Qualitative data analysis software: A call for understanding, detail, intentionality, and thoughtfulness

Áine M. Humble

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Abstract

Qualitative data analysis software (QDAS) programs have gained in popularity but family researchers may have little training in using them and a limited understanding of important issues related to such use. This paper urges increased understanding, detail, intentionality, and thoughtfulness with regard to QDAS. A brief history of QDAS is provided. Family-focused research trends in qualitative research and QDAS use are presented. Factors to be considered when choosing a qualitative software program are described and current debates in the field noted. Suggestions for increasing dialogue about QDAS in the family studies field are included throughout these sections.

Key words: CAQDAS, qualitative data analysis software, qualitative research, QDAS, theory building

Qualitative Data Analysis Software:
A Call for Understanding, Detail, Intentionality, and Thoughtfulness

Researchers appear to be increasingly using or interested in using qualitative data analysis software (QDAS) programs such as Atlas.ti, MAXQDA, and NVivo in their qualitative or mixed methods research yet training and understanding in this area lags behind such interest. An adequate understanding of QDAS issues such as how programs are changing and how their evolving and increasingly complex features influence analyses is important for several reasons. Programs seem to be becoming more similar to each other but they still differ in numerous ways. Thus, it is argued that researchers should be aware of the variety of software programs and their features in order to pick the most appropriate software for a study (Lewins & Silver, 2007, 2009). Researchers also need to be critical about how they use various software tools such as autocoding and queries and the methodological and epistemological implications such features have for interpretation and theorizing.

Qualitative researchers who are resistant to using QDAS programs may benefit from an increased understanding of QDAS software usage debates and how early concerns have been minimized or eradicated with advancements in software development. Thompson (2002) noted how some researchers' assumptions about the positivistic nature of computers prevented them from being open to such use: "So ingrained is this view that even though computer programs represent a genuine advancement over manual methods of data analysis and have been designed to help speed up the process, some researchers continue to resist their use" (p. 2).

Conversation about QDAS in family research is lacking. Although articles have been published in family studies journals regarding how to write about and evaluate qualitative research (Ambert, Adler, Adler, & Detzner, 1995; Matthews, 2005), carry out grounded theory research (LaRossa, 2005), or conduct mixed methods research (Clark, Huddleston-Casas,

Churchill, Green, & Garrett, 2008; Gilgun, 2005; Sells, Smith, & Sprenkle, 1995), none of these articles mentioned QDAS. It could be argued that no such dialogue is found in family studies journals because it is not the right place for such conversations, which are more appropriately found in research textbooks or qualitatively-oriented journals. Only having methodological discussions about QDAS in qualitatively-oriented journals, however, contributes to the marginalization of qualitative research in our field.

Methodologically focused special issues do occur in family studies journals. The *Journal of Marriage and Family* (*JMF*) has had three (November 1988, November 1995, and November 2005), and the *Journal of Family Psychology* (*JFP*) had one in January 2005. In these special issues, many of the articles discussing quantitative analysis described how specific techniques were carried out in quantitative programs such as LISREL, STATA, and SPSS (e.g., Acock, 2005; Atkins, 2005). It may be necessary for quantitative software programs to be mentioned in these articles because statistical procedures cannot be carried out without the assistance of such programs. With qualitative research, of course, software programs are optional.

Nevertheless, QDAS use is present and increasing in the family studies field as I will later describe. Given its potential to change how qualitative analyses are being conducted, which in turn can affect the theorizing that emerges from such analyses, its influence should be openly discussed in methodologically focused journal articles. This influence should be noted because "the methods of design and data analysis comprising our research influence the kind of observations we can accrue, the questions we can explore, and the adequacy of the theories we use to guide our understanding and direct our interventions" (Snyder & Kazak, 2005, p. 3).

Outside of family journals, there is also little discussion regarding QDAS in family studies research, even in research oriented venues. In 2010, I presented the first ever QDAS

lecture and demonstration (Humble, 2010) at the National Council on Family Relations' annual conference. Yet quantitative data analysis techniques in which quantitative software programs have been demonstrated have been presented at this conference for years (e.g., Acock, 1999). In the *Sourcebook of Family Theory and Research*, Acock, van Dulmen, Allen, and Piercy (2005) discussed contemporary and emerging research methods. They noted that QDAS allows for increased efficiency in analysis and may even contribute to increasing acceptance of qualitative research by the broader academic community, but then they did not discuss the software further in their paper.[a] Little mention regarding QDAS was made elsewhere in the Sourcebook. Although the subject index listed "software packages," QDAS programs were not mentioned. Matheson (2005) is one exception to the dearth of conversation on this topic. In her article, for example, she described some drawbacks and benefits of using such programs.

Dialogue regarding QDAS is clearly lacking in the family studies field, thus this article fills in a critical gap. By reflecting on several issues, I aim to encourage greater understanding, detail, intentionality, and thoughtfulness regarding QDAS usage. I first provide an overview of the history of QDAS programs and then examine how individuals in the family studies field are reporting on their use of QDAS. I then provide an overview of factors to consider when choosing a program, and I conclude with a discussion about some current debates regarding QDAS.

Understanding

Understanding the features and history of QDAS is one important component of using it effectively. QDAS, also known as CAQDAS (Computer Assisted Qualitative Data Analysis Software) (di Gregorio & Davidson, 2008), refers to programs intended to qualitatively analyze qualitative data, which may be in a variety of forms (e.g., textual, audio, visual, and graphical). Programs can carry out many functions: (a) data entry/database structure, (b) coding, (c)

numbering/annotation, (d) data linking, (e) search and retrieval, (f) conceptual/theory development, and (g) data display (Miles & Weitzman, 1996). Lewins and Silver (2009) also note the following:

> CAQDAS packages may also enable the incorporation of quantitative (numeric) data and/or tools for taking quantitative approaches to qualitative data. However, they must directly handle at least one type of qualitative data and include some—but not necessarily all—of the following tools for handling and analyzing it: content searching, linking, query, writing and annotation, and mapping or networking tools. (p. 3)

QDAS programs first appeared in the 1980s as researchers started experimenting technologically to some of the problems identified with manually analyzing qualitative data (Mangabeira, 1995), such as the danger of a loose sheet of analysis being misplaced or the tedious and time-consuming nature of physically cutting and categorizing codes. In the late 1980s, several programs were developed independently around the world: "Textbase Alpha in Denmark; HyperQual, QUALPRO, TAP and the Ethnograph in the USA, NUDIST in Australia, and MAX, Aquad and ATLAS/ti in Germany" (Kelle, 1996, p. 230). By 1993, it was estimated that there were 15 QDAS programs available (Mangabeira).

In the mid 1990s, Mangabeira (1995) identified first, second, and third generation software programs. First generation programs included word-processor programs that could be used for textual analysis. Second generation programs involved computerized forms of "cutting and pasting" that allowed researchers to attach codes to text segments and retrieve all text segments assigned to a particular code. Third generation programs had theory building capabilities in which (hypothesis) testing of the data analysis was possible. Third generation programs have the ability to "(a) [search] for co-occurrences or overlapping of categories, (b)

[seek] out counterevidence to such co-occurrence or overlapping, and (c) [identify] chronological sequences of specified codes" (Walker, 1993, p. 94). Although theory building features are increasingly seen as important features to include in good programs (Miles & Weitzman, 1996), these features are not without controversy. For example, some view such hypothesis-testing as positivistic and inappropriate for interpretive research (Mangabeira).

Other categorizations of QDAS programs exist. MacMillan and McLachlan (1999) identify three categories: (a) text retriever, (b) code and retrieve, and (c) theory builder. Lee and Esterhuizen (2000) distinguish between (a) code and retrieve programs, (b) code-based theory building programs, and (c) conceptual network builders. In code and retrieve programs, open coding is assigned to text and then easily retrieved later for analysis. For example, a researcher can easily see all text segments that have been coded with "experiencing conflict" and compare them. These programs are the same as second generation programs, mimicking the manual process of cutting up segments of a page and putting them into file folders. Theory building programs typically include code and retrieve capabilities, but also have advanced features that allow for more complicated investigations of coding (MacMillan & McLachlan), like the features described in Mangabeira's (1995) third generation programs. A researcher can "test relationships between issues, concepts, themes, to e.g. [sic] develop broader or higher order categories, or at the other extreme, to develop more detailed specific codes where certain conditions combine in the data" (Lewins & Silver, 2009, p. 2). The assumption is that such searching capabilities result in a more nuanced and detailed analysis (an assumption that will be revisited in the final section of this paper). Conceptual network building programs provide ways for higher order codes to be diagrammed visually in a type of flow diagram (Lee & Esterhuizen).

Many researchers note that although programs have their distinct differences, some

distinctions—particularly those existing between code and retrieve versus theory building programs—are becoming "blurred" over time as newer editions of software programs are released (Lewins & Silver, 2007, 2009; MacMillan & McLachlan, 1999; Miles & Weitzman, 1996). For example, Atlas.ti 6, MAXQDA 10, and NVivo 9, the latest versions of the three leading software programs (Lewins & Silver, 2007), all have theory building capabilities although each uses a different term: (a) Query Tool in Atlas.ti, (b) Text Retrieval in MAXQDA, and (c) Queries in NVivo. Thus, even though MAXQDA is described as a "high-end code and retriever program" (Fielding & Cisneros-Puebla, 2009, p. 356), it has theory building capabilities. Since the release of version 10 of MAXQDA, all three programs also allow for textual (e.g., Microsoft Word, rich text format, text, or pdf), video, and audio data to be imported into the program. All three programs have the ability to import and export data to support mixed methods studies and to merge data analysis from multiple coders or projects. All three programs provide multiple ways to engage in open coding (e.g., by clicking and dragging, opening a window, or "quick" coding to the most recently assigned code). Descriptive coding (Richards & Morse, 2007) and autocoding are possible in all three programs. The ability to diagram theoretical models is also present in Atlas.ti, MAXQDA, and NVivo, thus each program has elements of conceptual network building, as defined by Lee and Esterhuizen (2000). Of course, the specifics of how these various similar features play out and the terminology used to refer to these features differ in the three programs. Descriptive coding, for example, is referred to as "attributes" in MAXQDA and NVivo but "families" in Atlas.ti, whereas diagramming capabilities are referred to as "mapping" in MAXQDA, "modeling" in NVivo, and "networking" in Atlas.ti. Researchers may have contrasting interpretations regarding the user-friendliness or intuitiveness of these and other program features.

Lewins and Silver (2009) also note that even though all programs share similar key principles with regard to qualitative analysis, such as the ability to be close to data and interact with it, they differ in many ways from each other. The makers of NVivo 9, for instance, have distinguished themselves from other software companies with their NVivo 9 Server, a program that allows multiple users to work simultaneously on the same file. Features, advantages, and disadvantages of various programs can be viewed at the CAQDAS Networking Project, at http://caqdas.soc.surrey.ac.uk/softwareoptions.html, which is updated on a regular basis.

It is clear that advancements in QDAS have been responsive to users' feedback. "Software development in qualitative research is a marriage of methodological ideals and pragmatic recognition of resources, possibilities, and above all, the responses of researchers-users" (Richards, 1999, p. 426). In early programs, text had to be "plain", but later versions changed to rich text formats that maintained formatting of the original document (e.g., italics, bolding). In early programs, texts could not be edited after they were imported into the program. Several researchers (e.g., Coffey, Holbrook, & Atkinson, 1996; Miles & Weitzman, 1996; Richards) developed wish lists of features they wanted to see in future programs. These lists contain features found in many current programs, such as the ability to hyperlink to audio or video files, create visual models, autocode, search memos, and incorporate mixed methods. Coffey et al.'s wish that "the ethnographer may look forward to a time when a reader can choose to hear extracts from interviews or other spoken data, or find video images when an expansion button is clicked on, or have a wide array of graphic images" (paragraph 8.10) is now at hand.

What remains a central feature of QDAS, however, is that although the program facilitates data management and analysis, the actual analysis itself, the program features that are used, and the interpretation of the analysis still reside with the researcher (Lewins & Silver,

2009). The program does not and should not "do" the analysis for the researcher, and any automated aspects of a program such as autocoding should be approached with caution, as I will later revisit.

In sum, QDAS programs have come a long way since their inception. Understanding how they have developed over the years and the types of available programs are important in being able to use such programs responsibly and effectively. On one hand, the program with the most features may not necessarily be the best program to use for a study. It could potentially overwhelm a researcher or research team, and it may not be the best use of their resources. On the other hand, a program with full theory building capabilities and complex diagramming capabilities might be just what a researcher needs. Understanding the researcher's agency is also key and should help prevent any misconceptions about what a program can or can not do. Although QDAS programs can speed up unavoidable mundane and tedious tasks (St. John & Johnson, 2000), good qualitative research can not be rushed.

Detail

We have little detail about how QDAS is being used in the family studies field. It is unclear whether systematic reviews have been conducted on QDAS usage, and those that have commented on this report different findings. A survey by Miles and Huberman (1991, cited in Miles & Weitzman, 1996) suggested that three-quarters of qualitative researchers use computer software. Alternatively, QSR International, which makes and markets NVivo, estimated that only 10% of qualitative researchers use QDAS (Kaczynski, 2004). Given a growing interest in QDAS programs by new faculty members and graduate students (di Gregorio & Davidson, 2008; Kaczynski), it is possible that the percentage of qualitative researchers using such programs has increased since this estimate was provided. That percentage, however, is unknown.

More specifically, little is known about how family researchers use QDAS and how such use may be influencing the way in which qualitative data is analysed. Matheson (2005) reported on a review of family therapy research between 1990 and 2003, only mentioning that few articles discussing QDAS were found. She noted that researchers are "either not publishing the results or being explicit enough in their methods and analysis sections to fully describe the use of this technology" (p. 133). Given the probable increasing use of such programs, this detail is important so that the discipline can understand how these programs are influencing the nature of qualitative analysis. One way of assessing whether or not such programs are being used and how their use is being described is to examine the prevalence of their mention in academic articles. Toward that end, I conducted a systematic review of selected journals, using a procedure similar to reviews of (a) lesbian and gay families (Allen & Demo, 1995), (b) gerontological theorizing (Roberto, Blieszner, & Allen, 2006), and (c) feminist research (Wills & Risman, 2006).

Prevalence of Qualitative Research

Although the focus of this exercise was to examine prevalence and use of QDAS software, carrying out such a search also helped me partially assess the accuracy of Shehan and Greenstein's (2005) suggestion that qualitative research has become more mainstream in family research. In 1995, Ambert et al. noted that less than 2% of the papers published in the *Journal of Marriage and the Family* between 1989 to 1994 were qualitative. This review only included one family studies journal and no other researchers have examined the prevalence of qualitative research since that time.

I reviewed 20 years (1991 – 2010) of journal articles in 5-year increments (1991 – 1995, 1996 – 2000, 2001 – 2005, and 2006 – 2010) from the following selected journals: (a) *Journal of Marriage and Family* (*JMF*), (b) *Family Relations* (*FR*), (c) *Journal of Family Issues* (*JFI*), (d)

Journal of Family Psychology (*JFP*), and (e) *Family Process* (*FP*). The first three journals were chosen for similar reasons given by other researchers (e.g., Allen & Demo, 1995; Wills & Risman, 2006)—they are highly respected journals in family studies and either published (*JMF*, *FR*) or sponsored (*JFI*) by the National Council on Family Relations. *JFP* and *FP* provided an assessment of qualitative research in journals with a clinical focus. These five journals were deemed to represent a good cross section of top family studies journals. Four of them are ranked in the top ten (*JMF*: 1, *FP*: 4, *JFI*: 7, and *JFP*: 8) for their family studies impact factor (ISI Journal Citation Reports) from 1981 to 2009, and *FR* is an applied journal with an ISI family studies ranking of 13/32 for 2009.

The first stage of my analysis involved identifying original research (typically articles including methods and results sections). Every article in each journal was reviewed by examining a hard copy or electronic (pdf) copy. Articles theoretical in nature or methodologically focused were not identified as original research unless original data were included in the paper. The following were also excluded from the final count: book and audiovisual reviews, reviews (including the 1990, 2000, and 2010 decade reviews in *JMF*), editorials, introductions to special issues or sections, responses to previously published work, rejoinders, erratums, and articles focusing on teaching/counseling techniques[b] or experiences.

A total of 4393 articles were identified as presenting original results. The results sections of these articles were then examined for what type of data was presented: (a) qualitative, (b) quantitative, or a (c) combination of qualitative and quantitative findings. I did not assess if the authors themselves labeled their research as qualitative or mixed methods or if their data analysis involved qualitative analysis techniques. Thus, this identification of qualitative research was solely carried out through a focus on findings, which were typically presented as participant

quotes. I recognize that this is a limited approach to identifying qualitative research. It does little to assess the studies' methodological purposiveness and congruence (Richards & Morse, 2007) or their epistemological underpinnings. Nevertheless, this felt like the most appropriate initial step to take toward identifying whether or not QDAS had been used.

Of the 4393 articles, 394 were categorized as presenting qualitative findings and 100 as presenting a combination of qualitative and quantitative findings. Table 1 reports on the numbers and percentages for the four time intervals.

[Insert Table 1 about here]

The overall percentage of qualitative work from this sampling was 11.2%, but the prevalence of qualitative research findings varied among these five journals. *FP* and *FR* had the highest proportion of qualitative articles. Approximately 30% of their 2006 – 2010 articles involved qualitative findings. *JFI* doubled its qualitative content to over 20% by the third time frame. Across all four time periods, *JMF* published a low amount of qualitative research but the percentage almost tripled over that time period. *JFP* published the least amount of qualitative research findings. Only one *JFP* qualitative article was published during 2001 – 2005 and this article was mixed methods. An additional article by Gilgun (not included in this count) in a special *JFP* 1995 issue devoted to methodological issues discussed the role of qualitative research in family psychology. In the following five year interval, five articles in this journal reported qualitative findings. In sum, all five journals showed clear increases in qualitative research findings being published over the examined time frame. Thus, this selective review of the results sections in family studies journals provides some support for Shehan and Greenstein's (2005) assertion that qualitative methods are becoming more common in family studies research. Additional ways of assessing trends in family-focused qualitative research should be conducted.

Reporting of QDAS Usage

The second step of this review involved an assessment of articles reporting qualitative research findings (either alone or with quantitative findings) as to whether or not they reported using QDAS. Only articles published between 2001 – 2010 (n = 340) were reviewed during this stage. Each of these articles was saved as a pdf file and then Acrobat Adobe's "find" function used to search for software-related terms. Because many software programs exist and only one word could be searched for at a time, a decision was made to first search for commonly used program names and to limit the number of search terms used. The following nine search words were used to search for five programs: NVivo, N6, NUDIST, NUD*IST, NUD.IST, MAXqda, winMAX, Atlas, and Ethnograph. An additional word ("software") was used to search for any other programs. The section in which any of these words were found were then reviewed to make sure the mentioned program had been used for the study. Methods sections of articles in which no search terms were located were read to see if any other QDAS programs were mentioned (e.g., Qualrus). The final number of articles reporting that QDAS had been used was 79, which was 23.2% of the articles. Table 2 reports on the numbers found within each journal. Looking at the two time frames, the percentage of articles mentioning QDAS increased from 19.4% (28/144) in 2001 – 2005 to 26.0% (51/196) in 2006 – 2010. Based on this review, it appears that at least one-quarter of the most recently published family studies journal articles report use of qualitative software. Actual usage may be higher as not everyone who uses a QDAS program will necessarily report this or have published their work in journals.

[Insert Table 2 about here]

A variety of programs were mentioned (Table 3), with the three leading programs (as noted by Lewins & Silver, 2007) mentioned the most often. NUD*IST or NVivo (a later version

of NUD*IST) were the most commonly mentioned programs. Different versions of Atlas.ti and MAXQDA were the second and third most commonly mentioned programs. Six papers referred to qualitative software being used but did not identify a specific program.

[Insert Table 3 about here]

Papers varied in terms of how they described the QDAS programs. Ten articles identified the program or mentioned that one was used and gave no further detail. The majority of the articles noted that the program was used for (a) data management and organization, (b) data analysis (coding), or (c) a combination of data management and analysis. Just over one in five articles provided slightly more detail about the program's features or what features were used. For example, two researchers mentioned that they used Atlas.ti's merge function. Smock, Manning, and Porter (2005) noted that it was used to assess interrater coding reliability whereas Yu and Shim (2009) said it allowed multiple coders to work individually and then combine their results. Şenyürekli and Detzner (2008) described how "multilevel codes were created in the [MAXQDA] software and linked with relevant segment(s) of text" (p. 461) and made a reference to counting codes. Pfeffer (2010) wrote "To discern differences in reported experiences across participants, axial coding (Strauss, 1987) was conducted by running multiple data matrix analyses in NVivo" (p. 171). Waller (2008) noted how Atlas.ti was used to create visual displays and that codes had been groups into "families." Four researchers also mentioned using query tools to search for coding patterns (e.g., Waller).

Both Acock et al. (2005) and Ambert et al. (1995) noted the importance of providing detail (i.e., specific techniques) about how qualitative data were analyzed. In contrast, Matthews (2005) acknowledged that it is difficult to adequately describe one's analysis in the methods section. She suggested that "as long as the study has been well designed, the analysis section can

be fairly brief" (p. 804) and that the results section should provide adequate support for a sufficient analysis. No mention was made in any of these articles about whether or not the use of QDAS programs should be acknowledged or described, which may speak to the (low) visibility of QDAS usage in our field. Certainly given the page constraints of journal articles, there are relevant arguments for keeping methods sections brief and succinct. However, such lack of detail prevents readers from understanding whether or not qualitative family researchers are using QDAS programs and how they are using such programs. At minimum, individuals should be reporting on whether or not they used QDAS, and if so, which program they used. Matheson (2005), too, noted the opportunity for researchers to provide more QDAS detail.

Individuals who want to learn more about how QDAS is used in data analysis will need to seek out non-family studies publications. Software books sometimes provide opportunities for increased discussion of QDAS use in specific research projects, such as di Gregorio & Davidson's (2008) *Qualitative Research Design for Software Users*. This book includes eight examples of research that used QDAS. Four software programs (Atlas.ti, MAXqda, NVivo, and Xsight) are represented in the chapters, and screenshots show examples of coding, memos, and other features from the software programs. Qualitative research books are helpful, such as Richards' second edition (2009) of *Handling Qualitative Data: A Practical Guide*, which assumes its readers will be using QDAS to analyze their data, and, in fact, boldly states that "those who do not [use computer software] are clearly restricted" (p. xi). Richards' book refers to ten research projects throughout the chapters. These projects are available online (www.uk.sagepub.com/richards/) and provide much more detail about their methods, including their use of QDAS. Such publications could be reviewed in the book review sections of *JMF*, *FR*, and this journal, thus guiding family scholars to additional resources.

Qualitatively-oriented journals typically provide more space to describing methods, such as the *International Journal of Qualitative Methods, Qualitative Inquiry, International Journal of Social Research Methodology, Field Methods*, and *Qualitative Health Research.* Family researchers may want to consider not only accessing these journals for assistance with learning how to use QDAS, but also publishing in them. Researchers can take advantage of opportunities such as these to write at length about their experiences of using the software (Matheson, 2005). For example, I published one paper in the *Journal of Divorce and Remarriage* about remarried couples' wedding planning (Humble, 2009b) and a second one in the *International Journal of Qualitative Methods* focusing on how I used MAXQDA software for my analysis (Humble, 2009a). The second paper elaborated on how I used the program's interface (text browser, code system, coded segment windows) for open coding and constant comparison, the attributes option for descriptive coding, and two visual tools (Code Matrix Browser and TextPortraits) that presented different ways of looking at coding patterns. Importantly, the *International Journal of Qualitative Methods'* electronic publishing policy made possible the reproduction of full color screenshots that were necessary for describing how I had used the software. Family focused journals will need to find ways to incorporate findings made possible by new QDAS technologies.

These findings are an initial start in learning about whether or not family researchers are using QDAS and how they are using it. Qualitative research is clearly on the rise in the family studies field, although I recognize that my assessment of qualitative research only included one factor rather than the assessment of articles from multiple angles. It appears that in recent years, about one in four articles reporting qualitative findings mentions using some type of software. This review, however, only covered five journals and it focused mainly on the prevalence of

QDAS use. We now need more detail in terms of how software is being used in our field and how it may be influencing our analyses. For example, given that some researchers have argued that not all methodologies are suited to the use of QDAS (Gibbs, Friese, & Mangabeira, 2002), future inquiries could examine what kind of methodologies are being used in the studies in which QDAS is employed for analysis and data management. Conference presentations and articles in special journal issues on methodological issues are venues in which more detail can be provided.

Intentionality

A number of researchers (e.g., Lewins & Silver, 2007, 2009; Richards, 2009) argue that programs should be chosen intentionally. Potential QDAS users "should consider carefully their own level of familiarity with computers, the nature of the data to be analysed, the kinds of analysis to be performed, their own personal analytic style, and the resource implications involved" (Lee & Esterhuizen, 2000, p. 239). The CAQDAS networking project suggests that four factors be taken into account: (a) methodology, (b) research design, (c) project type, and (d) analytic approach (http://caqdas.soc.surrey.ac.uk/Support/planningforsoftware.html).

Ideally individuals should have researched, chosen, and learned how to use their software program prior to commencing a study with these points in mind. Yet qualitative software programs are often chosen without fully exploring their features or comparing their features with other programs. It may be that scholars do not know what questions to ask (Lewins & Silver, 2009) or do not know about the full range of available software options. New software updates are released frequently, so it may be difficult to keep up with the changes. Realistically speaking, researchers are often limited in terms of time, expertise, and financial considerations regarding a permanent purchase of a program. The Internet partially or temporarily removes the third criteria by allowing for trial programs to be downloaded from companies' websites and used for a

limited time (typically 30 days), but time and expertise issues still remain. Often researchers simply use the program (a) that is most well-known or used in their geographical region, university, professional field, or academic discipline; (b) that is available and/or supported at their institution; (c) that is most successfully marketed by its originators, or (d) for which training has been offered at an attended conference. These and other factors make it challenging to respond intentionally to ever-changing technological advancements.

Many software features should be explored before choosing which program to use. Even though various programs have similar features such as the ability to code or query data, the way in which those properties are carried out differ from program to program. For example, programs differ in how codes are assigned and retrieved, coded segments (coding stripes) are displayed, and data can be searched for co-occurrences of codes. Programs may contrast in what kind of files can be imported into a program and graphic files may not be supported by all programs. Individuals carrying out mixed methods research can explore various programs for how they support mixed methods research. Exploration of multiple programs will also help a researcher determine for themselves which program they find most user-friendliness and intuitive.

Software programs have different ways of managing data and output (e.g., memos and reports). Certain programs may allow a research study to be situated within one project file (an "internal database") whereas other programs link to files located outside of the QDAS file (called an "external database"). These variations may have implications for studies in which information needs to be shared or moved. External databases may become more common with the digitizing of audio and video files. These files can take up considerable space so they need to be located outside of a project file to keep its size manageable. Atlas.ti uses an external database. In contrast, NVivo and MAXQDA have default options for the size of audio and video files that can

be embedded within a program. Once a file reaches a certain size, any additional audio or video files must then be located outside of the program. Thus, depending on the size of a project and its associated files, these two programs' project files may be in the form of an internal database, external database, or combination of both. The default options differ according to each program, and some default options can be modified.

Questions about how multi-person teams can work with the data are important, yet few individuals have written about the logistics of using QDAS for team-based research (Sin, 2008). Some argue that QDAS use can be time saving in team projects (Hwang, 2008), yet others note new difficulties that can arise such as multiple interpretations of codes (Sin). In addition to considering the issue about internal or external databases, ease of merging features (i.e., merging multiple coders' coding into one file) may be an important consideration. The NVivo 9 Server is an important advancement in QDAS, allowing for multiple coders to work on the same file simultaneously, thus eliminating the need for merging features. This server is an additional cost beyond the purchase of individual licenses, however.

Various lists of questions to ask before choosing a software program have been developed (e.g., Lewins & Silver, 2009; St. John & Johnson, 2000). Questions also need to be answered before deciding whether or not to even use a software program (Matheson, 2005). Examples of these and other questions are:

- What is the purpose of your study and how will your results be used?
- How much data will you be working with?
- Do you know the capabilities of the available programs?
- What are the advantages and disadvantages of each program?
- How do you plan to use the software?

- Are you working individually or as part of a team?
- Is the project mixed methods? Do you want to import quantitative data into the program or export data to outside programs such as SPSS?
- Will the program handle the kind of data that are being collected?
- Do you want to use the program for transcription? Do you want to be able to create time stamps in the transcription that link back to specific locations in the audio or video file?
- What experience do you have with QDAS programs? How much time will you have to learn new software?
- What kind of visual tools and outputs (reports) will be helpful to you?
- What kind of resources are available in terms of software support?
- What processes will you use to ensure methodological integrity as you use the software?

Individuals often want to know what is the "best" program available but this is impossible to answer because the decision is often a subjective one and based on many factors (Lewins & Silver, 2007, 2009). Yet, exploring all programs and their features is likely not a realistic option for the majority of researchers. Intentionality in choosing a software program will need to be balanced out with practical considerations. Knowing what questions to ask, where to find up-to-date reviews of programs (such as at the CAQDAS Networking Project previously mentioned), and how to access demo program versions can save time and resources and are steps in the right direction. More open dialogue about how to make appropriate software decisions and the challenges of keeping up with technological changes can also occur.

Thoughtfulness

Hopefully researchers are able to take into account as many factors as possible when choosing a program. Regardless of the way in which a software program is decided on, however,

researchers still need to be critical once actually using it. There are clear benefits to using these programs, which various researchers have indicated (e.g., Matheson, 2005; St. John & Johnson, 2000). One commonly identified benefit is increased efficiency (Acock et al., 2005), as the program easily and quickly carries out "tedious manual tasks, such as multiple copying, cutting and pasting, filing, and refiling" (St. John & Johnson, p. 394). Yet, researchers need to think carefully about how technology can change how data are analysed and be mindful about any unintended outcomes (Taylor, Lewins, & Gibbs, 2005; St. John & Johnson). There has been little to no dialogue in our field about this (see Matheson for an exception).

For example, increased thoroughness in analysis may be a benefit but some researchers argue that the ability for such thoroughness may actually increase the amount of time spent on analysis (Sandelowski, 1995; St. John & Johnson, 2000). Indeed, such "thoroughness" may, in fact, be excessive attention to the "bells and whistles" of QDAS programs. "Playing around" with programs can extend the time spent on analysis while detracting from the actual work of interpretation. The notion of "thoroughness" can be challenged as well. It suggests that analyses carried out with QDAS may have more validity than those carried out manually. It also contradicts epistemological assumptions regarding the interpretive nature of qualitative research by suggesting that there is one "best" way to analyze data.

When software programs were first introduced into qualitative research, debates quickly and understandably emerged around their use. Early concerns centered around issues such as whether or not software would increase sample sizes, affect the quality of the research, and support teamwork (Taylor et al., 2005). Many early concerns have, in part, been removed through software improvements. For example, to address concerns about the ability to be close to raw data, programs were revised so that retrieved coded segments could be connected back to

their context (e.g., location in the transcript). Debates still remain about the benefits and drawbacks of using QDAS but this is healthy and important for the field and therefore should be ongoing. Such debates, however, often occur only among those specifically interested in QDAS issues rather than within the broader academic community.

To encourage conversation and debate regarding QDAS in the family studies field, I briefly note four selected issues in the remainder of this section. These issues relate to the following: (a) use of program features and programs—to use or not to use, (b) closeness with data, (c) a focus on coding, and (d) theorizing.

First, just because a program has various features, such as the ability to produce counts or autocode (e.g., searching for a word or phrase and then automatically coding it), does not mean a researcher has to or should use them. Underuse of QDAS features is a concern, yet uncritical use is also an important matter (Fielding & Lee, 2002). If using autocoding, researchers must think carefully about why they are using this feature (Peters & Wester, 2006) and how they are using this feature. For example, both MAXQDA's "lexical search" function and Atlas.ti's "GREP search" look for words or phrases and then allow the researcher to choose between coding just the search string, the sentence in which the search string is found, or a selected number of paragraphs surrounding the search string. These second and third options allow for more context to be included in the automatic search. Roberts and Wilson (2002) argue that "automated searching facilities. . . should only be used to support, rather than replace manual handling, reading and re-reading and gaining familiarity with the data which is the essence of qualitative data analysis" (paragraph 39). Similarly, just because QDAS programs exist does not mean all researchers have to use them or use them for every study. Even though one quarter of the articles reviewed for this paper reported QDAS use and I would expect to see this percentage increase in

the future, I would not expect to see that percentage reach 100%. Some forms of qualitative inquiry such as narrative inquiry and discourse analysis may not be suited to QDAS (Gibbs et al., 2002). Practical issues such as the purpose of a study and the amount of data to be analysed may also be factors in deciding whether or not to use a software program (Matheson, 2005).

Second, concern was raised early on regarding how QDAS program might result in "distance" from the data being analyzed, a concern that the "raw data" would not be revisited once the technology was used (Roberts & Wilson, 2002). This is one of those issues that has been responded to through technological advancements such as the one previously noted in which retrieved coded segments can now be easily traced back to their context. With the greater levels of flexibility found increasingly in software programs, there should be no reason to feel distant (Gibbs, 2004). However, using software should not mean that other ways of examining data are no longer used. Transcripts, for example, should still be read prior to coding and analysis can and should be moved away from the computer screen when necessary. It is also important to acknowledge, however, that carrying out an analysis manually does not necessarily ensure closeness to data (Lee & Esterhuizen, 2000). Use of QDAS can both promote and deter closeness to data (Gilbert, 2002; Richards, 1998). The increased ease of coding in QDAS can result in overcoding (or *coding fetishism* as it is referred to in the field), which can mean too much closeness to the data (Gilbert). QDAS programs can also help provide the type of distance that is needed in qualitative research to abstract and synthesis (Richards). Striking a balance between distance and closeness is probably desirable.

Third, an overemphasis on coding as the way to analyze data has been raised as a concern (e.g., Miles & Weitzman, 1996; Richards, 1999, Thompson, 2002). Coding may not be appropriate for all types of analyses, such as chronologically organized data (Fielding & Lee,

2002) and narrative analysis. Hyperlinking has been raised as an alternative but complicated way to analyze data in a QDAS program (Coffey et al., 1996; Fielding & Lee, 2002; Lee & Esterhuizen, 2000). I have yet to see an example of a study in which this was the sole form of analysis, but some have argued that it may be particularly helpful for ethnographic research.

The fourth and final issue I would like to briefly discuss regards how theory building takes place within QDAS programs. As stated earlier, some programs are seen as having theory building capabilities whereas others are not, Most programs, however, are increasingly incorporating some theory building features (Richards, 2002) and very few programs now involve only code and retrieve capabilities (Lewins & Silver, 2007). Theory building features of a program are those that allow researchers to make queries regarding relationships between codes (hypothesis testing). For example, a researcher can inquire whether code "A" overlaps or follows code "B". Figures 1 show a screenshot from MAXQDA 10 of such an inquiry, which shows that 8 segments were found in which "deciding to become a caregiver" and "experiencing conflict" overlapped each other. Figure 2 shows an example of one of the eight segments in which the two codes overlapped.

[Insert Figures 1 and 2 about here]

The assumptions underlying querying tools need to be debated. The querying process in QDAS programs seems to suggest that two concepts are related only if they appear close to each other, overlap each other, or one is nested within another in a document. Kelle (1996, 1997) raised a concern about how individuals might come to believe that theories based in this manner were better than theories developed manually. Questions need to be raised about what these queries are testing. In one respect, they may be a test of how carefully an interviewer asked questions or how linearly or "clearly" an interviewee described their experiences and linked

various aspects of those experiences together. Yet, those who have interviewed people will probably agree that research participants' experiences are often complicated and teasing out the links in their stories can take time and effort. It may be that queries are a test of the actual coding itself. For example, if a researcher codes small segments (e.g., line by line) as compared to larger segments (e.g., multiple paragraphs), she or he is less likely to find (physically, in the program) related codes. This does not need to mean, however, that the concepts are unrelated and cannot be considered part of a developing theory. Kelle (1996) notes:

> A strategy whereby the code itself and not the text is regarded as evidence for an [sic] hypothesis (that means if the researcher does not return to the original text) can only be applied meaningfully and consistently if codes can be seen as true representations of certain facts described by the raw data (that means that each appearance of a certain code informs the researcher whether a specific event has occurred or not). In order to do this the codes must be precisely defined, and there must be a high degree of certainty that the codes have been applied in a systematic and consistent way, in other words, the coding must have a high degree of validity and reliability. Furthermore, the coding of the raw data must be inclusive and exhaustive. This means that one must be certain that every single instance of the investigated phenomenon that occurs in the raw data has been coded. (p. 237)

Moreover, coding larger chunks of data to ensure relationships between codes are found may result in loss of detailed analysis. Although line-by-line coding may not be appropriate in every situation, Charmaz (2006) notes several benefits of it. In particular, it forces a person to look more closely at data thus resulting in the generation of more ideas.

Certainly rigorous and thoughtful theoretical explanations of family life have been

developed in the past without using such software features. We need to be critical about the use of such QDAS attributes, as they risk "overly mechanizing the [analysis] process and marginalizing the reflection of the researcher" (Morison & Moir, 1998, as cited in Roberts & Wilson, 2002, paragraph 39). One central concern is that the researcher "may not return to the original data with an open and questioning mind, or return as frequently as they may have done, were they not using CAQDAS" (Roberts & Wilson, paragraph 45). It may be that that many users ignore these programs features and thus this may not need to be a point of concern. Indeed, many users appear to only use basic features of theory building programs (Kelle, 1997; Lewins & Silver, 2007). Nevertheless, with increasing focus on theory building features in QDAS, thoughtful dialogue needs to occur. I see this as part of a larger debate regarding the amount of detail that needs to be provided about qualitative analyses. Some say detail is not needed if the analysis is good (Matthews, 2005), but others call for more detail (e.g., Acock et al, 2005; Ambert et al., 1995), noting that the data analysis process should not be romanticized (Acock et al.). If QDAS features—particularly the theory building aspects of the program—are being used to build family theory, these should be talked about and mentioned in research reports.

Debates have always existed regarding QDAS. Some controversies continue whereas new ones have arisen in response to technological developments and ongoing scrutiny of how QDAS impacts qualitative research. It is important to make these debates known within the family studies academic community as opposed to a select group of people specifically interested in QDAS. Such open dialogue will affect two groups of researchers. First, researchers who are keen on using software to analyze their qualitative data will benefit from being encouraged to think more carefully and to be more reflective about what program features they use and how they use them. Second, although not everyone or every study may need to use QDAS, those who

have been resistant or hesitant to use the software can benefit from an increased awareness in two ways. They can discover how previous concerns have been minimized or eradicated as new software versions have been released in response to researchers-users' feedback. These researchers can also learn about how thoughtfulness and reflexivity should always be a part of using the programs.

Conclusion

Although likely not used by all family studies researchers, it is evident that qualitative software programs are certainly being used in our field. Examining the past 10 years of research in five family-focused journals shows that approximately 25% of studies in which qualitative data are reported mention its use. Given that graduate students and new faculty members appear to be driving the demand for and interest in using QDAS (di Gregorio & Davidson, 2008; Kaczynski, 2004), it is likely that this percentage will increase. Some qualitative researchers have gone as far as to suggest that technological advances have made it (rightly or wrongly) indefensible not to use them (Richards, 2009; Sandelowski, 1995) or unthinkable not to use them (Peters & Wester, 2006). St. John and Johnson (2000) suggested that the question is not whether or not a program should be used but what program should be used.

Qualitative data analysis software programs are here to stay, and as such, we need to consider various factors associated with its presence and to increase dialogue about its use in our field. The following points summarize recommendations noted throughout this paper. At minimum, journals should require that qualitative family studies researchers report whether or not they used a QDAS program, and if so, which one. If space is available, the researchers should provide more detail on what specific QDAS features they used and how they used them. In addition, family researchers can publish detailed reports of their analyses and their use of

QDAS programs in journals such as *The International Journal of Qualitative Research Methods* and other publications. Conferences are excellent venues for detailed dialogue and debate. Special methodological issues in family studies journals should ensure that QDAS is a part of the dialogue in qualitative focused articles. Book review sections should aim to include reviews of QDAS books. Finally, family studies journals can review their publishing policies and instructions to authors for how they are able to incorporate and accommodate QDAS features such as diagrams and the use of color. Officially allowing for longer manuscript lengths (e.g., a maximum of 33 pages instead of 30), for example, could be one way of accommodating the inclusion of flow diagrams as part of an analysis. Having hyperlinks to on-line details or colored diagrams could be another approach, as already provided by this journal.

In this paper, I have argued for more understanding, detail, intentionality, and thoughtfulness with regard to QDAS, and I hope my comments stimulate continued dialogue on this topic. Hostility, naïve enthusiasm, or utopian belief toward such programs (Duchastel & Armony, 1996) do not serve the field well. Technology offers many benefits to researchers, but it is vital that we think carefully regarding when and how it is used. There are many ways that such dialogue can be incorporated into the family studies discipline.

Notes

[a]A supplemental chart comparing eight QDAS programs can be found at http://secure.ncfr.com/pdf/sourcebook/matheson.pdf

[b]Many *FP* articles focusing on clinical practice included “case studies” as a way to demonstrate a particular theoretical point. Although case studies are a type of qualitative analysis, I did not interpret these articles as presenting qualitative research findings.

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Table 1

Qualitative Research Findings in Selected Family Studies Journals, 1991 – 2010

	5-Year Interval							
	1991 – 1995		1996 – 2000		2001 – 2005		2006 – 2010	
Journal Name	*n*	%	*n*	%	*n*	%	*n*	%
Family Process	5/58	8.6	12/77	15.6	25/99	25.3	32/103	31.1
Family Relations	31/197	15.7	42/195	21.5	49/166	29.5	60/212	28.3
Journal of Family Issues	12/119	10.1	24/166	14.5	43/203	21.2	64/327	19.6
Journal of Family Psychology	0/115	0.0	0/188	0.0	1/224	0.0	5/422	1.2
Journal of Marriage and Family	12/388	3.1	16/351	4.6	26/382	6.8	35/401	8.7

Note. Percentages are based on empirical studies that reported qualitative results (n = 394) or a combination of qualitative and quantitative results (n = 100).

Table 2

Family Studies Articles Reporting Use of QDAS Programs, 2001 – 2010

	5-Year Interval	
	2001 – 2005	2006 – 2010
Journal Name	*n*	*n*
Family Process	6/25	8/32
Family Relations	12/49	19/60
Journal of Family Issues	2/43	12/64
Journal of Family Psychology	0/1	2/5
Journal of Marriage and Family	8/26	10/35

Table 3

QDAS Programs Used in Family Studies Articles, 2001 – 2010

Program	*n*
NUD*IST, N6, or NVivo	33
Atlas.ti	20
winMAX or MAXqda	9
Ethnograph	4
FolioViews	2
Software program[a]	6
Other[b]	6

Note: The total number adds up to 80 because one article reported using two programs. [a]Name not mentioned. [b]Each of the following programs was mentioned once: (a) HyperResearch, (b) QDA Miner, (c) Qual Pro, (d) Qualrus, (e) Text Base Alpha, and (f) Minnesota Contextual Content Analysis.

Figure 1

Example of Text Retrieval (Query)

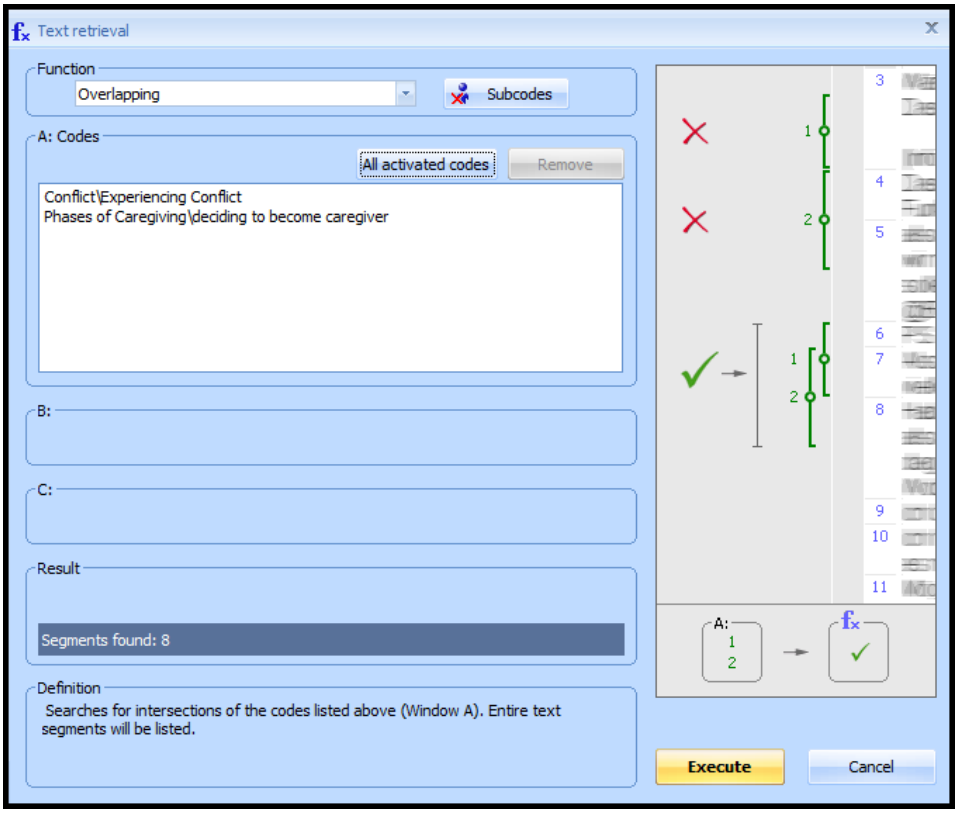

Figure 2

Example of Coded Segment with two Overlapping Codes