

Expanding the History and Range of Mixed Methods Research

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Abstract

Presentations of the history and range of mixed methods research presented in textbooks, handbooks, and journal articles have typically ignored a great deal of earlier and contemporary research that integrated qualitative and quantitative approaches, but did not explicitly identify itself as “mixed methods.” This article reviews earlier research, in both the natural and social sciences, that clearly integrated qualitative and quantitative approaches and methods, and discusses some contemporary research traditions that use such integration without labeling this “mixed methods.” Important implications of these studies and traditions for the conceptualization and conduct of mixed methods research are discussed.

Keywords

mixed methods history, mixed methods definition, qualitative and quantitative

A prevalent view of the history of mixed methods research identifies the beginnings of this approach, or of its systematic development, with the work of Campbell and Fiske (1959) on triangulation, with a full flowering of actual mixed method studies in the 1980s. Typical statements are ones by Creswell and Plano Clark (2011): “The formative period of mixed methods began in the 1950s and continued up until the 1980s. This period saw the initial interest in using more than one method in a study” (p. 25), and “During the late 1980s to early 1990s . . . [a number of individuals from different disciplines] were writing . . . on an approach to research that moved beyond simply using qualitative and quantitative methods as distinct, separate strands in a study” (p. 20). Similarly, Teddlie and Tashakkori (2003), although they mention a “substantial degree of important mixed methods research” (p. 5) that took place between 1900 and 1950, say almost nothing about what was “important” in these studies, and state that the “emergence of the first explicit multimethod designs” did not occur until after 1950 (p. 6).¹

My argument in this article is that the discussion of mixed methods studies in textbooks and methodological publications on mixed methods research has often been narrow and myopic, both historically and in contemporary scope. Early research that clearly involved the joint use and integration of qualitative and quantitative approaches, but that predates the emergence of “mixed methods research” as a distinct and self-conscious strategy, is usually ignored or simply mentioned, with no discussion of what these studies might contribute to our understanding

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of how to effectively combine these approaches. (Significant exceptions are Brewer & Hunter, 2006, pp. xv-xxxi; Hesse-Biber, 2010, pp. 2-3; and Irwin, 2008.)

Similarly, a substantial amount of current research that combines qualitative and quantitative methods and data, in both the natural and social sciences, is ignored, despite its potential relevance for the field of mixed methods research. The deliberate and systematic use of both qualitative and quantitative approaches and methods, and the integration of these, was present long before anyone had labeled this as a particular *type* of research, and even before the terms *qualitative* and *quantitative* were established, and continues to be more widely used in forms largely unacknowledged in the mixed methods literature. Here, I describe studies that fall outside the usual range of discussion of “mixed methods,” and attempt to identify important implications of these studies for our conceptualization of, and strategies for, the combined use of qualitative and quantitative approaches.

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 politically advantageous to claim, distorting the actual history, and current range of use, of combining qualitative and quantitative approaches, methods, and results. In developing and promoting mixed methods research, it is more persuasive to present 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 work recognizes. 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 sort of argument has been stated more broadly by Platt (1996, p. 260 ff.), who maintained 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; [http://en.wikipedia.org/wiki/Presentism_\(literary_and_historical_analysis\)](http://en.wikipedia.org/wiki/Presentism_(literary_and_historical_analysis))).

Platt (1996) 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. (p. 44)

Terms such as *survey* had a very different meaning in the early part of the 20th century from what they later acquired; “‘participant observation’ was done in the 1920s but . . . was not then called that . . . nor was it seen as clearly distinct from modes of data collection now regarded as quite different” (1996, p. 44). Platt concluded that “we need, therefore, to look more closely at the conceptualization of methods” (p. 45).

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 article, 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, Chmiel, & Rogers, 2015). I begin with the history of using both qualitative and quantitative thinking and strategies in research, and then consider contemporary examples of such approaches that rarely are recognized in the mixed methods literature.

The conceptual starting point for this article is seeing mixed methods research as the actual integration of qualitative and quantitative concepts, methods, and data in practice, regardless of whether or not these are explicitly identified as “quantitative” and “qualitative,” or labeled as a distinct type of research. An in-depth treatment of the definitions of “qualitative,” “quantitative,” and “integration” is beyond the scope of this article (for a more detailed discussion, see Maxwell, 2010; Maxwell et al., 2015; Pearce, 2015), but such conceptual elaboration of these terms is not essential for my argument. Thus, I consider a study “mixed methods” if it used strategies drawn from both approaches, regardless of how these were labeled, and used these strategies in ways that were mutually informative, rather than separate and compartmentalized.

History

The combined use of quantitative and qualitative strategies in the natural sciences predates that in the social sciences, although the natural sciences are almost never mentioned in the mixed methods literature, and I am not aware that anyone has studied the possible influence of these earlier uses on the development of mixed methods research in the social sciences. Astronomy, since the time of the Greeks, has used both observational description and quantitative measurement, but clear examples of research that combined these do not seem to occur until Galileo’s observations of various heavenly bodies using a telescope. 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 the 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, 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 (<http://solar-center.stanford.edu/sunspots/galileo1.html>).²

Similar 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 below, in the “Contemporary Practice” section), 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 qualitative 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 particular 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 below.

The qualitative descriptions in these examples from the physical sciences necessarily lack one key feature of most qualitative research in the social sciences: a focus on meaning. However, they are clearly qualitative in most other senses. First, they involve verbal or visual description, rather than numerical measurement; McPhee (1998), in his acclaimed account of the development of the theory of plate tectonics, stated that “geology is a descriptive, interpretive science” (p. 379). Second, they are particularistic, focusing on single events or phenomena rather than primarily on generalizations. Compton (1985), in a widely used manual of geological fieldwork, argued that “every geological event is unique and each rock and structure thus has intrinsic uniqueness, a dependency differing radically from those of broadly abstract science” (p. 1).³ Third, the research is inductive, discovering new phenomena and generating theories about these, rather than simply testing prior hypotheses. In the natural sciences, the incorporation of meaning, intention, and other such “mental” interpretations appears later, in the study of animal behavior, and is discussed below, in the “Contemporary Practice” section.

In medicine and epidemiology, combining qualitative and quantitative methods has been used since at least the mid-19th century. The statistician David Freedman, in two articles arguing for the value of qualitative investigation as a complement to statistical analysis (1991/2010, 2008), described a number of important studies from the 19th and early 20th centuries that combined qualitative evidence and reasoning with experimental methods and statistical analysis, such as Snow’s discovery of the cause of cholera. (Irwin, 2008, analyzed this and other examples for their implications for mixed methods research.) The editors of a posthumous collection of Freedman’s articles (Collier, Sekhon, & Stark, 2010) summarized Freedman’s position as follows: “Researchers who rely on observational data need qualitative and quantitative evidence, including case studies. . . . No single tool is best: They must find a combination suited to the particulars of the problem” (p. xv).

The combining of qualitative and quantitative approaches in the social sciences also occurred much earlier than is often acknowledged. Small (2011) noted that “one can find mixed methods studies throughout the history of the social sciences” (p. 60), and some of these earlier studies have been discussed by Alastalo (2008), Brewer and Hunter (2006), Johnson and Gray (2010), Irwin (2008), Maxwell and Loomis (2003), and Platt (1996). However, these studies are rarely described in mixed methods textbooks, or cited in articles.

The use of both quantitative and qualitative methods of investigation can be found in 19th- and early 20th-century research on social problems, such as that of Charles Booth (e.g., 1892-1897; see Alastalo, 2008, p. 28) and Jane Addams (e.g., 1912; see Platt, 1996, pp. 262-263). In addition, statements of the importance of combining qualitative and quantitative approaches are present in the work of the psychologist Wilhelm Wundt, who was both the “father of experimental psychology” and an advocate for the study of the psychic processes of spiritual life, which “lies beyond the scope of experiment” (<http://plato.stanford.edu/entries/wilhelm-wundt/#Vol>), and the sociologist Max Weber, who both developed the concept of *verstehen* (interpretive understanding) and supervised the large-scale surveys of the *Verein fuer Sozialpolitik* in the early 20th century (Zeisel, 1933/1971, pp. 116-119).

Possibly the first published report in the social sciences that explicitly described the deliberate integration of qualitative and quantitative methods and data in an empirical field study was W. E. B. DuBois’s *The Philadelphia Negro* (1899). E. Anderson (1996), in his introduction to a reissue of the book, called it “one of the first works to combine urban ethnography, social history, and descriptive statistics” (p. ix). The book contains many numerical tables, interspersed with observations, quotes from interviews, and excerpts from documents. DuBois noted 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). However, his work had little influence on the development of social research methods:

he 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. (Platt, 1996, p. 247)

In the early 20th century, other studies also deliberately integrated qualitative and quantitative methods, including the well-known “Hawthorne studies” of working conditions and worker productivity, begun in 1924 (Roethlisberger & Dickson, 1939), and three community studies: *Middletown*, by Robert Lynd and Helen Merrill Lynd (1929); *Marienthal*, by Marie Jahoda, Paul Lazarsfeld, and Hans Zeisel (1933/1971); and the *Yankee City* studies, begun in 1930 (Warner & Lunt, 1941). (The Hawthorne, Marienthal, and Yankee City studies were described by Brewer & Hunter, 2006; some implications of the Marienthal study for mixed methods researchers are presented in Maxwell et al., 2015). All these works exhibit an intentional and systematic combining of qualitative and quantitative approaches and methods, and a thorough integration of both sorts of data in developing their conclusions—a depth of integration not often matched in more recent research. A less well-known study that combined both approaches is Margaret Hagood’s *Mothers of the South* (1939/1996); this study is discussed below.

This combined use of qualitative and quantitative approaches, and integration of qualitative and quantitative data, continued into the latter half of the 20th century, including influential works by Blau (1963); Dalton (1959); Festinger, Riecken, and Schachter (1956); Lipset, Trow, and Coleman (1956); and Milgram (1974). However, these authors did not explicitly emphasize this joint use, let alone identify it as a distinct approach, and have been largely ignored in the mixed methods literature. (The Lipset et al. study was discussed by Brewer & Hunter, 2006, and the Festinger et al. and Milgram studies were analyzed by Maxwell & Loomis, 2003). It appears that the combined use of qualitative and quantitative methods was seen as unproblematic during this period. Staw (1992, p. 136) argued that in the field of organizational behavior in the 1950s, combining methods was more common than it later became, and Rabinowitz and Weseen (2001, pp. 15-16) identified the work of Festinger and Milgram as representing a period in psychology when qualitative and quantitative methods were more easily combined than later.

This listing of earlier studies in the social sciences that clearly qualify as “mixed methods” is by no means comprehensive; it has been drawn from a few general sources on the history of research methods in the social sciences (particularly Platt, 1996, and Alastalo, 2008), the few mixed methodology publications listed earlier that discuss this history, and my own rather idiosyncratic knowledge of research in the natural and social sciences. However, it does establish that the intentional and systematic use of both qualitative and quantitative approaches and methods in a single study, and the integration of qualitative and quantitative data in drawing conclusions, were present long before anyone had identified this as a particular *type* of research. The field of mixed methods research urgently needs scholarly historical work on the origins and development of ways of combining qualitative and quantitative concepts, methods, and data, work that avoids the restrictive conceptual categories and tendencies toward presentism that have characterized many previous accounts.

Contemporary Practice

In the natural sciences, clear examples of the integration of qualitative and quantitative approaches, methods, and data can be found in all the disciplines that incorporate field research, including geology, planetary astronomy, paleontology, and biology (e.g., Heinrich, 1979). In

geology, the uniqueness of particular geologic phenomena, and geology's concern with process and context, give great importance to qualitative description and inference. (For a more detailed discussion of the integration of qualitative and quantitative approaches and data in geology, see Maxwell et al., 2015).

In biology, ethology (the study of animal behavior) provides many additional examples of such integration, ranging from the early work of Koehler (1924/1927), Portmann (1953/1961), Tinbergen (1961), and von Uexkuell (1934/1957) to contemporary research on animals' cognition and behavior (e.g., de Waal, 1989; Heinrich, 1999; Shettleworth, 2010). A striking example is Jane Goodall's (1986) 600-page *The Chimpanzees of Gombe: Patterns of Behavior*, a summary of 25 years of work with these chimpanzees. This work presents a close integration of tables, graphs, and other quantitative data with verbal descriptions of the behavior of particular individuals, often supplemented by photographs, showing the processes of problem solving and social interaction that these individuals engaged in.

This sort of integration is frequent in field research in ethology, but is not often explicitly discussed in publications. An exception is a report by Minta, Minta, and Lott (1992) on hunting associations of badgers and coyotes, drawn from a 3-year study of badger ecology using implanted radio transmitters. The qualitative data consisted of descriptions of the animals' behaviors and of the surrounding environment; the quantitative data consisted of counting or timing of associations and of specific behaviors, and estimates of spatial distance between the animals, and also of aggregate data (such as success rates for coyotes hunting alone and with badgers), presented as descriptive data and also analyzed using inferential statistics.

The qualitative and quantitative data are deliberately integrated in presenting and supporting the authors' conclusions:

We used two types of indices of the association's costs and benefits to each species: first, we compared rates of prey capture and activity budgets of each species hunting alone and hunting in an association. Then we recorded each species' response to the other's presence assuming that behavior that initiates or maintains the association is evidence that the net outcome for the behaving animal is neutral or positive, while behavior that tends to avoid or terminate the association is evidence that the net outcome is negative [The term "then" does not refer to chronological sequence; both types of data were collected concurrently.]. (Minta, Minta, & Lott 1992, p. 815)

Their conclusion, that the association represents mutualism (joint benefit), rather than parasitism or competition, is supported by both types of data, as well as by the description of features of the habitat that would make individual hunting less productive, for both species, than hunting in association.

Probably because of the space limitations of journal articles, this work contains relatively little explicit description of the *processes*, mental or behavioral, involved in the associations between badgers and coyotes. Such description is more prominent in longer works, such as that of Goodall, described above. Frans de Waal, in *Peacemaking Among Primates* (1989), stated that "The first tasks of an ethologist beginning research on an unfamiliar species are to try to get into its skin; to think at its level" (p. 105), and after describing one episode that he observed while studying rhesus monkeys, he commented "When watching closely enough, one can 'see' monkeys think all the time" (p. 106). This clearly fits the usual definition of "interpretive" inquiry in the social sciences—"Interpretive inquiry, as is the case with all other forms of qualitative inquiry, focuses on understanding (interpreting) the meanings, purposes, and intentions (interpretations) people give to their own actions and their interactions with others" (Smith, 2008, p. 459)—if one extends this approach from "people" to nonhuman animals.

In anthropology, the joint use of qualitative and quantitative methods has been continuously present for many years (Morse & Pelto, 2014; Weisner, 2012, 2014). Malinowski (1922), in a work that substantially transformed ethnographic field research, emphasized the use of both methods (p. 24), and this has been repeatedly endorsed in methods texts (e.g., Bernard, 1988; Johnson, 1978; LeCompte and Schensul, 1999). Herskovits (1952), in a work that initially defined the subfield of economic anthropology, argued that “It has become increasingly imperative that a quantitative approach to studies of economic life must be employed wherever possible” (p. 502). A recent work on ethnographic method (Heath & Street, 2008) 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 (e.g., Atran & Medin, 2008; Heider, 1972; Sankoff, 1971; see Maxwell, 2011b, pp. 49-51, 64-67, for a more general discussion).

Many classic ethnographic studies have incorporated quantitative data, mainly descriptive statistics (e.g., Lewis, 1951; Rappaport, 1968; Redfield & Villa Rojas, 1934); later research also used more sophisticated quantitative methods, including game theory (Barth, 1959; Davenport, 1960) and Guttman scaling (Witkowski, 1972). However, until very recently there has been little explicit discussion of *how* to integrate the two approaches and types of data, or any reference to the literature on mixed methods (Weisner, 2012). As in the natural sciences, integration has apparently been seen as unproblematic, and simply a matter of common sense. Probably for this reason, the combined use of both methods in anthropology has received almost no notice in works on mixed methodology.

In archaeology, as in geology, the use of both qualitative description and quantitative measurement and aggregation has been common since the 19th century. However, the combined use of qualitative and quantitative methods was greatly expanded and transformed by proponents of what was initially called the “new archeology,” later termed *processual archeology* (L. Binford, 1983; S. Binford & Binford, 1972). 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, this 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, to better understand the processes that created the sorts of remains that archeologists study. A classic example is L. Binford (1978), *Nunamiut Ethnoarcheology*, 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. This integration is very similar to that in Goodall’s *The Chimpanzees of Gombe*.

Similarly, linguistics has often used both quantitative and qualitative methods (Schilling, 2013), but until recently there has been little explicit discussion in published empirical or methodological works of *how* these can be integrated (an important exception is Zentella, 1990). Schilling (2013) noted that variationist sociolinguistics, “though essentially quantitative in nature” (p. 8), “has never really strayed very far from its ethnographic roots and its focus on the local as well as the global” (p. 9), citing Labov’s work in the 1960s (e.g., Labov, 1966). She identified Penelope Eckert’s *Linguistic Variation as Social Practice* (2000) as “a model study exemplifying the synergistic union of quantitative variationist and qualitative ethnographic

methods” (p. 9). Eckert (2000), in discussing her fieldwork, stated that “the pursuit of social meaning in variation calls for a hybrid research practice, for while we can get at local categories and their meanings only through close qualitative work, the study of variation is very essentially quantitative” (p. 69).

There are also newer research approaches that involve integrating qualitative and quantitative methods and data, but that have received little if any recognition from the mixed methods community. An example is design-based research⁴ (DBR), a widely used approach to improving educational interventions and environments (T. Anderson & Shattuck, 2012; Bannan-Ritland, 2003; Brown, 1992; Collins, 1992; Kelly, Lesh, & Baek, 2008). This approach, originally conceptualized by Brown (1992) as beginning in an experimental setting, proceeds to more natural environments through multiple iterations of an intervention, continuously testing and refining the intervention, and assessing not just *whether* the intervention is effective, but *how* and *why* it is. (Some would now argue that it could also begin in a more natural setting, leading then to experimental work.)

DBR intrinsically involves an integration of quantitative/experimental and qualitative strategies—specifically, integrating experimental manipulation of the intervention with primarily qualitative data collection using observations and interviews, though often (and increasingly) also involving quantitative techniques, including pre/post testing of students (e.g., Martinez, 2008), forced-choice questionnaires (e.g., Wolf & Le Vasan, 2008), and hierarchical linear modeling (Roschelle, Tatar, & Kaput, 2008). As in many of the natural sciences, the approach typically alternates between observation, measurement, and the recording of both; the goal is to best describe specific, local features of the intervention and its outcomes, as well as the context in which these occur. Both qualitative and quantitative data inform the conclusions, and are closely integrated to develop and test the interpretation (theory) of what took place, as well as to generate fresh insights, new perspectives, and original understandings.

DBR has been acknowledged as a mixed methods strategy by some of its practitioners (e.g., T. Anderson & Shattuck, 2012; Walker et al., 2011); Clements (2008) argued that traditional qualitative methods “are actually stronger if used within the context of a randomized experiment” (p. 417). However, I have found no references to this approach in the mixed methods literature specifically. (I suspect that this is partly because methodological discussion in DBR has been framed in very different terms from that in the mixed methods literature.)

Implications

The first implication that I draw from these studies is that much of the broader range of research that I discuss shows little evidence of the paradigm conflicts that have been a hallmark of the recent history of self-identified mixed methods research in the social sciences, as well as of the battles between qualitative/humanistic and quantitative/scientific approaches in history (Landes & Tilly, 1971). Rabinowitz and Weseen (2001) noted that “in the natural (hard) sciences, which use a variety of qualitative and quantitative methods, such debates do not range in the same way” (p. 16). There have certainly been conflicts, both intellectual and political, between advocates of quantitative and qualitative approaches in some other fields; for example, between field geologists and lab geologists (McPhee, 1998, pp. 378-382); in archeology, between advocates and opponents of the “new archeology” (e.g., L. Binford, 1983, pp. 13-18); and between behaviorists, who dismissed Jane Goodall’s work because she talked about her chimpanzees as having feelings and intentions (e.g., Goodall, 1992, p. 14 ff.), and biologists and psychologists who believed that it was legitimate to do research on animals’ minds (e.g., Heinrich, 1999; Shettleworth, 2010). However, neither the natural sciences, nor the earlier work in the social sciences mentioned above, exhibit the kinds of purportedly “fundamental”

philosophical differences, or claims of incompatibility of the two approaches, that characterized the paradigm wars in some of the social sciences, and were central to the emergence of “mixed methods” as a distinct and self-conscious approach in the late 20th century.

I believe that these latter conflicts were substantially created by the specific intellectual and social context in which they occurred, and are not intrinsic to the integration of qualitative and quantitative approaches (cf. Alastalo, 2008, pp. 34-38; Bryman, 2008). I argue that “paradigm incompatibility” is a social construction (Hacking, 1999), unique to this specific context, that does not help us understand the actual difficulties in integrating qualitative and quantitative approaches more broadly.

Second, these studies do not support the view that mixed methods research requires a specific foundational “paradigm,” or that particular approaches to research are “based on” distinct, internally coherent philosophical positions. Particular fields and subfields in the social sciences exhibit a diversity of philosophical assumptions (Abbott, 2001, 2004; Maxwell, 2010; Pitman & Maxwell, 1992). Although it is important for mixed methods researchers to understand the “mental models” (Greene, 2007) that have often informed qualitative and quantitative research, and the philosophical views that influence these (Maxwell, 2004, 2012a), this is quite different from the “paradigm” views of these two approaches that have shaped the recent history of mixed methods research. (For a more detailed discussion of this issue, see Maxwell, 2011a.)

A third implication of the studies I have discussed is that, despite the systematic and in-depth integration of qualitative and quantitative approaches and data in many of these studies, there is almost no use of, or attempt to develop, *typologies* of ways to combine these approaches, or even a conceptualization of this integration as a *type* of research. This is strikingly different from the later, self-conscious development of mixed methods as a distinct methodology or “paradigm,” which has been largely characterized by typological conceptions of design. It seems possible that this difference is partly responsible for a tendency to identify the real inception (or at least the coming of age) of mixed methods research with the formulation of distinct types of research designs for combining qualitative and quantitative approaches (e.g., Teddlie & Tashakkori, 2003), and to neglect the possible relevance of earlier studies that lacked this typological thinking.⁵ The absence of such typologies in the wider range of mixed methods studies also problematizes the assumption that these are essential for the development and informed practice of mixed methods research.

A fourth implication of these studies is that most of them exhibited the close involvement of the researcher or team with the collection and analysis of *both* the qualitative and quantitative data, rather than seeing these as separate “strands” of the research. This has important consequences for the integration of the two approaches, since these are not initially compartmentalized, and the implications of each type of data for the other are much easier to notice. This involvement makes it much more difficult to sustain the view that only one of the two approaches or types of data is the “right” one, and the lack of such involvement has often been a major factor in studies that exhibited conflict between the approaches (e.g., Kaplan and Duchon, 1988; Trend, 1979). However, *initial* integration is not necessarily beneficial; there may be situations in which separate analyses of the qualitative and quantitative data may be necessary to allow each to fully develop its findings and to provide greater final integration (e.g., Plano Clark et al., 2013; Trend, 1979).

Fifth, a prominent feature of the integration of qualitative and quantitative approaches in these studies is the use of both qualitative and quantitative data in *developing*, as well as testing and supporting, the conclusions of the study. This sort of integration is characteristic of the natural sciences, and is often found in earlier mixed methods studies in the social sciences. It typically involves both triangulation and what Jennifer Greene called initiation, which involves

using *differences* in the implications of the two sorts of data to develop deeper and richer understandings. Greene (2007) distinguished between these as two distinct *purposes* for mixed methods research, as seeking convergence or divergence, respectively. However, I think it is more useful to see these as possible *outcomes* of the research, rather than as prior goals. Whether results will converge or diverge usually cannot be known in advance, and both may be intertwined in ways that make them difficult to separate.

Sixth, I think that this broader range of mixed methods studies illustrates the importance of identifying the actual use and integration of qualitative and quantitative concepts and methods, rather than relying only on the authors' terminological labels for what they did, or by drawing inferences based solely on publications that focus on the results of the study. Schilling (2013) noted that "Writeups of research projects focus on results and interpretations—not on how the data from which the findings were drawn were actually obtained" (p. 1). In some instances, the actual integration of the qualitative and quantitative methods and data is only apparent in separate reports on how the study was done, such as those in Hammond (1964) and Frost and Stablein (1992), or in chapters dealing specifically with methods, such as those added by Blau (1963) to the second edition of *The Dynamics of Bureaucracy*. For these reasons, published articles are not always reliable sources for inferring integration, or the lack of this (see also Maxwell & Loomis, 2003).

The study by Hagood (1939/1996), mentioned above, is a good illustration of this point. At first glance, this appears to be a straightforward qualitative multiple case study of tenant farm women; the book consists almost entirely of descriptions of particular farms or individuals, quotes from interviews, and qualitative summaries of interview and observational data, with no quantitative tables or statistical analyses. A clue that this may not tell the entire story is that Hagood's PhD dissertation was a statistical analysis of fertility patterns of native White women in the Southeast (Scott, 1996, p. iv); this study constituted the preliminary work for her subsequent field study (Hagood, 1939/1996, p. 226). Hagood later wrote an influential (Scott, 1996) textbook, *Statistics for Sociologists* (1941).

In a chapter, "Finding the answers," on the methods used in the study, Hagood provides information on the quantitative aspects of the study. First, statistical data were used in selecting the sample of farms and women included, to ensure approximate representativeness, and in comparing her results with those from a separate sample in the Deep South. Second, Hagood (1939/1996), made innovative use of 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.

This method of presentation avoids the featuring of pathological cases as typical . . . Furthermore, it continually stresses the important fact of variation within even a fairly homogeneous group. (pp. 228-229)

These two statistical concepts are repeatedly used in the presentation of the case material, for example, "The modal practice with regard to school attendance is . . . One extreme of divergence from this practice is . . . The other extreme is a family . . ." (Hagood, 1939/1996, p. 149).

This example also illustrates my final point: that although there are distinctive differences between the qualitative and quantitative “mental models,” these are potentially decomposable sets of assumptions, concepts, and strategies, rather than unified paradigms (Bergman, 2008; Hammersley, 1992; Maxwell, 2011a; Pearce, 2015; Small, 2011). The fact that Hagood used the statistical concepts of central tendency and range of variation as an intrinsic part of her data analysis, without quantifying her data, still makes this, for me, a mixed methods study; Platt (1996) stated that Hagood’s study “combines statistical and case study logics” (p. 256). I suspect that if someone were now to write up this strategy, with examples of its application, it would easily be accepted by the *Journal of Mixed Methods Research* as a contribution to mixed methodology.

In summary, I have argued that a better understanding of the history and breadth of combining qualitative and quantitative approaches, methods, and data can be of significant practical value to mixed methods researchers in designing their studies and drawing conclusions from their data. This article provides only an initial survey of this history and breadth, and some of the implications that I draw from these studies. More in-depth historical and comparative work is needed to further develop these implications.

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Notes

1. The review by Teddlie and Johnson (2009a, 2009b), of methodological thought from antiquity to the present, deals mainly with philosophical issues in the periods prior to the 1950s; they mention some mixed methods studies from the 1920s to 1940s, but do not discuss *how* these researchers combined qualitative and quantitative methods and data.
2. More broadly, Kuhn (1957) argued that it required both the mathematical calculations of Copernicus and Kepler, and the visual evidence provided by the telescope, to achieve the general overthrow of the Ptolemaic system, with its assumption of unchanging perfection in the celestial realm.
3. This often involves (at least implicitly) a different approach to causation from that prevalent in quantitative research, one that sees causality as intrinsically referring to the mechanisms or processes that produce a particular outcome in a given context, rather than being limited to general laws or regularities, and that accepts causal explanations derived from the study of specific events and phenomena. For a more detailed discussion, see Maxwell (2011b, 2012a).
4. This approach was originally termed *design research* (Collins, 1992) or *design experiments* (Brown, 1992). However, the former term also has a completely different meaning, and “design-based research” is now the usual designation.
5. Although the typological definition of “design” is the dominant one in the mixed methods literature, it has been subjected to criticism within this community (e.g., Bryman, 2006, 2007; Guest, 2013; Morse, 2006). A full discussion of this issue is beyond the scope of this article; for an alternative conception of design, see Maxwell (2012b) and Maxwell and Loomis (2003).

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