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Illumination with a Dim Bulb? What Do Social Scientists Learn by Employing Qualitative Data Analysis Software in the Service of Multimethod Designs?

**Michael J. White¹, Maya D. Judd¹,
and Simone Poliandri²**

Abstract

Although there has been much optimistic discussion of integrating quantitative and qualitative findings into sociological analysis, there remains a gap regarding the application of mixed approaches. We examine the potential gains and pitfalls of such integration in the context of the growing analytic power of contemporary qualitative data analysis software (QDAS) programs. We illustrate the issues with our own research in a mixed-methods project examining low fertility in Italy, a project that combines analysis of large nationally representative survey data with qualitative in-depth interviews with women across four cities in Italy. Despite the enthusiasm for mixed-methods research, the available software appears to be underutilized. In addition, we suggest that the sociological research community will want to address several conceptual and inferential issues with these approaches.

I. INTRODUCTION

One of the intriguing and seemingly promising developments within several branches of social science in the last several years has been the use of mixed methods.

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Particularly noteworthy has been the rapid development of qualitative data analysis software (QDAS), which would seem to both automate some of the more tedious aspects of fieldwork and analysis, as well as allow for newer kinds of investigations. Both analytically and computationally, then, the social sciences would seem to be well-positioned for advances that would enable new significant insights from *both* the study of large-scale qualitative data (most often, transcribed free-flow interviews) and mixed-methods data. In our review and own data analysis, we see much progress, but there remains, we suggest, unrealized potential in the incorporation and exploitation of this new software.

Developments in computer technology would seemingly facilitate the incorporation of large amounts of qualitative data into a variety of research approaches. These may include predominantly qualitative investigations, predominantly quantitative projects augmented with qualitative analysis, and most important, perhaps, decidedly mixed-methods projects (Bazeley 2006, 2007, 2010; di Gregorio and Davison 2008; Lewins and Silver 2007). In recent years, a number of computer software packages have been developed and refined—with still others being introduced¹—for the analysis of qualitative data. For instance NVivo, ATLAS/ti, and MAXQDA allow analysts to code and analyze passages of narrative from in-depth interviews, focus groups and the like, as well as to combine such data with quantitative results from surveys, or to convert qualitative coding and matrices into a format that allow statistical analysis (Bazeley 2006, 2010; Miles and Huberman 1994; Sandelowski 2003; Tashakkori and Teddlie 1998; Teddlie and Tashakkori, 2009). Thinking expansively, such software, in conjunction with the intellectual progression of the field, might help usher in a revolution in methodology (qualitative, quantitative, and mixed) akin to the role of computational software in fomenting the quantitative revolution in social sciences an academic generation ago.

A new generation of studies might provide insight that conventional approaches alone could not. At the same time, the reception has not been uncritical. Some scholars have expressed concern that the undertaking of mixed methods studies has only proliferated due to the belief that there is an “inherent good to doing so” (Twinn 2003) and that this approach has become “methodologically fashionable” or “somewhat of a fad” (Sandelowski 2003: 323; see also O’Cathain, Murphy, and Nicholl 2007). Among those willing or eager to adopt such approaches, a number of justifications have been given for employing mixed methods, including the possibility of producing knowledge that otherwise would not be captured using one method alone, providing more confidence in findings, allowing for a wider variety of views, investigating an issue that would otherwise not have been possible, and understanding why or how a certain study component did not work (Greene 2007; O’Cathain et al. 2007; O’Cathain and Thomas 2006).

In this paper we turn a critical eye to what we can—and cannot—learn from this potentially informative development. We attempt to go beyond some standard understandings of augmenting conventional sociological analysis with a qualitative approach, hoping to offer some useful insights and point the way to improved use of QDAS. We suggest that our argument applies in the near term to mixed-methods studies, in whose research forum the discussion is most active, but eventually also to

larger-scale studies of in-depth interviews and other extensive text-based interview sources. We would caution that there has been a long tradition of text-based analysis (content analysis) in the social sciences, so our perspective applies more to the effort to extend such techniques by virtue of automation and integration with other methodological designs.

To illustrate this thinking, we draw on our own research regarding low fertility in Italy. Irrespective of the intrinsic interest in the topic, we draw on this example because it derives from hopes to address exactly this issue. The plunging of fertility rates in Italy and its persistence at sub-replacement levels came as a surprise to the research and policy communities. The phenomenon has called into question some conventional paradigms and theorizing about fertility change and family formation. This in turn opens the door for new ways of thinking and new methods of investigation. In such a setting, in-depth conversations with prime actors might be particularly revealing, in a way that would supplement, or perhaps even challenge, the more standard statistical analysis of survey data. Thus, the methodological analysis and the example we offer from our own project are closely linked to the broader concerns we attempt to address in this methodological paper.

The paper is structured as follows. We begin with a brief review of software approaches to qualitative data analysis, particularly in the service of mixed-methods analysis. We then examine the extent to which key analytical features of these dedicated software packages have actually been used. To this end we describe the results of a “content analysis of content analyses” of the published literature concerning the utilization of such software for analyses. This is followed by an example from our own experience using such software in our own project. We conclude with a broader discussion of some of the mismatch between the technical capabilities and actual usage linked to these software packages and a reflection on several other important aspects of research design that seem, at least to date, to have complicated the integration of qualitative and quantitative methods.

2. QUALITATIVE DATA ANALYSIS AND MIXED-METHODS FRAMEWORKS

We see recent software packages as offering an extremely promising portfolio of tools that could enhance an array of investigations. More than provide simple analytical tools per se, they may help the research community gain insights by looking through a different lens and thereby gaining an alternative or augmented view of the issue under investigation. We bring together in this paper an effort to look directly at the degree of adoption of such techniques, while also sharing our experience of working directly on a research problem that called for such multimethod approaches.

We offer first a short overview of some of the approaches to qualitative data incorporation that appear in the literature. Much more extensive (and rapidly evolving) treatments are given in some of the key references we cite. Most notably, perhaps, the second edition of the *SAGE Handbook of Mixed Methods in Social and*

Behavioral Research (Tashakkori and Teddlie, 2010) provides one such source. Although “mixed research,” or projects that include both qualitative and quantitative data are by no means new to the social sciences, the label “mixed methods” was apparently not coined until recently. Campbell and Fiske’s (1959) article which introduced the concept of “multiple operationalism”² is viewed by some scholars as having formalized the practice of using multiple research methods. This concept was furthered by Webb et al. (1966:3), who introduced the term “triangulation,” and by Denzin (1978) and Jick (1979), who outlined a scheme for how to triangulate methods. Through a “triangulation” measurement process, one observes whether a proposition can survive “the onslaught of a series of imperfect measures,” thus increasing confidence by minimizing error in each instrument (Webb et al. 1966:3, cited in Burke Johnson, Onwuegbuzie, and Turner 2007:114). Scholars have since identified additional reasons for combining quantitative and qualitative research that goes beyond triangulation (Morse, 1991; Rossman and Wilson 1985; Seiber 1973) and have defined the purposes or rationales for conducting mixed-method studies. These range from the philosophical to the pragmatic (see Dzurec and Abraham 1993; Greene 2006, 2007; Greene, Caracelli, and Graham 1989; Sechrest and Sidana 1995).

The prospective mixed-methods researcher will now find a variety of classificatory schemes by which mixed-methods research designs have been differentiated (Creswell and Plano Clark 2007; Green 2007; Greene et al. 1989; Morgan 1998; Morse 2003; Niglas 2004; Tashakkori and Teddlie 2010). Indeed, in the final chapter of the *Handbook of Mixed Methods*, Tashakkori and Teddlie note a “continuously evolving landscape of integrated methodology” (2010:803). The evolution has led these authors to exposit *families* of designs (2010:815). They go on to write, “A fundamental assumption of MMR [mixed methods research] in social behavioral and health research is that it provides a better (broader, more credible) understanding of phenomena under investigation than a dichotomous QUAL/QUAN approach” (2010:816). While such a classification is extremely useful for pointing out the range of routes to a mixed-methods design, and perhaps the range of underlying philosophies and inferential strategies, our approach will be simply to allow for any of the several mixed approaches while not engaging the argument about the classification itself.

Examples from sociology and allied fields illustrate the range of approaches. Abbell (1987, 2004) undertakes metric classification of coded narratives, or “comparative narrative analysis” in which the analyst applies formal, mathematical models to qualitative data. Abbott (1992, 1995) has similarly developed an approach for the systematic comparative analysis of narrative sequences, often called “sequence analysis.” Ragin (1987, 2000) has developed an application of Boolean algebra (Qualitative Comparison Analysis or QCA) that permits joint analysis of variables and cases through the algebra of truth tables. Ragin contends that is possible to develop an original “synthetic strategy” as a middle way between case-oriented (qualitative) and variable-oriented (quantitative) approaches (Ragin, 1987, 1997). This line of work has since been developed further by scholars such as De Meur and

Rihoux (2002), Rihoux (2003, 2006); see also Rihoux and Ragin (2009). Other scholars have similarly transformed narrative or qualitative content into discrete elements that allow for observation and quantitative measurement of structural features of narratives. For example, Franzosi's (1989, 1994, 1997, 2003) quantitative narrative analysis (QNA) allows for counts and statistical analyses of the complex set of relationships between subject-action-object triples, allowing one to go "from words to numbers" while Bearman and Stovel (2000) analyze narrative sequences as networks, allowing them to identify patterns within the structure of Nazi narratives. Driscoll et al. (2007) exploited a mixed-methods design to analyze respondent perceptions of vaccine-safety guidelines in both open and closed-ended questions; coding qualitative portions using NVivo and then merging with the closed-ended responses and analyzing with SAS. Within the mixed-methods literature, a number of authors have similarly either "quantitized" data (converted qualitative data into numerical codes that can be analyzed statistically; for example, see Miles and Huberman [1994]; Sandelowski, Harris, and Holditch-Davis [1991]; Onwuegbuzie et al. [2007]; Sandelowski [2003])³ or "qualitized" data (converted quantitative data into narratives that can be analyzed qualitatively; for example, see Hesse-Biber [1996]; Taylor and Tashakkori, [1997]).⁴

Indeed, the use of QDAS raises questions of when and how different qualitative and quantitative data are integrated in mixed-methods analyses. Bryman (2006a) points out that, most commonly, the results of qualitative and quantitative components of mixed-methods study are considered in relation to each other as conclusions are being drawn (see also Morse 2003; Sale, Lohfeld, and Brazil 2002). In fact, quantitative and qualitative methods are often treated separately in order to validate, explain, or complement findings using the other method (as in triangulation, mentioned above). Still, Bryman (2006a) found that only 7 of 232 social science articles he reviewed used an approach that involved the conversion of data.

Bazeley has written extensively on the issue of integration (Bazeley 2006, 2009; Bazeley and Kemp 2012). These writings suggest a number of reasons why the integration of methods before interpretation and discussions is relatively uncommon. Building on the work of Caracelli and Greene (1993), Bazeley suggests that the integration of data requires a certain breadth of skills that are not commonly available within a single researcher. In addition, scholars are frequently encouraged to write up results separately from the different components of their study (indeed, some scholars take issue with the term "mixed methods" to describe research that blends methods within or across stages of the research process). Bazeley and Kemp (2012) make note of both progress in developing mixed methods and persistent pessimism about integration. They go on to argue, however, that true integration needs to occur before conclusions are drawn, the earlier the better, ultimately producing a final product that would not have been achievable without said integration. Finally, Bazeley (2006:65) suggests that while integration is greatly facilitated by the use of QDAS, this tool remains very much in development. While some recent studies have explored the utility of research that integrates qualitative and quantitative data (e.g., Adamson et al. 2004; Sandelowski 2000; Weisner 2005), there remains a need for systematic

information on how to actually carry out such transformative analytic designs. Creswell and Plano Clark (2007:188) in their recent contribution to mixed-methods research don't even mention QDAS until their final chapter on "future research directions" in which they suggest that "mixed method researchers will benefit from creative combination of quantitative and qualitative data analysis software programs." They even go as far as to suggest the need to develop software programs specifically designed to facilitate mixed-methods designs and the analysis of data within such designs.⁵ We emphasize "text-based managers" or "code-based theory builders,"⁶ programs that allow for thematic analysis and interpretation of qualitative data.

Specifically, researchers can code⁷ and analyze transcribed passages of in-depth interviews, focus groups and field notes, avoiding heaps of awkward note cards. What is more, such programs have the capability of linking qualitative and quantitative data through the creation of "attributes" and "matrices" (or intersections of data). Attributes can be either primary data, such as the participants' age, gender, and class, or metadata, such as the interviewer's name (Andrew, Salamonson, and Halcomb 2008; Bazeley 2007; Lewins and Silver 2007). Once created, attributes can be used to either filter or search the data set. Attributes can also be used to explore coded text, through the use of matrix⁸/intersection tables, which enable associations and patterns among the data to be analyzed. The frequency of concepts, categories and themes and the complex associations between attributes and codes can be readily identified and then be exported and analyzed through statistical programs. Critically, however, the researcher always has ready access to the underlying qualitative data (e.g. original text) from which the exported numeric information is derived (Bazeley 2006), facilitating a deep analysis that uses both qualitative and quantitative methods.

3. TO WHAT EXTENT HAVE QDAS PACKAGES REALLY BEEN USED?

Certainly QDAS packages have generated enthusiasm among social science researchers, some of whom perceive the possibility of further integrating qualitative with quantitative data as a powerful enhancement to their analytical practices. Yet, at first glance, it seems that such initial enthusiasm has not translated into significant and widespread changes in how ever-improving software packages have been used for research design and analysis. Perhaps it is due to the complexity of these tools (see Bazeley 2006; Di Gregorio and Davidson 2008). Perhaps it is due, in part, simply to the recency of some software developments, and the inevitable lags in publication and diffusion through the scholarly literature.

An intriguing suggestion is that diffusion in the use of such software and its allied approaches has been hindered by debate over whether QDAS changes or biases the processes of qualitative analysis (Fielding and Lee 1993; Lewins and Silver 2007). Bazeley (2007:7-8) outlines a number of concerns qualitative researchers have put forth with regard to the computerization of qualitative analyses, including: "concern that computers can distance researchers from their data; the dominance of code and

retrieve methods to the exclusion of other analytic activities; the fear that the use of computers will mechanize analysis, making it more akin to quantitative or 'positivist' approaches; and the misperception that computers support only grounded theory methodology, or worse, create their own approach to analysis." Researchers may only now be growing aware of the capability to use QDAS to integrate analytic tasks and stretch methodological boundaries, given that the general principles of such software were originally geared toward taking a quantitative approach to qualitative data (Lewins and Silver 2007).

Di Gregorio and Davidson (2008) suggest that a lack of training in QDAS-based methods and a lack of technical support have also hindered both the building of knowledge about these tools and their dissemination (see also Lewins 2008),⁹ and advocate for a meta-theory that goes beyond brand-specific approaches using such software, which would aid in the development of richer methodological perspectives, and, perhaps, a new research genre.

There would seem to be the distinct possibility for QDAS to help drive new and extended analysis, much the same way that the rapid developments in microprocessor technology helped drive computationally intensive social science. But, the question remains, to what extent have researchers actually utilized (or underutilized) QDAS? Are researchers putting aside color markers and note cards, or at least compiling and sorting them in front of a computer monitor? Are they using them in the service of conversion mixed-methods designs? About a decade ago, authors such as Bazeley (1999), Bourdon (2002), and L. Richards (2002) encouraged more innovative use of QDAS, pushing researchers to go beyond simple code-and-retrieve and data management functions, but have researchers taken up this call? A content analysis of recent published literature can offer a clearer view of these issues.

We now present our results for our canvass of recently published material where qualitative approaches might be found. The idea is to provide a representation of the researchers' usage of qualitative data analysis software packages as well as the extent of such usage. We searched every issue of 38 national and international social sciences and research methods journals published for the decade of the 2000s, i.e. 11 inclusive years 2000–2010.¹⁰ We limited our analysis to research articles only, excluding book reviews, commentaries, and editorials, so as to better capture the employ of these QDAS techniques in research itself. Figure A1 in the appendix lists the journals, the search software utilized, and the total count of articles (base) found in each of the years 2000–2010. There was a gradual increase throughout the decade in the total number of eligible journal articles published, as the 2009–2010 period saw about 35% more than the 2000–2001 pair of years. This was due both to increased articles per journal over the span and to the introduction of three new journals (*Qualitative Research*, *International Journal of Qualitative Methods*, and *Journal of Mixed Methods Research*) during the decade. Even the titles of these three new journals are suggestive of an increased interest in qualitative and mixed methods over the decade. Of course, we consciously included these journals precisely for the insight they might provide regarding methods of rising attractiveness.

Table 1. Total Number of Articles Featured in Each Journal Within the Period 2000–2010 and the Total Number of Articles with at Least One Mention of Software Term

Journal	“Hits”	N	Article Count	Use Density	NVivo	NUDIST OR “ATLAS.ti”	Search term		
							“ATLAS.ti”	OR “ATLAS.ti”	win MAX MAXQDA
Administrative Science Quarterly	5		201	2.5%		2	3		
American Anthropologist	2		366	0.5%	1		1		
American Journal of Sociology	4		401	1.0%	2		2		
American Sociological Review	3		461	0.7%			3		
Annual Review of Sociology	0		251	0.0%					
British Journal of Sociology	6		323	1.9%	2		3		1
Cultural Anthropology	0		213	0.0%					
Demography	0		462	0.0%					
Educational evaluation and Policy Analysis	4		198	2.0%	1	2	1		
Ethnology	1		203	0.5%			1		
Evaluation & the Health Professions	0		278	0.0%					
Evaluation Review	1		288	0.3%	1				
Family Planning Perspectives*	0		273	0.0%	0				
Forum: Qualitative Social Research	37		874	4.2%	3	5	24		5
Gender and Society	0		334	0.0%					
Intl. Family Planning Perspective*	2		211	0.9%	1		1		
Intl. Journal of Qualitative Methods	1		210	0.5%					1
Intl. Journal of Social Research Methodology	24		301	8.0%	16	5	3		
Journal of Health & Social Behavior	4		325	1.2%	3		1		
Journal of Marriage & Family	9		948	0.9%	4	2	3		
Journal of Mixed Methods Research	11		64	17.2%	7		4		
Politics and Society	0		216	0.0%					

(continued)

Table 1. (continued)

Journal	"Hits" N	Article Count	Use Density	NVivo	Search term			
					NUD*IST OR NUDIST	"ATLAS/ti" OR "ATLAS.ti" OR "ATLAS.ti"	win MAX	MAXQDA
Population and Development Review	0	294	0.0%					
Population Studies	0	218	0.0%					
Qualitative Health Research	152	1083	14.0%	72	3	74	1	2
Qualitative Research	13	245	5.3%	6		7	0	0
Qualitative Sociology	9	245	3.7%	3	1	4		1
Quality & Quantity	0	526	0.0%					
Social Forces	3	696	0.4%	1		2		
Social Networks	0	255	0.0%					
Social Problems	4	317	1.3%	2		2		
Social Science and Medicine	267	4556	5.9%	116	35	104	6	6
Social Science Research	0	523	0.0%					
Sociological Methodology	0	100	0.0%					
Sociological Methods and Research	1	196	0.5%	1				
Sociological Research Online	23	542	4.2%	13	4	5	1	
Sociology of Education	3	184	1.6%		1	2		
Sociology of Health and Illness	0	524	0.0%					
TOTAL N = 38 Journals	589	17905	3.3%	255	60	246	8	16

Table 1 presents the total count of articles per journal for each year of the decade, as well as the total number of articles in which we received a “hit” for a string search on any of several versions of qualitative data software.¹¹ We focus on these software packages because they are the most common programs used in the social sciences for qualitative data analysis. Of course, we do not expect every single investigator to identify a software package by name in such a way that it will emerge in a string search. Nevertheless, we might expect *new* technology or applications software to be *more* likely to receive explicit mention than those being invoked for now-standard analysis. This provides one window on the incorporation of new techniques.

Table 1 suggests that such packages are not widely used. The overall density of “mentions” is under 4%. The *Journal of Mixed Methods Research* leads the group with 17.2% of articles coded affirmatively for some QDAS software, which is consistent with expectation with our approach. The *International Journal of Social Research Methodology* (at 8.0%) and *Qualitative Health Research* (at 14.0%) are the other two publications that record substantial mentions within their pool of articles. Worth noting is that *Social Science and Medicine*, relatively voluminous with over 4500 articles during the decade, is at 5.9%. Without *SSM*, the overall use density for the 37 remaining journals is 2.4%. We can also discern, at least from this sample, variation in the places where inroads are being made in the use of such software. Among the top ten journals in density, one finds, besides methods journals devoted to the representation of qualitative or mixed research itself, two health-related journals (*SSM*; *QHR*), one administration journal (*ASQ*) and one education policy journal (*EEPA*). Overall, we might argue that there is now some modest evidence of these techniques being harnessed to shed light on research protocols in mainline sociological journals, or a range of topical social sciences journals. Still, several major discipline-wide sociology research journals—*American Sociological Review*, *American Journal of Sociology*, *Social Forces*—show very low density for these techniques.

Table 2 pushes further on the matter. Here we examine, to the degree possible through this content analysis strategy, exactly what features of software investigators employ. In order to ascertain this, we conducted a series of intersection searches—“AND”—cross-indexing the various software names with a group of terms, including “matrix” or “matrices” (calculated as a single entry), “Boolean,” “text analysis,” and “mixed-methods.”¹² The first two terms represent advanced features available in the software packages under consideration, while the second two represent the broader contexts of our study. The searches were conducted in the 24 journals that returned at least one positive entry in Table 1. The total number of articles featured in this selection of journals for the period under consideration is 17,905. Table 2 reports the total results of our searches on these intersections.

The results of Table 2 raise questions about how serious the penetration has been in these several journals and the research activities they represent. More sharply, the results of Table 2 question the extent to which social scientists have actually exploited the software’s analytical features, beyond perhaps keeping track of text gathering quotable passages to illustrate cases (recognizing that these are highly

Table 2. Results of a Boolean Search for Software Name and Feature [with "AND"] Conducted in the 38 Selected Journals for the Period 2000–2010 (or Since the Journal Began Publishing)

Journal	TOTAL			
	"matrix" or "matrices"	"Boolean"	"text analysis"	"mixed methods"
Intl. Journal of Social Research Methodology	0	0	0	0
Qualitative Health Research	3	0	2	6
Forum: Qualitative Social Research	4	0	4	2
Qualitative Research	0	1	0	0
Intl. Journal of Qualitative Methods	1	0	0	0
Journal of Mixed Methods Research	1	0	1	3
Journal of Marriage & Family	1	0	0	0
Intl. Family Planning Perspective (2000-08)/Intl. Perspectives on Sexual and Reproductive Health (2008-10)	0	0	0	0
Educational Evaluation and Policy Analysis	1	0	0	0
Evaluation Review	0	0	0	0
American Anthropologist	0	0	0	0
Ethnology	0	0	0	0
Social Science and Medicine	11	0	6	9
Journal of Health & Social Behavior	0	0	0	0
Administrative Science Quarterly	2	0	3	0
American Sociological Review	0	0	0	0
American Journal of Sociology	0	0	0	0
Sociological Methods and Research	0	0	0	0
Social Problems	0	0	0	0
Sociology of Education	0	0	0	0
Social Forces	0	0	0	0
British Journal of Sociology	1	0	0	0
Qualitative Sociology	0	0	1	0
Sociological Research Online	0	0	1	1
TOTAL	25	1	18	21

valuable tools for the analyst working with large amounts of text). For instance the word “Boolean” (in the sense of an intersecting search within the investigator’s text data) rarely occurs in articles that mention these text analysis packages by name. The terms and phrases “mixed methods” and “matrix” (and their variants) occur more frequently. An intriguing feature of Table 2 is the number of appearances (25 total across NVivo and ATLAS/ti) for the intersection between the software name and “matrix” (or “matrices”). Since, again, matrix has a wide array of possible meanings, we decided to probe these cases a bit further.

For articles published in the last two years of our analysis window (2009–2010), we extracted the articles themselves and reviewed them for the context in which the successful “hit” occurred. We focused our review on 38 journal articles published in 2009–2010 that generated successful string searches on either of two leading software packages (NVivo, ATLAS/ti, and variants) and two key application strings (“matrix” and variants thereof, “mixed methods”). Our approach was to press beyond the specific passage and look in more detail at various places in the articles where methodology was described. We also noted how empirical results were presented. Most particularly, we were eager to get a reading on the degree to which both quantitative (often frequency distributions, sometimes regression results) and qualitative results (often quotations from a respondent or an extract from an interview with interviewer and respondent) appeared. Beyond this we were particularly interested in identifying points where some of the more analytical features of the software packages were put into use. The string “matrix” is a case in point: our “hit” on the word “matrix” along with the software name NVivo might uncover an application of the software feature or, perhaps, a use of the word “matrix” to describe a conceptual array, some fundamental or originating element, or another usage.

The more in-depth view does not lend itself to a tabular presentation, but we discuss our analysis of our reading. (More detailed information is available from the authors.) These articles do reveal an array of intriguing and creative approaches to data analysis. Given that we searched explicitly on “mixed methods,” we found several innovative approaches to combining ways of approaching a problem; typically these involved one line of work (strand) to pursue a qualitative avenue (often with in-depth interviews or focus groups) while another line pursued a quantitative avenue (often with survey data from the project or secondary sources). Many of these authors reported iterative efforts to have the qualitative and quantitative strands of the work communicate with one another. For instance, in a study designed to understand and improve conditions for long-term care, Kaasalien and colleagues (2010) report two prongs of data collection:

. . .we collected data using concurrent intermethod mixing, or rather, we collected data through the use of both qualitative (focus groups, individual interviews) and quantitative strategies (questionnaires). (P. 1691)

Empirical results in the manuscript include both excerpts from the interviews and focus groups and tables of frequency distributions from the survey. While we do not

discern evidence of the use of some of the data processing features of QDAS, we do observe here a distinct effort to place qualitative and quantitative data collection and analysis on parallel tracks in the same study. Ames et al. (2009) also note placing data collection on parallel tracks.

We are, in a few cases, able to identify authors who do make explicit use of the software features to work across or analyze from the text. A qualitative study of immigration asylum seekers indicates, “Additional codes relating to time periods of detention and post-detention were applied, so that data could be extracted by matrix query for code and time period” (Coffey et al. 2010:2072). In a paper that seems as much methodological as substantive, Hutchinson and colleagues (2010) write:

Another type of NVivo search tool that we used for conceptual and theoretical development is the matrix coding query function. This allowed us to investigate relationships between concepts and categories by searching for data coded to multiple pairs of items simultaneously. (P. 295)

In their abstract, they also state, “This paper demonstrates how the software package QSR-NVivo can be used to facilitate a grounded theory approach” (Hutchinson et al. 2010:283). Also along these lines, in a paper that is seen by us as both substantive and methodological, King (2010:10, for Figure 2, with an NVivo output image captured) reports a matrix query result.

By contrast, a decidedly substantive paper (examining adherence to HIV antiretroviral therapy in Tanzania) appears to indicate use of several key analytical features of the software: “The data were summarized through descriptive text-based summaries and data display matrices. Provider and patient transcripts were coded and analyzed separately, and then compared for common themes” (Watt et al., 2009:1795). These papers certainly do show what can be done. More generally, however, it is difficult to find evidence of research teams using the software’s analytical features to summarize, cross-classify, and analyze multiple portions of text. To be sure, the text (quotes, excerpts of interchanges) are themselves powerful—perhaps all that is needed or desired for the scholarly purpose at hand.

In some other cases, while we uncovered a “hit” on the search term matrix (matrices), our examination of the full text indicates that the work was being used to describe a conceptual diagram, or to mention a feature of the QDAS software that we did not necessarily see implemented in the analytical section of the paper.¹³ All told, of those searches that produced a successful string retrieval “hit” for the Boolean search on the software package and the word “matrix,” less than half (9 out of 22 by our assessment) actually provided evidence of using the software itself to cross-classify aspects of the text under review.

As we dug into these few dozen papers, we did uncover many instances of the use of the coding features of the software. This seems to have achieved more rapid and widespread adoption. In addition to replacing the note card and sorting approach, the software more readily (we presume) facilitates multiple coders (and inter-rater

reliability evaluations) along with expediting, perhaps, a process of iterative code development.¹⁴ For instance, in a mixed-methods study of alcohol consumption, the investigators report use of these features:

... each document was coded by at least two researchers with coding decisions recorded electronically using NVivo, a computer program for managing and analyzing qualitative (text) data. We resolved all discrepancies between the two coders through discussion.

We then retrieved all segments of text attached to each code and further elaborated, refined, and differentiated the initial codes. (Stoller et al. 2009:73)

Several of the other published manuscripts we examined appeared to make use of the electronic coding aspects of the software, although we did not often detect evidence of moving beyond to tabulate, analyze, or cross-classify these coded passages.

The research community is certainly moving toward a broader and more frequent usage of this class of software. Consider how these examples contrast with skepticism voiced by Roberts and Wilson (2002) in a study of the compatibility of technology with qualitative data analysis. In their conclusion, Roberts and Wilson write,

While there are some elements of the qualitative research process that can benefit from computer assistance, the process of data analysis could be harmed by reliance on software packages. [...] The employment of computer programs in qualitative data analysis is a practice that should be viewed with caution. (Par. 48)

And,

CAQDAS packages possess features that reflect their quantitative and positivistic heritage, particularly their facilities for creating and adding coding categories. Over-reliance on these features could lead to a fracturing of the data whole and a loss of meaning. (Par. 51)

Clearly some researchers have mastered and/or embraced these tools. On the other hand, our analysis—both as we observe the relative paucity of the use of features in those articles that generated “hits” and the larger search/count results of Table 1—indicate that the adoption appears to remain far short of the analytical power offered by this technology.

4. OUR EXPERIENCE WITH USING ONE TYPE OF QDAS IN A MIXED-METHODS RESEARCH DESIGN

We now turn to our own mixed-methods research in order to illustrate some of these issues. We are able to draw on data from a project examining low fertility in Italy. Because of the demographic puzzle that low Italian fertility presents, the project entails the combined analysis of large nationally representative survey data with substantial qualitative primary data collection. Our qualitative data set consists of 349

in-depth interviews conducted in the cities of Bologna, Cagliari, Padua, and Naples with 174 women of childbearing age (23 to 45) and, when possible, their partners and the women's mothers. The prior work of several scholars—for example, Sassler (2004) and Manning et al. (2011)—suggests that in-depth interviews might be particularly valuable in efforts to understand relationship dynamics.

In the following example, we illustrate the ways one qualitative data analysis software package¹⁵ can be employed in the service of conversion and combination mixed-methods designs. This example is taken from a specific project in which team members are investigating two leading, but somewhat contrasting, fertility theories frequently employed to explain reproductive behavior in Southern European countries. The first theory, known as “too much family” (TMF) argues that very strong family ties between relatives and the “familistic” nature of institutions have led to considerable interdependence between generations, inducing younger cohorts to delay departure from the parental home and relatedly, avoid, postpone, or limit their entry into parenthood (Livi-Bacci 2001). The second theory, known as the “second demographic transition” (SDT), embodies a number of social changes, including the postponement (and related decline) of childbearing, increased rates of cohabitation and birth outside of wedlock, a decline in marriages and a growth in divorce rates. These have been caused in large part by ideational change beginning in the 1960s, consisting of increased emphasis on individual autonomy, rise of values associated with “higher order needs,” and rejection of institutional control, all of which in turn encouraged a feminist movement, and increased female participation in the labor force and gender equality (Surkyn and Lesthaeghe 2004). These ideational changes have led to the emergence of “postmodern fertility preferences” (Ariès 1980; Lesthaeghe 1995; van de Kaa 2001) and the “new” family behaviors mentioned above.

Before turning directly to the example, we provide a brief explanation of the qualitative data set. An anthropologist in each of the four cities conducted semistructured interviews with interviewees selected through personal contacts gained by a complex indirect snowballing procedure with multiple entries (independently selected initial contacts), so as to avoid a clustered sample. The indirect snowball sampling procedure allowed us to stratify the sample by age, parity, and marital status of the woman in order to maximize variation in sociodemographic characteristics. The semistructured interviews were concluded with a brief structured survey that collected a number of basic demographic characteristics (e.g. education, marital status, number of children). The interviews, which were recorded, were transcribed and imported into the database. Results from the structured survey were entered into a spreadsheet, which was also imported into the database in the form of “attributes,”¹⁶ allowing us to combine, within the same database, quantitative and qualitative data and hence conduct comparative analysis of the responses of subgroups with respect to themes, concepts, or issues raised in the qualitative material (Bazeley 2010:434–35). Using NVivo, all of the 349 interviews were coded using broad descriptive categories identified based on the research design, existing theories, hypotheses and variables whose effects the team is currently studying (Lewins and Silver (2007:85) define this as a deductive approach to coding). The descriptive codes¹⁷ (Miles and Huberman 1994) were checked

for validity and reliability through comparative coding across researchers, and consist of six broad categories or “nodes” (childbearing, childcare, work, etc.) and subcategories or additional nodes (beliefs about the proper age of childbearing, compatibility of work and childcare, importance of work to women respondents, etc.).

In the project, team members selected seven descriptive nodes used to code the large data set that were relevant to the two theories of fertility under investigation and narrowed the inquiry to women of parity 0 and 1 ($N=174$). We discuss one of these nodes in the following example. Specifically, we take the node “women’s considerations concerning the decision to have a first child” and added a more detailed layer of meaning to the data by “subcoding” the node for the presence of behavior which supports one (or both) of the two theories. This practice has also been defined as “interpretative coding” (Lewins 2008; Lewins and Silver 2007; Miles and Huberman 1994). Figure 1 presents the results of a matrix query, using the imported attributes and the interpretive coding.

The software program was asked to find all interviews with women of parity 0 and 1 across the four cities ($N=174$) coded for “considerations concerning the decision to have a first child” which were subsequently subcoded for “supports TMF,” “supports “SDT,” or “supports BOTH” [theories]. The matrix display in Figure 1 thus provides both the frequency of interviews containing at least one passage that supports one or the other theory, as well as interviews with at least one passage containing elements of both theories. Within NVivo 8, the researcher can also easily access a detailed content of the responses by simply double-clicking on each cell, which then produces the actual text coded.¹⁸ Interpretive coding of the qualitative data set produced the finding that often elements of both theories are present within the same interview, even within the same passage. This result would be difficult to ascertain using survey methods that employ *a priori* defined categories, and as such do not always so readily allow the investigator to probe for a deeper understanding of ways actors negotiate important life events. Indeed, while the interviewees were asked about the decision to have a first child, none of the women were asked to explicitly comment on aspects that would support or reject broader theories of fertility decline, such as “too much family” or the “second demographic transition,” and as such the material coded reflects their spontaneous reaction to the topic of first births. The qualitative analysis reveals that although these theories have often been set in opposition to one another, elements of both explanations for fertility behavior are present among the respondents, many of whom demonstrate the unique ways that actors negotiate and combine conflicting norms and values within particular settings.

Such displays of data can be problematic, in that they do not always provide a clear denominator (i.e., population at risk). Figure 1, for example, only indicated occurrences that match the query, not the base from which that is drawn. At the same time, there are legitimate and interesting questions regarding determining the most appropriate denominator. (This problem is not at all limited to qualitative data analysis and the use of such software; the issue is often present in conventional survey responses—for example, in deciding whether the denominator is the person, the household, or the total of all responses in, say, multiple response analysis). Should

	A : Children = 1 ▾	B : Children = 0 ▾
1 : b1. Supports TMF ▾	32	42
2 : b2. Supports SDT ▾	21	47
3 : b3. Supports Both ▾	11	19

Figure 1. Considerations Concerning the Decision to Have a First Child by Parity. Subcoded for TMF, SDT, and Both. Women in Bologna, Padua, Cagliari, and Naples. NVivo Matrix Query and Screen Capture

we consider, for example, as our population, those women coded for “considerations concerning the decision to have first child”? Or should we consider all women of parity 0 or 1? Relatedly, we are faced with the issue of the “null response” outlined above. What about the women who were not coded for “considerations concerning the decision to have first child,” or those who *were* coded for this node but were not coded for “supports TMF,” “supports SDT,” or “supports BOTH”? Of those who potentially fall into a “null response” category, does this imply that they have no opinion? Were they not asked about this aspect? Did they decide consciously not to speak to this topic, because it is not important to them? Within a semistructured interview, respondents will not be equally comprehensive or forthcoming in their discussion of a given topic. Finally, the matrix display in Figure 1 does not account for potential overlap between cells. A quick glance at the table confirms that the total number of women parity 0 in the matrix display (N=108) exceeds the total number of women of parity 0 across the 4 cities (N=99), clearly suggesting that some interviews contain not only at least one passage coded for “supports BOTH” but may also contain a passage coded for “supports TMF” and/or “supports SDT.” While these are at base conceptual/methodological issues that would redound back to the investigator’s design, we would suggest that the software could make the issue both more apparent and more readily resolved after the investigator chooses a strategy.¹⁹

In order to respond to these different issues (denominator, null response, overlap between categories), as well as further explore the relationship between results from the thematic coding of the qualitative data and the socioeconomic and demographic variables from the structured survey, we converted (or quantitized) the qualitative data to a quantitative form for statistical analysis. Figure 2 presents the information on the presence or absence of the nodes under consideration for women parity 0 and 1. The first column shows the anonymized identifying string for each interview, while the subsequent columns indicate, for women parity 0 and 1, the presence or absence of the nodes under consideration.^{20, 21} Figure 2 shows results from only the first 21 interviews from Bologna in order to illustrate the outcome in a more compact form.

We then imported these into a conventional statistical software program²² and used the software to analyze relationships within the codified—i.e., converted—data.

Bologna presence				
	A : 1ja Own considerations, expectations, beliefs...	B : b1. Supports TMF	C : b2. Supports SDT	D : b3. Supports Both
1: T_Bb01_0403dg0	1	0	0	0
2: T_Bb02_2303dv1	1	0	0	0
3: T_Bb04_3004dv1	1	0	0	1
4: T_Bb06_0305dv1	1	1	1	1
5: T_Bb07_0605dg0	1	1	1	0
6: T_Bb09_1107dg1	1	0	0	1
7: T_Bb10_1909dg1	1	1	1	1
8: T_Bb12_2009dg1	1	1	0	1
9: T_Bb14_0410dg1	1	1	0	0
10: T_Bb15_1710dv0	1	1	0	1
11: T_Bb16_1910dv0	1	1	0	1
12: T_Bb17_0311dg0	1	0	0	0
13: T_Bb18_1611dv0	1	0	0	0
14: T_Bb19_2111dg0	1	0	1	0
15: T_Bb20_0112dv0	1	1	1	0
16: T_Bb22_2801dg1	1	1	0	0
17: T_Bb23_0102dg0	1	1	1	1
18: T_Bp01_1801dg0	1	1	1	0
19: T_Bp03_1803dg1	1	0	0	0
20: T_Bp04_0404dg1	1	1	0	0
21: T_Bp05_0704dv1	0	0	0	0

Figure 2. Presence or Absence of Codes for “Considerations Concerning the Decision to Have a First Child” and Presence or Absence of Subcodes: TMF, SDT, and BOTH. Women in Bologna Parity 0 and 1 (in Actual Quantitative Analysis All Four Cities Included). NVivo Query and Screen Capture

Table 3 presents these results. The converted data allow us to observe patterns of response difficult to see using the qualitative software alone.

In this table, we now have a different picture of the data, which endeavors to account for some of the issues raised above. Specifically, we consider as denominators both the total number of women of parity 0 (N=99) or 1 (N=75) across the four cities, as well as the total number of women coded (at least once) for each of the three “subcodes” under consideration. We also account for interviews that support neither (that is, none of the three subcodes) and those that were not, in the first place, coded for “considerations concerning the decision to have a first child,” giving some indication of the “null response” category. Quantitizing the data also helped to explicitly reveal the overlap between categories, and shifted the results such that the BOTH category increases significantly. Specifically, the BOTH category now includes interviews which contain (a) at least one passage coded for BOTH (i.e., presence of TMF and SDT within the same passage); (b) at least one passage coded for TMF *and* at least one passage coded for SDT within the same interview; (c) at least one passage coded for BOTH *and* at least one passage coded for SDT within the same interview; (d) at least one passage coded for BOTH *and* at least one passage coded for TMF within the same interview; (e) at least one passage coded for BOTH, *and* at least one passage coded for SDT *and* at least one passage coded for TMF all within the same interview. The results from Table 3 suggest that support for TMF rises from parity 0 to 1 (up 9.5% of all; up 16.9% of coded), while support for the SDT declines from parity 0 to 1 (down 5.9% of all; down 4.9% of coded). Support for BOTH similarly declines from parity 0 to 1 (-12% of all; -12.1% of coded). These results are in line

Table 3. Considerations Concerning the Decision to Have a First Child by Parity. Subcoded for TMF, SDT, and Both. Women in Bologna, Padua, Cagliari, and Naples

	Parity 0			Parity 1		
	of all %	of coded %		of all %	of coded %	
Supports TMF	21	21.2	27.3	23	30.7	44.2
Supports SDT	23	23.2	29.9	13	17.3	25.0
Supports BOTH	33	33.3	42.9	16	21.3	30.8
Supports neither—or null	11	11.1		18	24.0	—
Total N	88	—	77	70	—	52
Null (no code for considerations re first child)	11	11.1%		5	6.7%	—
Number (women parity 0 and 1 in 4 cities)	99	100.0%	100.0%	75	100.0%	100.0%

with our hypothesis that “too much family” plays a significant role in fertility behavior, especially as women begin childbearing. Needless to say, this technique can be further expanded to include more nodes and different demographic variables, allowing for more complex statistical analysis (e.g., regressions and the development of empirical models).

More broadly, this brief example provides insight into some of the ways one QDAS program can be fruitfully employed in the service of conversion mixed designs. It also, however, confirms the existence of some shortfalls. Conversion designs (this particular example included) also raise a number of issues commonly voiced by qualitative researchers, including, for example, the loss of depth and flexibility that occurs when qualitative data are quantitized. Indeed, quantitized data are fixed and one-dimensional and cannot change in response to new insights in analysis. Qualitative codes, on the other hand, are multidimensional, meaning they can and do provide insights into a host of interrelated conceptual themes or issues during analysis (Bazeley 2004). Yet as we also point out in several places, the possibility of revisiting codes during analysis means that quantitative and qualitative analytical processes can be employed iteratively and interactively, allowing the researcher to identify emergent themes and insights, and ultimately produce results difficult to achieve using one method alone.

5. THE FUTURE: EXPANDING THE DOMAIN OF APPLICABILITY

Our discussion to this point has concentrated on some of the key conceptual issues in the literature, augmented by a content analysis of the reports of use of this technology that would facilitate mixed methods design, and further illustrated by an application drawn from our own research. Now we expand our discussion, examining how the incorporation of QDAS and the advancement of mixed methods and related design has been more elusive than we might otherwise imagine.

5.1. Sampling

One additional point of divergence, we suggest, is linked to sampling approaches. The word “frustration” (rather than “deficiency”) is likely more appropriate here, because some observers may not feel that these characteristics are intrinsic desiderata for qualitative analysis. There are several elements here, but we mention two. Often collection of narrative data does not draw on representative samples. However, the value of ethnographic and case study research, for instance, is fundamentally predicated on the idea that deep experience with a single community adds to knowledge. That claim is not in dispute.

By contrast the conventional representative-survey-based approach has concentrated on deriving a sample from an identifiable population universe, often via a random draw from a definitive sampling frame. Of course, such an approach—well established in elementary statistics texts—permits the investigator the claim of generalizability, for it allows the investigator to calculate not only a point estimate of the parameter of interest, say β , but also to calculate the (sampling) accuracy with which β has been estimated. Thus, a properly specified model could retrieve a set of β 's, even if descriptive population estimates (prevalence values, for example) developed for the local population might not accurately reflect the value in the full population. The divergent sampling practices of quantitative research (often working with relatively large randomly drawn samples) and qualitative research (often working with samples of more limited size drawn purposively) may inhibit integration.

Today it is readily possible—at least in principle—to draw a large multipurpose sample and apply an instrument (or investigative approach) that draws on extensive narrative data collection, or somewhat in parallel, utilizes both text-based (narrative) data collection and conventional survey approaches (such as closed-ended questions) in the same investigation. Our own research is implicated here. Our investigation for Italy had a sample size ($N = 174$ women in our example subpopulation; 349 interviews overall) that some may regard as substantial, but it still drew on a snowball approach to generate our cases in locales and demographic categories of interest. Generalizability, as sought by random-sample oriented investigators, need not be sacrificed, nor is it necessary to give up on detailed “natural” responses of interviewees. The technology and the conceptual development of mixed-methods and conversion designs would seem to be well-positioned to allow such an investigation to go forward.

The future path may be more interesting, nuanced, or challenging than a simple move to larger, random samples and electronic data coding would suggest. Consider, for contrast, that some biomedical studies enroll nonrepresentative samples. Interest in relatively rare events as well as logistical considerations (availability of physicians and clinics), would seem to play a role in this. The implicit argument would be that most such biomedical processes extend across subpopulations to others not in the study group(s). This state of affairs seems not to have impeded biomedical research progress or compromised the health of populations (for a contrary argument, see Duncan [2008]).

More broadly, we might argue that qualitative samples are designed to make possible “analytic” generalizations (applied to wider theory on the basis of selected

cases along with general constructs), but not “statistical” generalizations (applied to wider populations on the basis of representative statistical samples). To this regard, Miles and Huberman (1994:27–28), citing Firestone (1993), argue that qualitative sampling can provide the opportunity to select and examine observations of generic processes that are key to our understanding of new or existing theory about the phenomenon being studied. The implications are that theory will drive the selection of these cases, and also that the careful examination of the cases may lead to elaboration or reformulation of theory (see also Curtis et al. 2000; Onwuegbuzie and Collins 2007; Onwuegbuzie and Leech 2005, 2007).

The realistic challenge, then, is to develop a better understanding of exactly which circumstances are most worrisome and which circumstances are not. We suggest that it is possible to bring these two strains of sampling closer together—that their goals are not at odds—and that data processing technology (QDAS) makes this more feasible. It is a very exciting agenda item for the future.

5.2. Data Capture

Another promising avenue for growth and integration is suggested by the integration of qualitative and quantitative approaches at the point of data collection. Axinn and Pearce (2006:14), in a contribution on mixed-methods data collection strategies, ask: “How important is it to use combined approaches?” They suggest that some researchers have long used a combination of data collection methods. In fact, some of the combined approaches, such as those by the anthropological demographer Caldwell and his colleagues, have helped to reshape the way scholars think about sociodemographic processes, such as fertility, marriage, and mortality (Caldwell 1982; Caldwell, Reddy, and Caldwell 1983, 1988). Well-known for his research conducted in Nigeria, Caldwell has used a “microdemographic” approach²³ to argue that fertility decline occurred as a result of family nucleation where benefits and wealth flowed from parents to children instead of children to parents (Caldwell, 1982). Caldwell (1977) has long been critical of the over-reliance on Western categories and theories of economic rationality, arguing that these approaches potentially skew results, and has encouraged researchers to use mixed methods of inquiry.

The ethnosurvey (Massey 1987; Massey and Zenteno 2000) has received some attention and has been implemented in the field, although the actual number of applications of the ethnosurvey (identified via that nomenclature) appears to be modest.²⁴ Notable work employing a multimethod approach also includes Kertzer and Hogan’s combined anthropological, demographic, and archival research endeavor (1989, 1990) and Knodel’s mixture of methods (survey, focus groups, and key informant interviews) to study fertility, aging, and AIDS in Thailand (Knodel and Im-em 2004; Knodel et al. 1987, 2001). Axinn and Pierce (2006:15) comment that we “have good reason to expect much to gain in our research by a continued effort to combine data collection methods and develop hybrid methods that go beyond qualitative/quantitative distinctions.” We agree.

5.3. Richness-Sparseness Trade-off

Many primary data collection efforts are community or regional studies. There are several advantages to researching within a local context. To begin with, such studies are logistically manageable. The challenge, however, lies in understanding what inferences we can make from such localized data. We can interpret it all as a wish for richer data. Indeed, there has always been a stream of smaller-scale community and regional studies throughout the social sciences.²⁵ Often investigators assert that processes are better “understood with grounded insights coupled with statistical techniques that attempted to discern patterns from large-scale census data” (Tashakkori and Creswell 2008:4). Axinn and Pearce (2006) echo this view in their discussion of mixed methods. In the field of anthropological demography, there has typically been a conceptual need to link ethnographic observations of social behavior (e.g., marriage, kinship, and property inheritance) to wider social systems in order to meaningfully make interpretative sense of localized phenomena (Greene 2008:7).

In another domain, qualitative information (and its storage and management in digital form) can be very helpful in illuminating conventional quantitative research results. Perhaps this process reaches its most widespread form in the use of extended quotes in national polling data, such as some news organizations’ practice of reporting nationally representative statistical tabulations and then illustrating viewpoints with authorized quotes from selected respondents.²⁶ The use of qualitative information can provide the audience with a deeper (beyond journalistic?) understanding of the topics under discussion. Our hope, somewhat in contrast, is to put more weight on the qualitative side of the combination. This would, in turn, entail a shift in methodological perspective that would allow for a real employment of the full power of qualitative analysis, rather than confining it to a validation tool for quantitative data or a mere source of “real-life testimonies” and anecdotal material.

If small-scale studies that happen to be qualitative studies are intrinsically nonscalable, will they inevitably fall short of informing social science more broadly? The development of population-based estimates can be quite consequential and certainly we can hear a strong voice for the population-based approach (Duncan 2008). The well-developed literature in population-based inference, sometimes with a more explicit causal framework (see, among others, Moffitt 2005), suggests a way to express this issue. Qualitative studies characteristically use small, purposefully selected samples aimed at in-depth understandings as opposed to quantitative studies that use large, representative samples. Applying a statistical analysis to a small sample is problematic. Indeed, sampling in qualitative analysis aims to reach “‘theoretical saturation’ regarding the topic or process being investigated. . . rather than to generate results that can be generalized to a larger population with a minimum of error” (Bazeley 2003:415).

5.4. Coding

The research literature on qualitative data analysis is replete with discussion of coding. We do not wish to add redundantly to that discussion. Conversely, our

experience with QDAS ourselves, and with the analyzing the work of others, suggests that there is an avenue for progress to be made, especially as we consider using the specialized features of such software packages. This intersects with our description of the “denominator issue” above, where the population of observations—based on passages, persons, or persons with a subset of codes—needs to be indicated more directly. Our concern (and a definitive demonstration of this is beyond our scope here) is that that coding, while practiced with a great deal of expertise, has not yet settled into a consistent enough practice (scale, hierarchy, passage length) to move into a realm of comparisons across studies. We suspect this day may arrive before long, parallel to the well-worn path of survey research in terms of question format, length, categories, etc. Here we speak of a more standardized procedure, where appropriate, to get from extensive narrative transcript, to coded and analyzed text. There is ample guidance with respect to how to code (recommendations, caveats, pitfalls). An interesting thinking exercise is to ask whether hypothetically parallel and identical teams could produce similar results from using the software (same size of coded passages; same codes and hierarchy; same “tabulation” or Boolean search). There is also the companion question, say, deriving from a more interpretative approach of whether we would want or expect coding to be comparable. Even as we argue there is room for maturation along this dimension, we are optimistic that this growth will come quickly and broadly.

6. CONCLUSION

Our analysis of QDAS may seem, at first, to present a sobering picture, and perhaps one illuminated with a dim bulb, indeed. Not all need remain dim, however. The issues we raise here—most specifically the apparent underutilization of software features for processing narrative data—are readily addressed.

We would argue that there is no intrinsic social scientific or technological obstacle to the sample representativeness (a.k.a. generalizability or out-of-sample prediction) problem. This complaint—the match of data universe to the population about which one wishes to make inferences—finds its way into discussion of a wide array of research approaches, some qualitative, some not. What is new is that by invoking sampling techniques in conjunction with text-based approaches it is entirely possible to retrieve from the field narrative data that are as representative (at least in terms of subjects or observations) as any conventional survey data. We are surprised by the lack of progress on this, and we see this as a promising way forward. Even as we encourage this way forward, we recognize that some investigators may reject the very idea of seeking representative inferences from narrative data, whether it is about a simple point-in-time attitude or a more causally intended interpretation of relationships among viewpoints expressed by respondents. This is well worth a discussion within the research community, but the current state of technology is not an obstacle to making such representative inferences.

The more modest adoption of coding analysis approaches relates to the exploitation of the software itself. Seemingly these text-analysis applications come with

bells-and-whistles ready to provide analysis beyond the manner of code and retrieve, which was so sharply criticized, even at the outset (L. Richards 2002). Our further view is that the current state of software development is sufficiently “user-friendly” that the prospective user need not fear nor complain about the learning curve. Why have these features not been so much used? We remain puzzled. Perhaps we need more analytical practice in how to derive relational information ($\text{Code A} \cap \text{Code B}$) in settings beyond the conventional survey/statistical world. This is not a trivial step forward, and we would argue that it presents more of a challenge than the sampling issue we just discussed. This does involve addressing issues of null responses, “measurement error” in narrative coding, intercoder reliability, and the like. But while the issues here may be deeper and more conceptual, there is a substantial (and growing) body of writing on all these issues, and the current state of technology is no obstacle to progress. There would appear to be considerable benefit to sociology—at least the field could ascertain if this is so—and allied social and health sciences if more could be done with the technology presently available.

With the advent of new software, qualitative and mixed-methods approaches may represent a significant opportunity to augment knowledge. As yet, however, until some key conceptual issues are addressed, and until we are ready to better exploit features of existing software, some of that potential will remain unrealized. It should be easy to brighten this bulb.

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APPENDIX

Journal	Search Engine	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
1 Demography	JSTOR (2000-2006), SocINDEX (2007-2010)	43	42	40	38	38	38	38	47	48	40	50	462
2 Social Science Research	ScienceDirect Journals	27	30	26	27	32	39	47	67	77	63	88	523
3 Intl. Journal of Social Research Methodology	Academic Search Premier	21	20	26	28	32	27	27	25	36	29	30	301
4 Qualitative Health Research	SAGE Journals Online	54	53	90	89	88	86	87	122	138	140	136	1083
5 Forum: Qualitative Social Research	Directory of Open Access Journals	107	42	51	67	79	96	104	71	122	79	56	874
6 Qualitative Research	SAGE Premier 2007 (2001-2008), SAGE Journals Online (2009-10)	16	16	18	18	18	25	26	25	32	32	35	245
7 Intl. Journal of Qualitative Methods	Directory of Open Access Journals (2002-2010)			24	17	21	22	33	29	21	22	21	210
8 Journal of Mixed Methods Research	SAGE Journals Online (2007-10)												64
9 Population Studies	SocINDEX	22	22	21	20	20	21	20	18	15	17	16	218
10 Population and Development Review	SocINDEX	24	26	27	34	25	25	34	26	23	24	26	294
11 Journal of Marriage & Family	SocINDEX	83	87	85	75	94	95	92	89	97	88	63	948
12 Intl. Family Planning Perspectives (2000-08)/Intl. Perspectives on Sexual and Reproductive Health (2008-10)		23	22	23	19	16	19	20	15	17	17	20	211
13 Academic Search Premier													
14 Family Planning Perspectives (2000-01)/Perspectives on Sexual and Reproductive Health (2002-10)		30	28	26	18	27	21	23	21	22	25	32	273
15 Academic Search Premier													
16 Educational Evaluation and Policy Analysis	SAGE Premier 2007	21	17	17	21	16	16	16	14	15	22	23	198
17 Evaluation Review	SAGE Premier 2007	24	26	26	27	26	28	34	25	26	25	21	288
18 Evaluation & the Health Professions	SAGE Premier 2007	25	25	28	24	25	27	21	23	28	25	27	278
19 American Anthropologist	Wiley-Blackwell Social Science and Humanities Collection	26	41	55	27	27	33	37	40	23	30	27	366
20 Ethnology	Academic Search Premier (2000-2010, until Issue 2)	23	22	21	21	23	19	18	18	12	18	8	203
21 Social Science and Medicine	ScienceDirect Journals (23 volumes)	310	280	308	405	424	465	529	428	432	482	493	4556
22 Journal of Health & Social Behavior	JSTOR	28	26	28	33	38	25	26	29	31	30	31	325
23 Sociology of Health and Illness	SocINDEX/Wiley-Blackwell Social Science and Humanities Collection	38	34	36	47	43	41	42	55	65	62	61	524
24 Administrative Science Quarterly	SocINDEX	24	22	21	16	16	16	16	17	20	17	16	201
25 American Journal of Sociology	JSTOR	43	45	25	28	32	40	36	36	45	36	35	401
26 American Sociological Review	SocINDEX	46	38	40	38	40	43	42	41	45	47	41	461
27 Sociological Methodology	SocINDEX	8	8	9	12	9	5	11	11	9	10	8	100
28 Social Problems	SAGE Premier 2007	17	18	16	14	15	17	18	20	19	22	20	196
29 Social Forces	SocINDEX/JSTOR	14	25	17	19	14	15	16	16	16	16	16	184
30 Social Networks	Academic Search Premier	47	46	42	52	50	89	89	62	72	67	80	696
31 British Journal of Sociology	ScienceDirect Journals	19	15	22	18	18	20	25	34	26	27	31	255
32 Politics and Society	SocINDEX/Wiley-Blackwell Social Science and Humanities Collection	35	32	32	29	24	21	27	27	31	31	34	323
33 Cultural Anthropology	SAGE Journals online	20	19	17	19	22	20	19	18	20	19	23	216
34 Annual Review of Sociology	Anthrosource	16	20	17	18	19	20	20	20	22	22	19	213
35 Quality & Quantity	JSTOR	28	19	20	24	24	17	19	25	23	27	25	251
36 Qualitative Sociology	Academic Search Premier	25	28	24	26	42	46	56	61	50	77	91	526
37 Gender and Society	SocINDEX	23	19	22	23	22	26	23	24	28	18	27	245
38 Sociological Research Online	SAGE Journals online	25	34	34	31	32	34	28	30	28	28	30	334
	none (only available through its own website)	69	38	41	34	25	53	47	58	60	66	51	542
TOTAL		1414	1322	1403	1482	1546	1679	1795	1730	1828	1849	1857	17905

Figure A1. Journal Sources, Search Engine, and Article Count by Year, 2000-2010.

Notes

1. More recent software packages, such as QDA Miner and Dedoose, are have been developed with multimethod analysis more directly in mind.
2. Burke Johnson, Onwuegbuzie, and Turner explain that “multiple operationalism” refers to the practice of using more than one method as part of a validation process in order to ensure that “the explained variance is the result of the underlying phenomenon or trait and not of the method (e.g., quantitative or qualitative).” It was argued that the convergence of findings stemming from two or more methods “enhances our beliefs that the results are valid and not a ‘methodological artifact’” (2007:113–14. Quoted passage cited from Bouchard 1976:268).
3. Teddlie and Tashakkori (2009:269) clarify that “quantitizing might involve simple frequency count of certain themes or responses. Conversely, it may consist of more complex ratings of the strength or intensity of those themes or responses. Simple descriptive statistics might be used to summarize frequency counts. More complex inferential statistics might be performed on the transformed data that include rating of strength or intensity.”
4. There is debate over whether research designs that have one data strand, analyzed with different methods, can truly be considered to be mixed method research. Similarly, scholars have debated over whether studies that quantify qualitative data (or vice versa) should be included (Bryman 2006b; see also Gilbert 2008). Bazeley (2006:65) points out that “some have argued for total separation of the qualitative and quantitative components of mixed method studies, with integration considered legitimate only at the point of final interpretation (e.g., Morse 2003; Sale et al. 2002).”
5. Ours is not a software review, but extensive discussions of the individual software packages and their features do exist (Bazeley 2006, 2007, 2010; Lewins and Silver 2007).
6. A number of scholars lament this label, as it implies that the software itself builds the theory. These programs are, on the contrary, theory-building support tools, designed to help the analyst do the theory building (Di Gregorio and Davidson 2008).
7. “Codes” can be thought of as “labels given to segments of textual data, from text that has been transcribed from an interview or other narrative data (i.e. magazines, newspapers, etc.)” (Hesse-Biber and Leavy 2005:327; see also Bazeley 2007; Lewins and Silver 2007).
8. The matrix function in NVivo, for example, allows for multiple comparisons at one time, with or without restrictions on what data are considered within each query. One can, for example, create a matrix based on the presence/absence of each code (see Driscoll et al. 2007, above) or a frequency of occurrence of interpretive coding categories. Given satisfaction of basic statistical assumptions, matrices can provide the basis for quantitative hypothesis testing and analysis (Bazeley 2006).
9. “How-to” manuals have, however, increasingly become available (see among others, Bazeley 2007; Gibbs 2002; Lewins 2008; Lewins and Silver 2007). It is not clear how these might tap and inform experienced researchers ready to use some of the more sophisticated features of such software.
10. We used different search engines because the 2000–2010 issues of the journals we considered are accessed and thus searched through different software and associated search engines.
11. As different authors use alternatively ATLAS/ti, ATLAS/ti, or ATLAS.ti, we ran a Boolean search “OR” cross-sectioning the three spellings in order to obtain the most inclusive results. Similarly, we ran a Boolean search “OR” cross-sectioning NUD*IST and NUDIST. Yet, for clarity and space purposes, we report the comprehensive results under one spelling both in the text and in all the tables.

12. An earlier phase of our research also searched on the term “attribute,” because of its importance in these packages. Attributes are generally fixed characteristics—say age, sex—of the file/interview that are linked to the text and then can be used in sorting, filtering, and analysis. Unfortunately “attribute” is so widely used in scholarly writing that it gave no purchase on the underlying issue and we abandoned it. Similarly, in one phase we search on the term “demography” (and “demographic”), but again, the generic nature of its use made it uninformative for our purposes. The occurrence of “demography” (84 occurrences for the equivalent Boolean search to those presented in Table 2) suggests that in these articles there is explicit attention to the demographic or socioeconomic traits of the respondents.
13. Often it is difficult to tell whether the matrix was constructed within or without the software package. For instance, Stevens and Hildebrandt (2009:597) report use of NVivo, and go on to say, “We constructed qualitative matrices, plotting story elements across study participants and comparing each participant’s medication experiences with every other participant’s medication experiences.”
14. Manning et al. (2011:126) describe their experience of coding as “intensive and interactive.”
15. We used NVivo 8.
16. The word “attribute” is NVivo terminology. For our spreadsheet, we used Excel.
17. “Descriptive codes are fairly objective and self-explanatory in nature; they are used at the outset of the coding process when considering a segment of text for the first time. They allow the organization of data according to what it is descriptively about. They are based on predefined areas of interest, whether factual, thematic, or theoretical in nature” (Lewins and Silver 2007:86).
18. Double clicking on each cell also provides the researcher with information by case (or interview) of the frequency of occurrences of each node and the relative percentage (or density) of the document coded for that particular node. For example, double clicking the cell with the number “32” (the number of women parity 1 whose “considerations concerning the decision to have a first child” had at least one passage coded for “supports TMF”) reveals not only the actual text coded in support of TMF but, by interviewee, the number of passages coded (e.g., 2 references) as well as the percentage (or density) of the text covered (e.g., 4.2% of document).
19. We do not mean to suggest that such information cannot be determined. With appropriate manipulation of NVivo (and likely other software), features such as attribute reporting and matrix intersection allow the analyst (as in our case) to assemble the needed information. We thank an anonymous reviewer for calling on us to clarify this aspect.
20. Similarly to Table 1, in NVivo 8 all of the supporting text generated by this quantitized matrix is available for review and verification or further interpretation by simply double-clicking on a selected cell of the table. Richards (2005) draws a useful distinction between quantitative coding as data reduction and qualitative coding as data retention. QDAS offers the advantage of providing ready access to text associated with results generated for statistical analysis, thus allowing the researcher to continually validate conclusions against the qualitative data, and in this manner initiate further qualitative and/or quantitative analyses (see also Bazeley 2006).
21. Bazeley (2006:69) raises several important issues which arise in the conversion of coding for statistical analysis: “(a) there needs to be sufficient cases (preferably probabilistically rather than purposefully selected) to provide statistically sound samples for the

- procedures selected; (b) a decision has to be made about whether it is more appropriate to export information reflecting volume of text coded, or simply the presence or absence of a code, and (c) if the qualitative category codes data which are non-directional (e.g., that the issue of the character of a witness was raised, without identifying the conclusion reached), then, depending on the purpose, further coding of the data within that category (to more specific codes, e.g., reflecting a positive or negative assessment) could be necessary before export.” (See also Bazeley [2010] for further discussion of working with complex mixed data.)
22. Here we used Stata 10.
 23. An approach that combines multiple data collection methods—i.e., survey methods, observational methods, and less structured interviewed methods—in a dialectical fashion in order to study the causes and consequences of population phenomenon (Axinn and Pearce 2006:54).
 24. A Google Scholar search on “ethnosurvey” for 2000–2010 turned up mostly references to Massey (1987) and Massey and Zenteno (2000) and mention also of the Mexican Migration Project, where this approach was applied. It is of course likely that similar data collection strategies are being implemented without use of that word, since there has been wider attention to multimethod data collection *per se* (Axinn and Pearce 2006).
 25. Greene (2008:8) points out that in the Princeton Study on twentieth-century fertility decline in Europe, traditional demographic theory and epistemology were found to have insufficient explanatory power. The study found that “cultural setting influences the onset and spread of fertility decline independently of socioeconomic conditions” (Knodel and van de Walle 1986, quoted in Kertzer and Fricke 1997:11). In accordance with Rao (1997), Greene (2008:8) concludes that “this theoretical failure steered demographers to attend to cultural factors and to re-anchor their traditional quantitative thinking in ethnographic insight and theory.”
 26. For example, see a quote from a “follow-up interview” in a February 2012 NYT/CBS News poll, as reported by Jim Rutenberg and Allison Kopicki, “President Obama’s political standing is rising.” (Retrieved from <http://www.nytimes.com/2012/02/15/us/politics/economic-gains-give-lift-to-obama-in-poll.html?ref=politics>.)

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Bios

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