interesting” about these studies. I believe that there are important lessons for mixed methods researchers in these unrecognized works, and that we need to pay more attention to what has been going on outside the self-identified “mixed methods community.” In what follows, I review this history, both for explicit statements about combining qualitative and quantitative methods (which are rare), and for the conceptions of combining methods that are implicit in the works described.

It could be argued that the way in which self-identified mixed methods researchers have presented the history and scope of mixed methods research has been influenced to some extent by what it has been advantageous to claim in promoting this approach. In developing and presenting mixed methods research, it is more persuasive to describe this as a new and exciting development, a “third paradigm” for social research, than to acknowledge that people have been doing mixed methods research for centuries, and far more broadly than most mixed methods publications recognize. It’s also more advantageous to position yourselves at the center of this movement, as the people who are developing the methods and standards for this approach, than to accept that many other researchers are systematically combining qualitative and quantitative approaches with little or no input from the self-defined mixed methods community.

This view has been stated more generally by Platt (1996, p. 260 ff.), who argued that many textbook accounts of the history of research methods in particular fields are “origin myths” that systematically distort the actual development of these methods in order “to legitimate contemporary preferences” (p. 267). In attempting to understand the past, there is always a danger of imposing our own assumptions, categories, and goals, and ignoring or misreading how our predecessors conceptualized what they were doing. This is a fallacy that historians term “presentism” (Fischer, 1970, pp. 135–140; Presentism (literary and historical analysis). Platt emphasized that

The concepts used to describe the methods current have changed historically, so that the same practice cannot just have a different name but be part of a different set of ideas; this makes any consistent set of categories potentially misleading about methodological thought. (1996, p. 44)

The prevalent narrow focus in the discussion of the history and scope of mixed methods research is understandable and somewhat to be expected in the development of a self-consciously distinct approach. My main concern is that, in ignoring these older and more widely distributed studies, we may be giving ourselves tunnel

vision, and missing important insights. In this and the following chapter, I try to identify some of the insights that an expanded understanding of this history and scope provides for the conceptualization and use of mixed methods. A more detailed discussion of the relevance of some of these works for designing integration in mixed methods research is presented in Maxwell (2016, 2018); Maxwell, Chmiel, and Rogers (2015); and Maxwell and Loomis (2003). The last-cited work contains “design maps” of several of these studies. In presenting this broader history of combining qualitative and quantitative methods, I hope to clarify how mixed methods as an approach actually developed, and to draw lessons from this history.

Unfortunately, for much of this history, we have no evidence for how these researchers *thought* about combining what we now call “quantitative” and “qualitative” methods and approaches; this was done without any apparent sense that it was a novel approach that needed explaining or justifying. In addition, the terminology used for research methods has changed over time; for example, the current uses of the terms *quantitative* and *qualitative* in the social sciences are relatively recent, and they differ somewhat among social science fields. Outside the “mixed methods” community, even recent studies rarely provide much information on how the researchers conceptualized combining the two approaches. In reviewing the history of mixed methods research, broadly defined as the integrated use of both qualitative and quantitative concepts and methods, I will attempt to reconstruct the researchers’ thinking from the existing evidence of their work.

EARLY HISTORY OF COMBINING QUALITATIVE AND QUANTITATIVE METHODS

Although the self-identified “mixed methods” literature focuses largely on the social, behavioral, and health sciences, the earliest examples of research that combined qualitative and quantitative methods occurred in the natural sciences. Publicly accessible sources such as the *Stanford Encyclopedia of Philosophy* and Wikipedia have been cited here to emphasize how common combining qualitative and quantitative methods has been in history through to today. Babylonian astronomers combined observational description of the planets’ colors and motions with mathematical calculations of their movements as early as 1000 BC (Heath, 1932/1991, pp. xvii–xviii), but the clay tablets describing this provide no insights into how they conceptualized this combination. Greek astronomy further developed this practice (Heath, 1932/1991):

According to a story reported by Simplicius of Cicilia (6th century AD), Plato posed a question for the Greek mathematicians of his day: “By the assumption of what uniform and orderly motions can the apparent motions of the planets be accounted for?” (quoted in Lloyd, 1970, p. 84). Plato proposed that the seemingly chaotic wandering motions of the planets could be explained by combinations of uniform circular

motions centered on a spherical Earth, a novel idea in the 4th century BC. Eudoxus rose to the challenge by assigning to the planets a set of concentric spheres centered on the Earth. By tilting the axes of the spheres, and by assigning each a different period of revolution, he was able to approximate the celestial “appearances.” Thus, he was the first to attempt a mathematical description of the visible motions of the planets. (“Ancient Greek astronomy,” by Wikipedia contributors, https://en.wikipedia.org/w/index.php?title=Ancient_Greek_astronomy&oldid=1165273333, licensed under CC BY-SA 4.0 <http://creativecommons.org/licenses/by-sa/4.0/>)

A more detailed example of combining methods is Aristotle’s investigations in biology, in the fourth century BC. This involved counting or measuring many features of diverse species, as well as describing these, and classifying animals into types on this basis (Wikipedia contributors, “Aristotle’s biology,” n.d.). He did this “by noting that they have many general differences that vary in measurable ways—by the more and less, as he puts it” (Lennox, 2021). However, although these studies clearly involved mixed methods in the broad sense described above, Aristotle apparently wrote nothing about how he understood this combination.

The combining of *experimental* and qualitative methods was largely originated by the Arab mathematician and physicist Ibn Al-Haytham (c. 965–1040 AD), often called the “father of optics” and the “first true scientist” (Wikipedia contributors, “Ibn al-Haytham,” 2023). He made major advances not only in optics, but also in astronomy and geography. In optics,

Ibn al-Haytham was the first to correctly explain the theory of vision, and to argue that vision occurs in the brain, pointing to observations that it is subjective and affected by personal experience . . . [his] achievement was to come up with a theory that successfully combined parts of the mathematical ray arguments of Euclid, the medical tradition of Galen, and the intromission theories of Aristotle. (“Ibn al-Haytham,” by Wikipedia contributors, https://en.wikipedia.org/w/index.php?title=Ibn_al-Haytham&oldid=1166024105, licensed under CC BY-SA 4.0 <http://creativecommons.org/licenses/by-sa/4.0/>)

Similarly, in using a camera obscura (basically, a box with a pinhole) to observe a partial solar eclipse,

he observed the sickle-like shape of the sun at the time of an eclipse. His introduction reads as follows: “The image of the sun at the time of the eclipse, unless it is total, demonstrates that when its light passes through a narrow, round hole and is cast on a plane opposite to the hole it takes on the form of a moonsickle.” . . . In his work he explains the inversion of the image in the camera obscura [and] the fact that the image is similar

to the source when the hole is small. (“Ibn al-Haytham,” by Wikipedia contributors, https://en.wikipedia.org/w/index.php?title=Ibn_al-Haytham&oldid=1166024105, licensed under CC BY-SA 4.0 <http://creativecommons.org/licenses/by-sa/4.0/>)

The integration of visual description and quantitative measurement was further developed in astronomy with Galileo’s telescopic observations in the early 1600s. For example, in 1609 he trained his telescope for the first time on the moon, and observed previously unsuspected features, ones that he believed were not very different from those on Earth:

Measuring the length of the shadows cast into craters and by mountains at a time when the relative positions of the sun, moon, and earth were known, he was able to estimate the depths of the moon’s declivities and the height of its protuberances and to begin a three-dimensional description of the moon’s topography. (Kuhn, 1957, p. 221)

Similarly, Galileo showed that sunspots were actually features of the sun, rather than planets passing in front of the sun (which was widely believed at the time), by using both observational description of their origination, disappearance, and changes in shape, and measurement of their apparent velocity and mathematical calculations that demonstrated that their movement was only consistent with their being on the sun’s surface (Stanford Solar Center, 2008).

Other examples of the integration of qualitative and quantitative methods and data are found somewhat later in geology. Although the joint use of qualitative and quantitative methods and data is almost intrinsic to geology (and is discussed in Chapter 2), an early example is Charles Lyell’s classification, in his *Principles of Geology* (1830–1833, Vol. 3, Appendix 1), of the chronological order of different European rock strata, based both on his observational fieldwork and descriptions of superposition, folding, and unconformities of the strata, and on the quantitative measurement of the proportion of fossil shells of current versus extinct species in different strata, as a way of estimating the relative ages of different strata. This, and Galileo’s argument about sunspots, are early examples of the deliberate linking of qualitative and quantitative data to support a specific conclusion, a strategy that later came to be called “triangulation.” Such joint use and integration of qualitative and quantitative strategies is characteristic of many of the natural sciences, and is discussed in more detail in Chapter 2.

These studies involved an intentional and “on the ground” design that combined what we now call qualitative and quantitative methods. Although the qualitative descriptions in these examples from the physical sciences lack a key feature of much qualitative research in the social sciences—a focus on meaning—they are clearly qualitative in other senses, such as visual description. In the natural sciences, the incorporation of meaning, intention, and other such “mental” phenomena appears

later, in the study of the behavior of nonhuman animals. Charles Darwin's *The Expression of the Emotions in Man and Animals* (1872) integrated detailed descriptive observations and experimental investigation. For example, he experimentally tested people's ability to recognize emotions from pictures of people's faces:

Darwin chose 11 of Duchenne's slides, placed them in a random order and presented them one at a time to over 20 of his guests without any hints or leading questions. He then asked his friends to guess which emotion each slide represented and tabulated their answers. That kind of experimental control would be considered minimal today, but it was progressive for Darwin's time. . . . (Jabr, 2010)

His work made a major contribution to the development of ethology (the study of animal behavior and thought) as a subfield of biology, one that has continually integrated qualitative and quantitative methods (de Waal, 2016; Maxwell, 2016).

In public health, the work of Snow on the cause of cholera, in the 1850s, relied on both observational fieldwork and quantification of the number of cases of cholera in neighborhoods with different water sources (Freedman, 1991/2010, 2008). Quantitative and qualitative methods were also combined in the 1850s by Le Play in his studies of poverty in families in Europe (Zeisel, 1933/1971, pp. 109–112); this was continued by both Charles Booth and Jane Addams in their studies of social problems in the late 1800s. Similarly, Johnson (1978, p. 66) stated that Edward Tylor “was prone to support his search for cultural patterns with numerical data.” None of these researchers explicitly addressed the design of their research, but the “design-in-use” of these studies clearly involved the integration of quantitative and qualitative methods and data to reach their conclusions.

I do not claim that this is an exhaustive list of instances of combining what we now call quantitative and qualitative methods before the 20th century. There are doubtless many other instances of such integration; these are simply the ones that I have discovered in my rather idiosyncratic reading of this history. What stands out from the work described above, however, is that combining what we now call “quantitative” and “qualitative” concepts and methods was simply not seen as problematic in any way, to the extent that the two were often not even clearly distinguished.

THE EMERGENCE OF EXPLICIT DISCUSSION OF INTEGRATION OF METHODS

To my knowledge, the first deliberate and explicit integration of quantitative and qualitative methods in an empirical field study in the social sciences was W. E. B. Du Bois's *The Philadelphia Negro* (1899). Du Bois stated that even “the best available methods of sociological research . . . are liable to error from the seemingly ineradicable faults of the statistical method, to even greater error from the methods of general

observation” (pp. 2–3), and argued that “The use of both of these methods which has been attempted in this study may perhaps have corrected to some extent the errors of each” (p. 3). The book contains many numerical tables, interspersed with observations, quotes from interviews, and excerpts from documents, and arguments combining the two methods.

Unfortunately, this work has been ignored by later mixed methods researchers; with the exception of my own work, I have seen it cited in the self-identified “mixed methods” literature only once, by Mertens (2018), with no description of its methods. As Platt (1996) noted,

[Du Bois] was black, and his race meant that he could not hope for a job in a research university; thus he could not have the opportunity to train research students who would carry his legacy to the mainstream of white sociology. (p. 247)

Also largely ignored has been Max Weber’s insistence that the social surveys of the Verein für Sozialpolitik, in the late 19th century, address the entire pattern of life of the workers, subjective and cultural as well as objective (Zeisel, 1933/1971, p. 119), although Zeisel criticized Weber’s work as not adequately addressing the subjective/cultural side of this approach.

During the 1920s and 1930s, a number of classic studies (Jahoda et al., 1933/1971; Lynd & Lynd, 1929; Roethlisberger & Dickson, 1939; Warner & Lunt, 1941) were conducted that combined qualitative and quantitative methods, although not using these terms. These works have been mentioned in the mixed methods literature, but rarely analyzed for *how* the authors did this. The most explicit discussion by these researchers of how they integrated qualitative and quantitative methods is in the Jahoda et al. study of unemployment (1933/1971, pp. 1–10). The authors stated that “there is a gap between the bare figures of official statistics and the literary accounts. . . . The purpose of our study of the Austrian village, Marienthal, is to bridge this gap” (Jahoda et al., 1933/1971, p. 1). They argued that “we have tried to build up a comprehensive picture of life in Marienthal, while at the same time accommodating complex psychological situations within an objective framework that is supported by relevant statistics” (Jahoda et al., 1933/1971, p. 2; reproduced with permission). The design of the study was not further described, although they noted that some planned activities had to be abandoned, that new insights emerged during data collection, and that most of the analysis took place after the data had been collected. Zeisel concluded his review of earlier work up to the 1930s (1933/1971) by stating, “The task of integration lies still ahead” (p. 125).

An innovative example of incorporating quantitative concepts and methods in a qualitative study is Margaret Hagood’s *Mothers of the South: Portraiture of the White Tenant Farm Woman* (1939/1996; see Maxwell, 2016, for a more detailed discussion). Hagood used statistical data in selecting her sample of farms and women, to ensure representativeness, and in comparing her results with those

from a separate sample in the Deep South, but she also used statistical concepts to analyze her qualitative data:

We have tried to utilize case material to afford a richer sort of description than quantitative measures can give and yet to avoid the superficial, stereotyped, sentimental, “case study” . . . In order to analyze and present this material in a more scientific way than case study material is usually treated, we have used the two statistical concepts best suited to material for which no measures have been devised—the mode and the range of variation. These two measures, one of central tendency and the other of dispersion, . . . have the advantage of indicating for qualitative material the features that have the most meaning in everyday thinking—the type, or most usual, and the limits of the group under investigation in a particular trait. (Hagood, 1939/1996, pp. 228–229)

These two statistical concepts are repeatedly used in the presentation of the case material. (Hagood later wrote a textbook, *Statistics for Sociologists*, 1941.) This approach to integrating quantitative concepts in an otherwise largely qualitative study is, to my knowledge, unique, and has had no influence on the development of mixed methods. Existing typologies of mixed methods research designs provide no insight into, or guidance for, this sort of integration, which began with the conceptual framework of the study and influenced its research questions, data analysis, and validity strategies.

This period saw the beginning of an explicit distinction between quantitative and qualitative methods, although not using these terms, and with less clear articulation of the differences between these than was developed by later researchers. It is also obvious that these researchers saw no fundamental incompatibility between the two, and indeed identified definite advantages to combining the approaches.

FURTHER DEVELOPMENT OF INTEGRATION IN THE MID-20TH CENTURY

After around 1940, there was a decline in explicit discussion of the integration of qualitative and quantitative methods in most social science fields (anthropology was an exception, as discussed below). However, the actual integration of both approaches continued; Paul Lazarsfeld, in his Foreword to the American reissue of the Marienthal study (1971), stated that “The combination of quantification and interpretive analysis of qualitative material is today in the forefront of the research fraternity’s interest” (p. xxxvi). This period included studies (Becker et al., 1961; Blau, 1963; Festinger et al., 1956; Milgram, 1974) that involved the close integration of qualitative and quantitative concepts and methods, and have been recognized as “classics” in particular fields, but have almost never been discussed in the self-identified “mixed methods” literature.

Milgram's *Obedience to Authority* (1974) is the most explicit of these works in describing the integration of the experimental/quantitative and qualitative components of his study. Milgram and his associates planned a series of laboratory experiments in which participants were deceived into believing that they were part of a study of the effects of punishment on learning, and were then told to give increasingly severe fake electrical shocks to a supposed "subject" who was actually an accomplice of the researchers, and who feigned pain and eventually refused to cooperate. In chapters 2–4 and 6, Milgram provides detailed descriptions of the experimental protocols, including graphs and tables of the results. However, these are interspersed with photographs of the experimental setup and procedures, and transcripts of participants' reactions and their dialogue with the experimenters.

Chapters 5 and 7, in contrast, present post-experimental interviews with participants. Milgram stated that

From each person in the experiment we derive one essential fact: whether he has obeyed or disobeyed. But it is foolish to see the subject only in this way. For he brings to the laboratory a full range of emotions, attitudes, and individual styles. . . . We need to focus on the individuals who took part in the study not only because this provides a personal dimension to the experiment but also because the quality of each person's experience gives us clues to the nature of the process of obedience. (1974, p. 44)

This quote provides an early statement of one of the major complementary strengths of qualitative and quantitative methods: that experimental and quantitative methods are comparatively good at showing *that* a specific intervention or variable resulted in a particular outcome, but qualitative methods are usually necessary for understanding the *processes* by which this occurred. (I discuss this complementarity in more detail in Chapter 6.) Also, in addressing potential validity threats to the study's conclusions, Milgram used both the quantitative results from the experimental manipulations and qualitative data from the observations to rule out these threats.

The integration of qualitative and quantitative approaches was also present in other fields that have received almost no recognition in the "mixed methods" literature. In anthropology, such integration has been continually present for many years (Pelto, 2015; Weisner, 2012). Malinowski (1922), in a work that substantially transformed ethnographic field research, argued for the use of both methods (p. 24), although he actually made little use of statistics; this advice has been repeatedly advocated in methods texts (e.g., Bernard, 1988; Herskovits, 1952) and employed in practice. A later work on ethnographic method (Heath & Street, 2008) likewise emphasized the need for quantification, and explicitly endorsed statistical analysis: "every ethnographer needs some level of competency with statistics" (p. 93). In particular, quantitative methods have been seen as essential for understanding *diversity* within social and cultural groups (e.g., Atran & Medin, 2008; Heider, 1972; Sankoff,

1971; see Maxwell, 2012a, pp. 49–51, 64–67, for a more general discussion of this issue). I discuss the significance of intracultural diversity in more detail in Chapter 7.

Much of the early work in anthropology that combined quantitative and qualitative methods (often involving such sophisticated quantitative techniques as game theory and Guttman scaling) is discussed in Johnson, *Quantification in Cultural Anthropology* (1978), which may be the first textbook on combining quantitative and qualitative methods in research; I have never seen this work cited in the “mixed methods” literature. (I say more about this work’s approach to research design in Chapter 4.) Johnson provided detailed discussions of over 20 anthropological studies, ranging from the 1940s to the 1970s, that combined qualitative and quantitative methods. For example, he described a study by Montgomery on nutritional health in a village in southern India:

He was investigating the expected relationship between socioeconomic status and nutritional well-being in a stratified society. . . . He observed dietary practices, weighed foods, and did nutritional anthropometry, enlisting the aid of medical researchers for clinical observations and blood sample analyses. From the numerous quantitative data he collected, he found . . . that 60 percent of the community was more than 10 percent below standard in weight. . . . Moreover, though family economic rank showed a moderate correlation ($r = .57$) with dietary intake . . . it was not correlated with nutritional status as determined by anthropometry, clinical observation, or biochemical analysis. Instead, nutritional status was related to differences in sex and age. . . . (Johnson, 1978, pp. 94–95)

Although Johnson is clear about some of the challenges in combining the two approaches, nowhere does he suggest there is anything logically or philosophically problematic in doing this.

A later development took place in archeology, by proponents of what was initially called the “new archeology,” later termed “processual archeology” (S. Binford & L. Binford, 1979). These archeologists criticized much previous archeological practice for paying insufficient attention to systematically testing the theories they developed to explain their research findings; although not all of the testing they initiated was quantitative, their approach involved a substantial increase in descriptive statistics, and innovative uses of more sophisticated techniques, including multivariate analysis.

Some proponents of this approach also advocated the incorporation in archeology of ethnographic fieldwork with existing communities, along with quantitative methods, to better understand the processes that created the sorts of remains that archeologists study. A classic example is L. Binford’s *Nunamiut Ethnoarcheology* (1978), a study of an Inuit community, the animals they hunted, and the activities and processes that created the artifacts and other physical evidence that an archeologist would find. Binford’s report consists of a close integration of ethnographic descriptions of Inuit activities, including single case accounts, quotes from informants, and generalizations from these, with numerous tables and graphs showing

the weight, use, and disposal of different parts of the animals hunted, and inventories and measurements of hunting and meat storage sites, often accompanied by photographs and drawings.

In linguistics, researchers have been integrating qualitative and quantitative methods since the 1960s, but until recently there has been little explicit discussion in published empirical or methodological works of *how* these can be integrated. I discuss linguistics in more detail in Chapter 2.

Although (with the exception of anthropology) this period exhibits much less explicit *discussion* of combining qualitative and quantitative approaches than occurred later, the combined use of both methods in a study was widespread.

IMPLICATIONS FOR MIXED METHODS RESEARCH

The main implication that I draw from this history is that the relative strengths and limitations of qualitative and quantitative approaches are critical to successful integration, but these have been understood differently in different fields (Maxwell, 2018, p. 320), and in my view the mixed methods literature hasn't clearly conceptualized or employed these. In particular, quantitative methods are good at showing *that* a specific intervention or variable caused a given result, and in extending this finding to a randomly sampled population (though with caveats; see Maxwell, 2017). Qualitative methods and perspectives, in contrast, are especially valuable for discovering *how* it did so—the processes (including participants' beliefs and mental processes) that led to this result, and the contextual factors that influenced this outcome. I discuss these differences in more depth in Chapter 6.

In addition, qualitative methods are essential for assessing the *generalizability* of a study's conclusions to other populations or settings, a task for which quantitative methods provide almost no useful tools (Cartwright, 2015; Cartwright & Hardie, 2012). Such generalization, for which qualitative researchers typically use the term *transfer* (Donmoyer, 2008; Guba, 1981; Lincoln & Guba, 1985), depends fundamentally on understanding the *processes* (including mental processes) operating in the original setting, and how these would be influenced by the new context of a different setting—both major strengths of qualitative approaches. I present this argument in more detail in Chapter 7.

Finally, I worry that the lack of attention, within the self-identified “mixed methods community,” to the wider history and range of approaches to combining methods in both the natural and social sciences, as well as this community's emphasis on paradigms (discussed in Chapter 3) and design typologies (discussed in Chapter 4), may lead to its marginalization in the growing recognition and development of combining methods in the wider research community. I believe that greater attention to the diversity of mixed method approaches, discussed above and in Chapter 2, would be beneficial to the development of the field of mixed methods research.

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