Illumination with a dim bulb?
What do demographers learn by employing text analysis software and narrative approaches?

Michael J White
Maya Judd
Simone Poliandri

Population Studies and Training Center
Brown University

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Abstract

We examine the potential gains and pitfalls from the incorporation of qualitative and mixed methods into demographic analysis. Although there has been much optimistic discussion of integrating quantitative and qualitative findings, there remains a gap regarding the application of mixed approaches. We take up these matters in the context of the growing analytic power of contemporary text-analysis software packages. We illustrate the issues with our own research in a mixed method 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 (4) cities in Italy. Despite the enthusiasm for mixed method research, utilization of the available software remains modest. In addition, we suggest that the demographic research community will want to address several conceptual and inferential issues with the mixed methods approach.

Introduction

One of the intriguing and seemingly promising developments within population studies in the last several years has been the incorporation of qualitative and mixed methods into demographic analysis. While potentially providing insights that neither method alone could provide, some scholars have expressed concern that the integration of qualitative results into quantitative data and, more broadly, the undertaking of mixed methods studies have 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; cfr. O'Cathain, Murphy, and Nicholl 2007). On the other hand, a number of more grounded justifications have been given for integrating qualitative data and employing mixed methods approaches, including the possibility of producing knowledge that otherwise would not be possible 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 (O'Cathain Murphy, and Nicholl 2007; O'Cathain and Thomas 2006).

While the concepts, methods, and standards of mixed method research designs have been increasingly debated and refined (Creswell 2003; Green and Caracelli 1997; Miles and Huberman 1994; Tashakkori and Teddlie 1998, 2003), few methods are available for the integration of qualitative and quantitative data (Andrew Salamonson, and Halcomb 2008: 36). Developments in computer technology, however, have facilitated the fusion of qualitative data in mixed methods projects (Bazeley 1999, 2002). Specifically, a number of computer software packages have been developed for text analysis. Presumably – and according to the information circulated by the purveyors – these packages tout the ability to powerfully process and even analytically summarize textual data. Computer programs, such as NVIVO and ATLAS/ti, allow analysts to code and analyze passages of narrative from in-depth interviews, focus groups and the like. This is a very exciting and optimistic development, allowing researchers to bypass the world of note cards and sheaves of paper. Such software, in conjunction with the intellectual progression of the field, might help usher in a revolution in qualitative methods akin to the role of computational software in fomenting the quantitative revolution in social sciences an academic generation ago.

In this paper we take a critical eye on what one can – and cannot – learn from this potentially informative development. We attempt to go beyond some standard understandings of augmenting demographic analysis with a qualitative approach, hoping to offer some useful insights and point the way to improved use of such techniques.

The paper is structured as follows. We begin with a brief review of the state of contemporary mixed methods research, followed by a comment on the introduction of qualitative and mixed methods research in population studies. Our aim is not to demonstrate or critique the shift to incorporating qualitative and mixed methods into population studies, but rather to take this shift as the backdrop for the topic under examination. As such, we review the features of qualitative analysis of interest to demographers. We then focus our attention on the recent development of software packages for qualitative analysis, questioning and examining the extent to which key analytical features of these software packages have actually been used. To this end we describe the results of a 'content analysis of content analyses' concerning the utilization of computer-aided qualitative analyses in the demographic literature. This is followed by a discussion of several shortcomings and shortfalls of computer software packages. We conclude

by describing our own mixed method experience using the software NVIVO in a project focusing on understanding low fertility in Italy.

Mixed methods

"Mixed research," or projects which include both qualitative and quantitative data are by no means new to the social sciences. During the first half of the twentieth century, they can be seen across the work of both cultural anthropologists and fieldwork sociologists (e.g. Gans, 1963; Hollingshead, 1949; Johada, Lazarsfeld and Zeisel 1931 [2003]; Lynd and Lynd 1929 [1959]). However, the label "mixed methods" was not coined until recently (Burke, Johnson, Onwuegbuzie, and Turner 2007). Campbell and Fiske's (1959) article which introduced the concept of 'multiple operationalism'[1] 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 which go beyond triangulation (Rossman and Wilson 1985; Seiber 1973) and have more generally defined the purposes or rationales for conducting mixed-method studies (Dzurec and Abraham 1993; Greene, Caracelli, and Graham 1989[2]; Sechrest and Sidana 1995). Certainly within the last few decades, a vibrant discourse has emerged. Creswell and Tashakkori (2007b) identify four (not mutually exclusive) perspectives that have emerged from mixed methods research. The first is a *method* perspective in which the process and outcome of using different types of methods and data are the focus. This perspective was predominant during the 1990s, although has since been critiqued by those who argue that one cannot separate methods from paradigms or worldviews.[3]

The second is a *methodology* perspective in which "mixed methods" is discussed as a distinct approach and, as such, it necessarily incorporates worldviews, questions, methods, and inferences or conclusions into the research process. In other words, this approach ties (either explicitly or implicitly) the methods employed to philosophical assumptions; the methods

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[1] 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: 113-114. Quoted passage cited from Bouchard 1976: 268).

[2] For example, these authors identified the following reasons for combining qualitative and quantitative methodologies: (a) triangulation (i.e., seeking convergence and corroboration of results from different methods studying the same phenomenon), (b) complementarity (i.e., seeking elaboration, enhancement, illustration, clarification of the results from one method with results from the other method), (c) development (i.e., using the results from one method to help inform the other method), (d) initiation (i.e., discovering paradoxes and contradictions that lead to a reframing of the research question), and (e) expansion (i.e., seeking to expand the breadth and range of inquiry by using different methods for different inquiry components). Green, Caracelli, and Graham (1989: 256) defined mixed method designs as "those that include at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words) For a review of Dzurec and Abraham's (1993) and Sechrest and Sidana's (1995) reasons for pursuing methodological pluralism, see also Burke et al. 2007: 115)

[3] See also Gilbert 2006 and Sandelowski, 2003. Teddlie and Tahakkori (2006) label this perspective "quasimixed."

themselves are seen in more specific terms as strategies and procedures for collecting and analyzing data (i.e. research design, sampling procedures, data collection, etc.).

The third is the *paradigm* perspective, in which researchers discuss the worldview(s) which serve as the philosophical foundation for mixed methods research. For mixed methods scholars writing from this perspective, research is "less about methods or the process of research and more about the philosophical assumptions that researchers bring to their inquiries" (Creswell and Tashakkori 2007b: 305).

The fourth and final perspective is one of *practice*, by which scholars treat mixed methods as a "means or set of procedures to use as they conduct their research designs, whether these designs are survey research, ethnography, or others" (Creswell and Tashakkori 2007b: 306). It is a "bottom up" approach in which the need to use mixed methods emerges during the research endeavor as investigators collect and analyze both quantitative and qualitative data.

Greene (2006) has also offered a useful framework for thinking about mixed methods research as a methodological or research paradigm. She divides what she calls "mixed methods social inquiry" into four domains: (a) philosophical assumptions and stances (i.e., what are the fundamental philosophical or epistemological assumptions of the methodology?), (b) inquiry logics (i.e., what traditionally is called "methodology" and refers to broad inquiry purposes and questions, logic, quality standards, and writing forms that guide the researcher's "gaze"), (c) guidelines for practice (i.e., specific procedures and tools used to conduct research; the "how to" part of research methodology), and (d) sociopolitical commitments (i.e., interests, commitments, and power relations surrounding the location in society in which an inquiry is situated).

Despite the breadth of such perspectives and frameworks for mixed methods work, there still remains much debate as to what *exactly* should be labeled as a 'mixed methods' study (Burke Johnson, Onwuegbuzie, and Turner 2007), given that many projects labeled as "mixed" utilize qualitative or quantitative approaches and data in different ways. Some scholars have pointed out the need to distinguish between studies that utilize quantitative and qualitative data without serious integration and those that integrate data and the findings of both "strands" (Tashakkori and Creswell 2007). Supporters of the latter suggest that "true" mixed methods research goes beyond reporting two distinct "strands" of qualitative and quantitative research. Studies of this nature endeavor to "integrate, link, or connect these 'strands' in some way" (Creswell and Tashakkori 2007a: 108. [Quotes in original.]). The idea being that the conclusions drawn from such integration – accomplished through "comparing, contrasting, building on, or embedding one type of conclusion with the other" – provide a fuller understanding of the issue at hand than either method would alone (Creswell and Tashakkori 2007a; see also Creswell and Tashakkori 2008). There have also been attempts to distinguish between mixing within a single phase/strand (Tashakkori and Teddlie 1998) and mixing across phases/strands (i.e., sequential designs) (Creswell, 2003; cfr. Tashakkori and Creswell 2008: 4).

Thus far, however, the degree to which mixed methods researchers genuinely integrate their findings has rarely been addressed in the literature (Bryman 2007). In an examination of evaluation research articles, Green, Caracelli, and Graham (1989) found that only 5 out of over 100 mixed methods articles genuinely integrated quantitative and qualitative data during analysis. Niglas comes to similar conclusions in her analysis of mixed methods articles in the education field, concluding that "substantial integration of qualitative and quantitative data during the analysis was exercised very rarely" (2004: 98). In a similar vein, Bryman (2007) discusses results from interviews with 20 UK mixed-methods researchers. The majority of the interviewees felt that quantitative and qualitative findings were rarely genuinely integrated;

much more often they were treated as separate domains. Among the barriers to integrating the analysis and interpretation of quantitative and qualitative data, researchers mentioned: different audiences, methodological preferences, the structure of research projects, the role of timelines, skill specialism, the nature of the data, and the difficulty of bridging ontological and epistemological divides (Bryman 2007).

Yet, in discussions of mixed methods research, epistemological issues have often been marginalized in favor of pragmatic approaches to combining quantitative and qualitative work. Morgan suggests that a true mixed-methods 'paradigm shift' would necessarily go beyond treating this approach as "just a mechanically superior way to answer research questions" (2007: 73). He favors an approach that would emphasize not only epistemological concerns about the nature of knowledge that we produce but also the technical concerns about the methods used to generate that knowledge (2007: 48).

Qualitative and mixed-methods in population studies

Axinn and Pearce, in their recent contribution on mixed methods data collection strategies for demography and the wider social sciences, ask, "How important is it to use combined approaches?" (2006: 14). They demonstrate that researchers in the social sciences generally, and population studies in particular, have long used a combination of data collection methods (i.e., they mention, among others, Back and Stycos 1967; Becker et al. 1961; Lipset, Trow, and Coleman 1956; and Stycos 1955). In fact, some of the more recent combined approaches, such as those by John Caldwell and his colleagues have helped to reshape the way population scientists think about socio-demographic 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" approach 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's "Wealth-flow Theory" espoused in a *Theory of Fertility Decline* (1982) thus hypothesizes that, with industrialization, children lose their economic value to parents, who must be motivated to have children for non-economic reasons, such as love and affection. Based on his "microdemographic" approach, Caldwell (1977) has also long raised the concern that demographers rely too heavily on Western categories and theories of economic rationality, potentially skewing results.

Massey and his colleagues (Massey 1987a, 1987b; Massey and Espinoza 1997; Massey, Goldring, and Durand 1994) have also generated new insights through their use of "ethnosurveys." Massey et al. (1993) have attempted to integrate the most successful elements of migration theory to form a single comprehensive approach to understanding migration in industrialized countries. Massey identifies two stages in the migration process: the cause or initiation, and the continuation (why, for example, transnational flows persist over time and space). His interest in combining a variety of theoretical levels of analysis – including macro sociological, microeconomic, and cultural perspectives – has remodeled the ways some demographers think about migration. Brettell and Hollifield (2000: 2) comment:

> Social scientists do not approach the study of immigration from a shared paradigm, but from a variety of competing theoretical viewpoints fragmented across disciplines, regions, and ideologies. As a result, research on the subject tends to be narrow, often inefficient, and characterized by duplication, miscommunication, reinvention and bickering about fundamentals. Only when researchers accept common theories, concept tools, and standards, will knowledge begin to accumulate.

Notable work employing a multi-method 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) to study fertility, aging, and AIDS in Thailand (Knodel and Im-em 2004; Knodel et al. 1987, 2001).

Axinn and Pierce 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" (2006: 15). On the other hand, authors such as Bernardi, Kei, and von der Lippe argue that "researchers interested in population processes and phenomena have *not* taken advantage of the experience of colleagues in neighbor disciplines" (2007: 25. Italics added)[4] and, as a result, few demographic studies can be labeled as *truly* "mixed methods." These authors argue that there are still very few empirical studies in demography based on mixed methods approaches, and that most focus on non-Western populations (see, also, Axinn and Pierce 2006: 25).

Population Data, Population Inference, and the richness-sparseness trade-off

Many primary data collection efforts are community or regional studies. The advantages of researching within a local context are several. To begin with, such studies are logistically manageable. The challenge, however, is understanding what inferences one 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 in demography; witness, for example, the many studies in the historical demography of Europe.[5] "Micro-demographers" believe that demographic phenomena (birth, death, marriage, and migration) are often better "understood with grounded insights coupled with statistical techniques that attempted to discern patterns from large-scale census data" (Tashakkori and Creswell 2008: 4). This idea has recently been extended by Axinn and Pearce (2006) in a book on the value of mixed methods data collection in demography. 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 (see Greene 2008: 7).

More broadly, qualitative analysis has several features of interest to demographers:

- Understanding meanings and providing nuance in local settings (which large-scale-oriented demography has more difficulty reaching)
- Providing illustration of viewpoints
- Identifying behaviors that challenge standard models

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[4] Bernardi, Kei, and von der Lippe (2007) make this comment in an empirically based article employing mixed methods in area of population and family research. Through a combination of qualitative and quantitative data collection and analysis, they investigate the effects of social influence on family formation among young adults in two German cities. They integrate their different types of data through the structure of two case studies. The authors also comments on the ways their research contributes to the mixed methods literature (concurrent design structure, sample of relatively homogeneous cases for comparison, and rigorous research standards).

[5] 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 influence 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 concludes that "this theoretical failure steered demographers to attend to cultural factors and to reanchor their traditional quantitative thinking in ethnographic insight and theory" (2008: 8).

Qualitative work is probably indispensible in the pre-pre-test phase to understand concepts and how they work in the field. Understanding how people interpret family connections, occupations, or "happiness" vastly improves questionnaire development.

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 the *New York Times* practice of reporting nationally representative statistical tabulations and then illustrating viewpoints with quotes from selected respondents (obtained by permission). Use of qualitative information can provide the audience with a deeper (well 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.

While granting the value of nuanced insight and illustrative quotes (a la journalistic accounts of polling), we are still left with the issue of how to accommodate these approaches within the population-based world of demography. At first pass, it might seem rather surprising and puzzling that qualitative methods would become so widely and enthusiastically incorporated into the analytical portfolio of population studies. After all, demography (population studies) had its origins as one of the decidedly quantitative undertakings in social and health studies. Demographers do numbers. Perhaps the notion is contested, but one might advance a conventional view, a "standard model."

Demographic analyses typically involve (expect):

- Quantification of results
- Representative samples
- Use of national census or survey data sets (DHS, International-IPUMS, CPS, PSID)

The development of population-based estimates can be quite consequential and certainly one can hear a strong voice for the population-based approach, even as recently as the 2008 PAA Presidential Address (Duncan, 2008). The well-developed literature in population-based inference, sometime with a more explicit causal framework (see, among others, Moffitt 2005), suggests a way to express this issue:

> Estimation of unbiased coefficient linked to underlying behavior, as exposited in the conventional basic statistical approach:
>
> $E(\beta^*) = \beta$
>
> Where β^* indicates the sample point estimate from a model; and
> β indicates the underlying population value

We would argue – allowing plenty of room for dispute – that the standard model is the stock in trade of the demographic approach, at least with respect to the kinds of data used and the kinds of inferences one wishes to make from them. While national complete enumeration census data may occupy a less central portion of research activity today, surely the use of large national

samples is more in evidence. The interest in estimation of multivariate models from microdata has only reinforced this shift.

Sub-national samples have always been part of population studies, and they have had an intriguing persistence. One can speculate, without going too far out on a limb, that the persistence (growth?) of sub-population primary data collection is driven by constraints imposed by the use of conventional data. This is most clearly indicated by census data, even microdata, (for any country), where a huge number of observations are available, but with limited information about characteristics of persons. Perhaps this is also the view regarding many large nationally representative public access (public good) data sources that have been developed over the years. Possibly these are the key reasons that demographers have undertaken (resorted to?) their own primary data collection.

It may be actually difficult to tell where the practice of mixed and qualitative methods stands on the parameter inference $[E(\beta^*) = \beta]$ issue. Small samples – whether in psychology, anthropology, or demography – always run the risk of criticism on the grounds generalizability or "out-of-sample" prediction. Perhaps a more provocative way of phrasing the issue is with the following question:

> If qualitative studies are intrinsically non-scalable, will they inevitably fall short of informing population studies?

After a review of some of the features of qualitative analysis software, presentation of our own "content analysis of content analysis" and a brief presentation of our own use of NVIVO in the Italian fertility project, we will return to this and related questions.

Software packages

In recent years, riding the wave of the digital revolution, several software packages have been developed for text analysis. Packages such as NVIVO and ATLAS/ti allow the researcher to code[6] and analyze transcribed passages of in-depth interviews, focus groups and fieldnotes, avoiding heaps of awkward note cards and piles of paper. 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 and Richards 2000; Gibbs 2002). Once created, attributes can be used to either filter or search the dataset. Attributes can also be used to explore coded text, through the use of matrix/intersection tables, which enable associations and patterns among the data to be analyzed (for an example of a matrix intersection, see Woolley 2009). In our project on low fertility in Italy, for example, one might ask the software to search for all the instances in which the coded information "decision to have first child" intersects with women over the age of 35; or similarly where women over the age of 35 talked about the decision to have a first child and, for example, contraception. Such searches, also known as "Boolean queries" potentially allow for deep investigations of coded material, ranging from the frequency and content of thematic text to the presence of interlinking themes and ideas (we return to the use of Boolean technique below). While such queries could have, in principle, been carried out with note-card technology, the onerous nature of doing so is clear. Thus, technology has dramatically

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[6] "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).

opened a door in the qualitative arena, much akin to the way that the technology of computing chips facilitated the introduction and spread of iterative and computationally intensive quantitative methods (ordinal probit, multinomial logit, bivariate probit, etc).

Researchers such as Hesse-Biber and Leavy (2005) have also pointed out the possibility, with such software packages, of "quantizing" data, or turning qualitative (codes) into quantitative (variables). In other words, qualitative material is turned into numbers (i.e., presence or absence, or "scores" based on the number of answers codified as corresponding to certain categories) that allow for the application of statistical techniques (Miles and Huberman 1994; Sandelowski 2000: 253).[7] Similarly, words counts and 'mean phrase' counts can be used to reveal patterns across textual data (see, for example, Mechanic and Meyer 2000), although such approaches have also been critiqued for "losing" information when qualitative data is taken out of context, potentially changing its meaning (personal communication with Laura Senier, 2008).[8]

In contrast to "quantizing," quantitative variables can be directly enhanced by qualitative analysis, or what has been called "qualitizing." For example, Hesse-Biber (1996) conducted a study on body image and eating disorders among women using both intensive interviews and a self-administered questionnaire which included, among other things, a range of quantitative eating-disorder scales. She created an "eating typology" based on the quantitative data, while the qualitative data from the interviews provided a "grounding" of the meaning of the eating typology. The quantitative data also allowed her to code and make initial inferences about her qualitative data.

Andrew, Salamonson, and Halcomb (2008: 36) in their study of attrition among nursing students, suggest that the major benefit of computer technology is that it can assist the researcher in looking at the data creatively from a range of perspectives that would otherwise not be possible or could not be achieved in relatively small timeframes. Patel and Riley (2007), who study decision-making among staff in child out-of-home care programs, similarly find such software beneficial, in that it "speeds up certain, more routine elements of the qualitative research process and enables a more thorough examination of the data… efficiently and potentially in complex, sophisticated ways" (471).

To what extent have software packages really been used?

It is particularly in the last ten years that the release of improved versions of software packages has generated enthusiasm among many social science researchers, who perceive the possibility to further integrate qualitative with quantitative data as a powerful enhancement to their analytical practices. For instance, shortly after the release of the popular NUD*IST Revision 4, Pat Bazeley (1999) praised the program's ability to allow the fusion of qualitative and quantitative methods, thus granting interdependence to qualitative and quantitative data, "quantitative methods can stand *with*, rather than *beside*, qualitative data and procedures" (Bazeley,1999: 286. Italics in original).

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[7] For a specific example of this technique, see Alvernini, Lucidi, and Manganelli 2008.

[8] More broadly, anthropologists have expressed concern about the implications of removing qualitative information such as transcribed interviews and very personal fieldnotes from their "embeddedness" in particular socio-cultural, political, and economic contexts and sharing with others. In fact, "informants" themselves may express the wish that transcripts not be shared. The removal of transcribed interviews and fieldnotes from their original context raises, for some anthropologists, a plethora of ethical issues. Karen Till, for example, writes that sharing interviews transcripts "in politically charged settings can evoke anxiety, damage research relationships, and even jeopardize attempts at confidentiality" (2001: 53).

Yet, at first sight, it seems that such an initial enthusiasm has not translated into significant and widespread changes in how ever-improving software packages have been used for research design and analysis. Despite the diffusion of computer-aided qualitative data analysis in demography and (mostly in) other disciplines, it appears that the bulk of users consider these programs as ad-hoc means of efficiently managing large quantities of data (Bourdon 2002: 1; Fielding and Lee 1998). Bourdon (2002) suggests,

> The influence software can have on the analysis process is either seen as mildly positive with regard to its time saving potential or as a threat to some kind of methodological purity, distancing the researcher from the data or imposing some rigid and foreign framework on the analytic process. The use of software is then kept under surveillance, a large fraction of the package's capabilities are underused and the potential for innovative applications and methodological advances is impaired.

The author goes on to suggest that many features of such software packages are very seldom used, and researchers often never get beyond using them as "souped-up filing cabinets". Discussion concerning the use of software packages is often more about their pertinence[9] than any practical issues of software integration (Bourdon, 2002: 3; Richards and Richards 1999).

While enthusiastic about the capabilities and potential of software packages such as NVIVO, Bourdon's article focuses on only *one* of the many tools available, or that of the QSR Merge[10] (allowing multiple analysts working on separate datasets to later merge their work and compare specific coding, memos, and attributes in one unified project). This leaves the reader somewhat suspicious as to why, beyond coding and merging, the software package was left "under-utilized." In other words, while Bourdon touts the many (under-used) features of such software packages, he arguably does the same thing he accuses other researchers of doing, namely using the program to (simply) efficiently manage a large quantity of data, albeit across multiple researchers.

Lyn Richards (2002), the director of research services at Qualitative Solutions and Research (the developers of NUD*DIST and NVIVO) similarly notes that although qualitative computing has often been described by enthusiasts as "revolutionary," its methodological innovations are rarely discussed. She suggests that "while these tools have the potential to change methods, their adoption and their impact have been uneven, and they have been subjected to remarkably little sharp and critical debate" (2002: 263). In their 1995 work *Computer Programs for Qualitative Data Analysis*, Weitzman and Miles asserted that there had been a "phenomenal development" in qualitative computing, testified to by "an outpouring of journal articles, a series of international conferences on computers and qualitative methodology, thoughtful books on the topic" (4). In the 2000 edition the *Handbook of Qualitative Research*, Weitzman again stated his enthusiasm for such programs. L. Richards notes, however, that the "outpouring" of discussion soon subsided, and "outside of this very brief flurry of conference

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[9] Qualitative software packages have at times been seen as problematic in that some scholars feel that qualitative data may be 'damaged' when confined or 'constrained' to computers; analysis being the lesser for these limitations (L. Richards 2002: 267).

[10] This feature, once a separate software (QSR Merge) has now been incorporated directly into QSR NVIVO, so that multiple researchers can work on separate datasets – or the same one – and then easily merge them without the need for an additional software package. When working in a team, members may sign in using their initials, such that work can later be linked to the analyst if necessary (i.e., to see or compare coding done by a specific or multiple team members).

reports, the only mention of computing is in a few reviews and a few revision of methods texts (usually adding a new section or occasionally chapter on computing techniques)" (2002: 264). Rather than consider any larger methodological impacts, such reviews tend to simply survey particular packages. At most, the time-saving and efficiency aspects of software are weighed against the disadvantages of an initial learning curve, rather than any disadvantages or advantages to the analysis itself (Coffey, Holbrook, and Atkinson 1996; Lofland and Lofland 1995). In L. Richards's opinion (2002: 264),

> The clear impression is that there is little curiosity about technological change by those not using the tools offered. Thus a major new 2001 text on qualitative psychology, a burgeoning development, relies on the 1995 summary by Weitzman and Miles, and an understanding of qualitative computing far simpler than they presented then (Willig 2001). The programs listed are out of date (p. 151) and the functionality known appears only to be code-and-retrieve. Yet the author notes, in another context, 'It is worth keeping abreast of developments in research-related computer technology' (p. 152).

Richards argues that one of the reasons qualitative researchers using computers have not taken full advantage of their potential is because they assume that the (qualitative) method is the same, one merely has to learn how to do it on a computer. "No new goals or new analytical outcomes enabled by software," she says, "were predicted – rather we were seen as merely getting more rapidly to the old goals" (2002: 267). With limited debate over a higher literature of methods, computing easily slid into an association with techniques that "are generic, easily learnt, and that emphasize data management" (L. Richards 2002: 266). She suggests that part of this lack of "methods" is due the fact that qualitative researchers have traditionally not written up projects with an emphasis on the method employed when working with their data (L. Richards 2002: 267).

There would seem, however, the distinct possibility for the technology to help drive new and extended analysis, much the same way (as we argued above) that the rapid developments in microprocessor technology helped drive computationally intensive social science. Despite these lacunae, L. Richards (2002) suggests that qualitative computing has offered several radical methodological changes:

- The ability to handle concepts as things, thus to manage ideas, and explore their relations;
- The ability to hold and use factual information;
- Searching that drives, rather than ends, enquiry; and
- Coding that can provide data for more analysis.

If, as Richards asserts, qualitative researchers have not yet embraced the full spectrum of possibilities that such software packages offer, then the prospective of finding a higher number of "devotees" among demographers might be understandably lower. Yet, before even attempting a quantification of the extent to which researchers have utilized (or underutilized) software packages, we need to ask: are researchers engaging in computer-aided qualitative data analysis at all? Are they putting aside color markers and note cards, or at least compiling and sorting them in front of a computer monitor? What do the numbers tell us in regard? We thought that a content analysis of published literature would offer a clearer overview on these issues.

Content Analysis

The following tables present our results for a selective canvass of recently published material in the field of population studies and in methods journals where qualitative approaches might be

found. The idea is to provide a statistical representation of the researchers' usage of qualitative data analysis software packages as well as the extent of such usage.

Using a variety of search tools available in JSTOR, SocINDEX, SAGE Premier 2007, the Directory of Open Access Journals, and ScienceDirect Journals, we searched every number of ten national and international demography and research methods journals published within the last ten years (1998-2008).[11] In order to avoid dispersion of data and non-relevant results, we circumscribed our analysis to research articles only, leaving out book reviews, commentaries, and editorials.

Table 1 illustrates the total count of articles per journal for the period considered, as well as the total number of articles in which the individual entries "NVIVO," "NUD*IST," and "ATLAS/ti" appear. These software packages are the most common programs used in the social sciences for qualitative data analysis and, therefore, can be considered representative of the category. We decided not to include general terms like "computer" and "software" in the search, because their presence does not necessarily imply a discussion on qualitative data analysis computer programs. Rather, it seems standard for authors to explicitly mention the brand (and, in many cases, the version) of the software package they used to process data for their research.

Table 1. This table reports the total number of articles featured in each journal within the period 1998-2008 and the total number of occurrences of each selected term (NVIVO, NUD*IST, and ATLAS/ti).

Journal	# Articles	NVIVO	NUD*IST	ATLAS/ti
Demography	455	0	0	0
Forum, Qualitative Social Research	739	13	24	15
Intl. Journal of Qualitative Methods	167	1	0	0
Journal of Marriage and Family	955	0	0	0
Journal of Mixed Methods Research	31	5	0	0
Population and Development Review	348	0	0	0
Population Studies	240	0	0	0
Qualitative Health Research	916	42	24	3
Qualitative Research	178	4	3	1
Social Science Research	440	0	0	0
Total	**4469**	**65**	**51**	**19**

If the technological revolution has allegedly hit the field of demography and mixed-method studies, as some authors claim in reviewing and discussing the pros and cons of qualitative data analysis software, this is certainly not reflected in the published material of the last ten years. The terms "NVIVO," "NUD*IST," and "ATLAS/ti" appear respectively in merely 1.45%, 1.14%, and 0.42% of the articles featured in our selection of journals. The paucity of such percentages is even more striking when considering that some of the numbers for NUD*IST

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[11] Demography (1998-2008), Forum: Qualitative Social Research (2000-2008), International Journal of Qualitative Methods (2002-2008), Journal of Marriage and the Family (1998-2008), Journal of Mixed Methods Research (2007-2008), Population and Development Review (1998-2008), Population Studies (1998-2008), Qualitative Health Research (1998-2008), Qualitative Research (2001-2008), and Social Science Research (1998-2008). As noted in parentheses, some of the journals began publishing after 1998.

and NVIVO (the former being the precursor of the latter[12]) represent the same authors who, sometime in the early 2000s, have switched to the upgraded edition of the software developed by QSR International (T. Richards 2002). In addition, the wide majority of authors using such terms have published in either *Forum* or *Qualitative Research Journal*, while none have appeared in any of the demographic journals, and only one researcher has mentioned "NVIVO" in seven years of the *International Journal of Qualitative Methods*. It may not be too surprising that qualitative software utilization (at least manifest in text searches for the software name) has not made more inroads in mainline demographic publications such as *Demography*, *Population Studies*, and *Population and Development Review*. What may be more striking is that even in mixed methods and qualitative research journals, our searches for mention of the software come up empty.

One does not expect every single investigator to identify a software package by name in such as way that it will emerge in a string search. But consider a simple contrast with two popular statistical packages. A simple string search for the statistical software package "STATA" in *Demography* for the same 1998-2008 turned up 40 hits. A search on " SAS " (with a leading and trailing blanks) turned up another 21 hits. One might expect *new* technology or applications software to be *more* likely to receive explicit mention than those being invoked for now-standard analysis.

Could this indicate that researchers are timid or secretive when it comes to disclosing their adoption of qualitative data analysis software packages? Not likely. Rather, at first sight, it seems that the problem with the bulb is not so much its low wattage but, instead, it having been hardly used at all in the last ten years! In other words, our statistical results suggest that such packages have not just been underused – i.e. the dim bulb – to say the least, but rather that scholars have maintained a skeptical distance from them – i.e. better stick to the good ol' kerosene lamp than venture out on research terrain holding a relatively-new and questionable electric bulb (with all due respect for the metaphorical kerosene lamp and its users).

Figure 1. Number of articles in 3 selected journals in which the term "NVIVO" appears between 2001 and 2008.
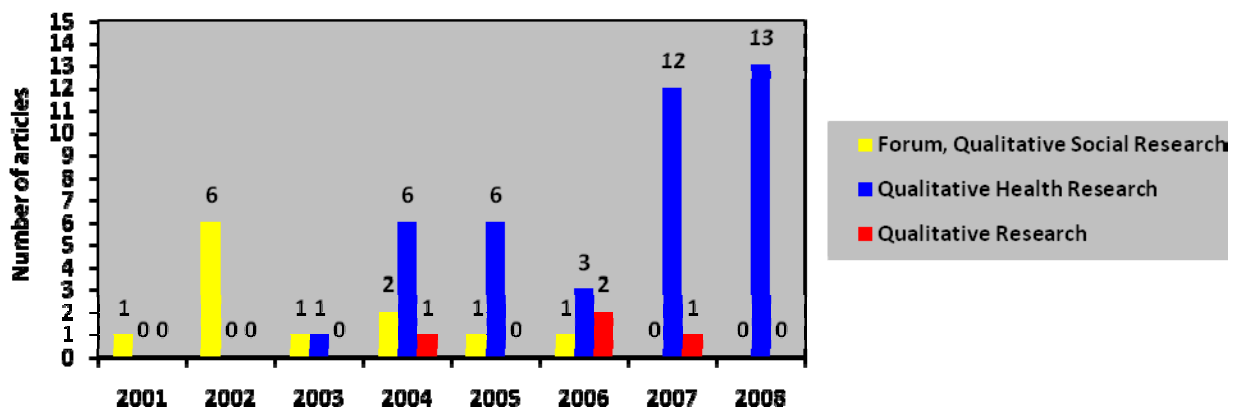
Yet, the bulb is being used, as the statistical sample displayed in Figure 1 illustrates. Here, we measured the frequency of appearance of the term "NVIVO" (which was introduced in 1999) in articles from three selected journals between 2001 and 2008. The journals are those that in our content analysis returned the greatest number of citations for "NVIVO." The immediate

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[12] See T. Richards 2002.

impression is that of a slow increase in the frequency of usage of the software in the period under consideration. Yet, this is only when we consider absolute figures. Relative numbers, instead, provide an ambiguous scenario in which such a growth appears clearly only in *Qualitative Health Research*, whereas the number of NVIVO entries remains steadily low in both *Forum* and *Qualitative Research*. Dissimilar frequencies in different publishing forums suggest a lack of widespread usage of the software among social science researchers and a marked separation between users (the few) and non-users (the many).

That said, the question then is: Can we quantify to what extent these few users have employed the qualitative data analysis software packages? In order to do so, we conducted a series of Boolean searches 'AND' cross-sectioning the terms "NVIVO," "NUD*IST," and "ATLAS/ti" with a group of terms including "matrix," "matrices," "Boolean," "attribute," "text analysis," "mixed-methods," and "demography." The first three terms represent advanced features available in the software packages under consideration; the next two represent simple elements of the programs; and the last two represent the broader contexts of our study. The searches were conducted in the 5 journals that returned at least one positive entry in Table 1 for the period 1998-2008 (or since the journal began publishing).[13] Table 2 reports the total results of our Boolean searches.

Table 2. This table illustrates the results of a Boolean search 'AND' conducted in the selected journals for the period 1998-2008.

	matrix	matrices	Boolean	attribute	text analysis	mixed-methods	demography
NVIVO	9	8	6	27	5	18	3
NUD*IST	10	8	4	11	10	3	0
ATLAS\ti	1	0	0	1	9	0	0
Total	**20**	**16**	**10**	**39**	**24**	**21**	**3**

The data analysis raises questions relative to what extent there has been any radical methodological change thanks to such software packages. Or more simply, the extent to which demographers have really exploited the software's analytical features beyond gathering quotable passages to illustrate cases.

The very low occurrence of the term "demography" and the concurrent greater incidence of "mixed-methods" in association with any of the software packages seem to confirm that only when explicitly declaring their integration of qualitative and quantitative methods some demographers seem to employ software packages, in particular the more recent and popular NVIVO. Instead, the field of demography *per se* appears to be still skeptical of qualitative methods and data or, at least, of the use of qualitative data analysis computer programs. Although this statement might sound speculative, it stems from evidence showing 3 total intersections of "demography" with any of the three software packages in a pool of 2031 articles (see Table 1) for the five journals under consideration, a mere statistical 0.14%. Yet, 21 concurrent appearances of "mixed-methods" with any software package, or 1.03% of the 2031

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[13] Forum: Qualitative Social Research (2000-2008), International Journal of Qualitative Methods (2002-2008), Journal of Mixed Methods Research (2007-2008), Qualitative Health Research (1998-2008), and Qualitative Research (2001-2008).

articles, do not look much more promising when considering the big picture. Nevertheless, it is a promising start, although still at a very low wattage.

More interesting and relevant to our question about demographers' underuse of software packages are the data from Table 2 comparing the incidence of simple versus advanced features of the software packages. The higher frequency in which the terms "attribute" and "text analysis" appear compared to "matrix," "matrices," and "Boolean" (particularly for NVIVO and NUD*IST) suggests that a greater number of researchers who use qualitative data analysis programs still confine their efforts within the realms of text management (24 occurrences), such as quote retrieval, and basic use of attributes (39 occurrences), such as filtering and/or "quantifying" the qualitative dataset (rather than using attributes for the construction of matrix tables, a much more powerful tool for analysis, for instance). On the contrary, the data from Table 2 highlight the lower co-occurrence, hence usage, of "Boolean" searches and software packages (10 occurrences). Once again, our content analysis reveals a subdued usage of qualitative data analysis software packages, a dim bulb indeed!

Shortcomings and Shortfalls

We elaborate here on the shortcomings and shortfalls in the use these packages. We begin by identifying two:

- Quotes absent analysis
- Design and Sample frustrations

Quotes only

Our content analysis raises questions about how often published literature involves actual exploitation of the software's analytical features. Quoted passages from the field abound, but only modestly does the field go beyond this. One interpretation is that the software has just made it easier to store and retrieve text material, expediting the very same process that was once carried out on 3x5 cards. This is a valued progression, but are we still illuminating with a dim bulb?

These software programs – NVIVO is the example – allow the analyst to cross-tabulate or cross-reference coded material. Usually Boolean techniques are used, e.g.

Code A ∩ Code B

should give rise to an extraction and count of passages where both codes occur. This would appear to be quite a powerful tool. Even more, it provides the analyst with enormous time-saving features which would, in turn, allow any research group to work with an extensive number of interview transcripts. Yet, it is difficult to find evidence of the use of such features in the published literature. The puzzle persists. L. Richards comments that for many developers of software packages, the focus on just doing coding, rather than utilizing techniques such as Boolean searches, was a conundrum from the start. She writes (2002: 269),

> Our software had never been intended to do only coding and simple retrievals; why would you bother to develop software for only that? Our starting point for developing programs was that mere coding was not what you wanted to do if you were working qualitatively, and from the earliest prototypes, NUD*IST allowed the creation and exploration of categories and searches that went far beyond the simple retrievals of manual methods.

For many researchers, it seems that software packages offer a quick answer to describing and retrieving data, while the tools for doing more interpretation once the coding is complete, are used much more infrequently.

Design and Sample Frustrations

We refer to the second concern as "sampling and design frustrations." And we use the word "frustrations" rather than "deficiencies" because many observers may not feel these characteristics are intrinsic desiderata for text analysis. There are several elements here, but we mention two.

First, most collection of narrative data does not draw on representative samples. Does this lower the wattage of the bulb? Maybe not. Maybe so. 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. Consider further the desire to make model-based inferences;

$$Y = \alpha + \beta X + \gamma Z + \varepsilon$$

We care about the accuracy (bias) of β as mentioned earlier. Nothing is new here. We are talking about the issues of generalizability, something often mentioned in the discussion of any empirical analysis. That we are using sub-population data does not necessarily compromise our ability to infer. A properly specified model could retrieve β, even if descriptive population estimates (prevalence values, for example) developed for the local population might not accurately reflect the value in the full population.

Maybe not: Consider clinical research. A number of biomedical studies enroll non-representative samples. Limited events, logistical considerations (availability of physicians and clinics) lead to this. We would presume that the inferential argument that provides for the continuation of such an approach is that most such biomedical process persist across subpopulations. This state of affairs seems not to have impeded biomedical research progress or the health of populations.

Maybe so: On the other hand, of course, the local-full inferential problem may exist. The sub population β may be far afield from what it is supposed to estimate, the full population β. The realistic challenge, then, is to develop a better understanding of exactly the circumstances that are most worrisome and those circumstances that are not.

A second concern within the "frustration" category is that which we call "null-response" issues. By the nature of rich data collection technique, rather free-form, we face a challenge in interpreting our coded "data." Consider the ex-post interest in querying a coded test database. Say, we query the intersection (*matrix* in NVIVO) between opinions about natural environment preservation and child health. We can readily count the number of passages (interviews) that speak to one or the other topic, and using the software we can tally the number of passages that speak of both in the same short space of time. This is fine, as far as it goes. The analyst can begin to tell a story about the connection between the two issues in the minds of respondents. But what about the null response, in which a respondent contributes no datum on A or B or the intersection? Does the individual have no opinion? Is it not within the respondent's consciousness? Note the contrast with the conventional survey approach, which would affirmatively obtain a response to each survey topic (even *Don't Know*) and could then cross-tabulate for the sample. What are we to do here? Should the research team assume DK/NA or

"no intersection" in this case? More simply, note that this feature of the approach raises some questions about the development of a proper denominator, something dear to demography. Consider, by way of placing this issue in relieve, a basic precept in research design (at least in some approaches to research design) that each observation contributes a countable case to a set of mutually exclusive and exhaustive categories. Our review of the literature – both the actual analyses and the writing about the use of these techniques – reveals a remarkable silence on this matter.

Hesse-Biber and Carter (2004) note a similar issue in their research on eating disorders and discussions with interviewees over whether their parents, peers, and siblings were critical of their bodies (the researchers transformed coded material into a variable called PPSC). Yet not all interviewees were asked about this issue in a standardized way, as would have taken place in a quantitative survey. In a follow-up discussion on the same topic, Hesse-Biber and Leavy comment, "Nor did the interviewer strive to bring up this particular issue in every single interview. Thus, measurement error is a real concern for anyone following the path that we are suggesting" (2005: 333). While Hesse-Biber and Leavy use the phrase "measurement error" to identify the issue, we would go further and suggest that differentiating the entire range of measurement errors would be valuable in these cases. As a simple enumeration, consider errors arising from sample design (bias), question wording or omission, and conventional "coding" of the response categories.

Our experience with mixed-methods research

We now turn to our own mixed methods research in order 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 entails, the project entails the combined analysis of large nationally representative survey data with a substantial qualitative primary data collection: namely, interviews with about 200 women (and sometimes their partners and mothers) across 4 major Italian cities.

Take for example, the following search of the data, conducted using a "matrix query" in NVIVO (table 3). The program was asked to find all interviews with women, categorized by number of children, that contain passages coded for the "compatibility of work and childbearing" or the "importance of work to women respondents."

Table 3. Bologna Interviews, Sources Coded Count.

Number of Children	0	1	2	3
Compatibility of work and childbearing	11	9	7	1
Importance of work to women respondents	22	29	5	2

What we can interpret at first glance is that women with few children (0 or 1) raise the issues of "compatibility of work and childbearing" and (especially) the "importance of work" more frequently than women with more children (2 or 3). This conclusion sounds reasonable, given that women with few children might be more focused on their careers and more preoccupied with reconciling work and childbearing.

One immediately wonders, however, what these numbers actually mean when we take into consideration the denominator, i.e. population at risk, so essential in population studies.

More specifically, if we now take as percentages the numbers shown in Table 3, we gain a slightly different picture.[14]

Table 4. Bologna Interviews, Percent Sources Coded Count.

Number of Children	0	1	2	3
Compatibility of work and childbearing	37.9%	25.7%	41.2%	25.0%
Importance of work to women respondents	75.9%	82.9%	29.4%	50.0%
Total number of women interviewed by number of children	29	35	17	4

Table 4 shows that not only are women by parity distributed very differently, but, for example, women with 2 children are equally concerned, if not more so, about the compatibility of work and childbearing as women with 0 or 1 child.

Things become even more complicated when endeavoring to conduct a matrix search examining the intersection of different codes, rather than the intersection between codes and chosen variables, as shown above. Take, for example, Table 5, which illustrates the results of a Boolean search "AND" to retrieve the number of interviews with paragraphs containing text coded for two issues (using the "near content" feature in NVIVO):

Table 5. Bologna Interviews women age 23-45. Interviews Coded Count. Boolean search 'AND' using "near content" (surrounding paragraph).

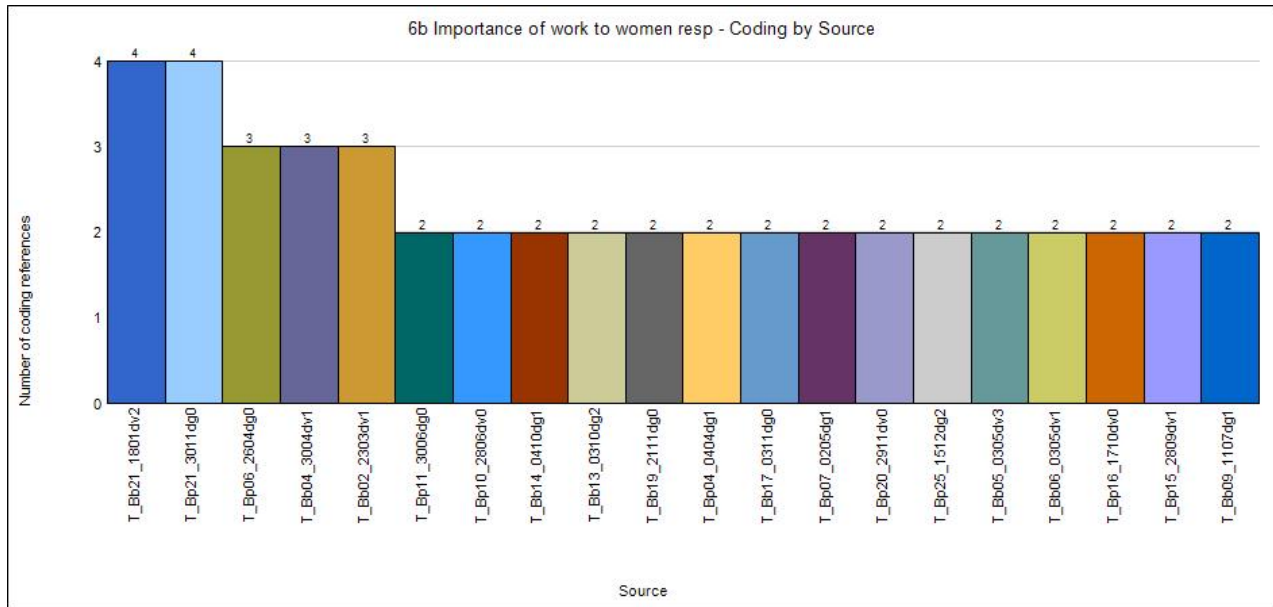|	Importance of work to women respondents
Woman's attitude to role played by husband-partner in childcare	2
Compatibility of work and childbearing	9
Compatibility or not of woman's work and childcare	15
Total	26

From this table, we learn that among women who mentioned (and were hence coded for) the "importance of work," more women also spoke (within the same paragraph) about "reconciling work and childcare" than also about their "attitude towards their husband's role in childcare". This is an interesting result, in that it suggests that women do not necessarily bring their husbands/partners into the picture when talking about the importance of work.

On the other hand, deciding on an appropriate common denominator is problematic. This table, generated with the NVIVO matrix tool, does not tell us, for example, if a woman who spoke in the same paragraph about both the "importance of work" and their "attitude towards the role played by their husband/partner in childcare" (2 interviews) also appears among the group of interviews in which women spoke of the "importance of work" and the "compatibility or not of work and childcare" (15 interviews). This table also gives no information about the total number of interviews conducted in Bologna for this age group, or any data on the total number of interviews with women which were coded for "importance of work to women respondents."

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[14] This cannot be done in one single table, but must be manually combined using a combination of NVIVO and Excel.

In fact, the total number of women age 23-45 interviewed in Bologna equals 50 (data not shown). Of these, we can ask NVIVO how many were coded for "the importance of work to women respondents" and obtain the following graph (Figure 2).

Figure 2. Frequency of code "importance of work to women respondents" in interviews conducted with women age 23-45 in Bologna.

Of the total population of 50 interviews with women age 23-45, the graph shows that 20 interviews were coded for "importance of work to women respondents." Each column represents an interview (with a descriptive string to protect the anonymity of the respondent), while the y-axis shows the number of passages that were coded for this specific aspect. For example, the first interview, "T_Bb21_1801dv2" was coded in four different places for "importance of work to women" (Table 5 tells us only that the interview was coded for "importance of work to women" at least once). Figure 2 also tells us that all 20 interviews were coded at least two times for "importance of work to women".

Going back to table 5, we can now confirm that there is some overlap between the rows, given that the total is 26, greater than the total number of interviews coded for "importance of work to women." In fact, we now know that of the 50 women interviewed, the researchers coded only 20 of these interviews for "the importance of work to women." Within this group of twenty interviews, some of the interviews had passages coded for "importance of work to women" which overlapped within the same paragraph with one of other salient issues (codes) pertinent to childbearing and the reconciliation of work and childcare included in the table. We can then produce a final Table 6, indicating this percentage (using 20 as denominator).

Table 6. Bologna Interviews women age 23-45. Interviews Percent Coded Count. Boolean search AND using near content (surrounding paragraph).

	Importance of work to women respondents
Woman's attitude to role played by husband-partner in childcare	10.0%
Compatibility of work and childbearing	45.0%
Comp or not of woman's work and childcare	75.0%

This table illustrates that in the interviews coded for "importance of work to women respondents" the women talked (in the same paragraph) simultaneously more about the "compatibility or not of their work and childcare"[15] than the "compatibility of work and childbearing" or "their attitude towards husband/partner's role in childcare."

This exploration of textual data gathered for the Italy project also allows us to illustrate the "null-response" issue outlined above. While we might hypothesize a connection between the "compatibility of woman's work and childcare" and "the importance of work to women," what about the other 30 women interviewed who were not coded for "the importance of work to woman respondent"? Does this imply that they have no opinion? Were they not asked this question? Did they decide consciously not to speak to this aspect, because it is not important to them? In other words, what of the null response in which the woman contributes no information on "the importance of work" (hence precluding the intersection of this with other aspects)? Perhaps the table should include a "non-response" category? This, however, begs the question of how to develop a common denominator. Do we consider the total population (i.e., all 50 interviews) or the total number of interviews coded for a certain aspect (i.e., 20 interviews)?

While software such as NVIVO certainly allows the researcher to handle concepts as "things" (and thus manage ideas and explore their relations) as well as to pursue a "searching that drives, rather than ends enquiry" (L. Richards 2002: 271), this exploration of textual data confirms the existence of some of the setbacks and shortfalls outlined above.

Conclusion

Our analysis of qualitative data analysis software appears to present a sobering picture, and perhaps one illuminated with a dim bulb, indeed! Not all need remain dim however. It seems well within the realm of possibility that both the sample frustration problem and the coding/analytical problem can be addressed.

We would argue that there is no intrinsic demographic or technological obstacle to the sample frustration problem. Recall this issue is elsewhere described as one of generalizability or the 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 virtually all community and regional studies including many published in the pages of demography journals. 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 is 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 (one of us has tried to do so in the field), and we see this as a promising way forward.

Even as we discuss or recommend this way forward, we recognize that some investigators may reject the very idea of seeking representative inferences form narrative data,

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[15] Or that researchers coding for the "importance of work to women" more often also coded (within the same paragraph) for the "compatibility of woman's work and childcare"...

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 cannot be offered as a crutch to avoid the issue.

The coding/analytical problem relates to the use 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 by Lyn 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 used? We remain puzzled. Perhaps we need more analytical practice in how to derive relational information (Code A ∩ 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, the current state of technology is no obstacle to progress. There would appear to be considerable benefit to population studies – at least the field could ascertain if this is so – if more could be done with the technology presently available.

With the advent of new software, qualitative and mixed methods may represent a significant opportunity to augment knowledge of demographic phenomena. As yet, however, until some key conceptual issues are addressed, and until we are ready to exploit features of the software in a savvier querying manner, some of that potential will remain unrealized. The bulb will remain dim.

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