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Routinizing Frame Analysis through the Use of CAQDAS

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Even though frame analysis has become a popular analytical framework in media studies and social movement research, the methodological underpinnings of the empirical identification of frames lack systematization and have consequently remained underdeveloped. This paper consolidates recent advances in the empirical measurement of frames and explores, in how far *computer-assisted qualitative data analysis software* (CAQDAS) can extend on these methodologies. Because framing has become a fairly widely used but ill-defined concept, the paper will start with a brief delineation of framing theory as it is understood for present purposes. Next, current attempts to measure frames empirically in a systematic fashion will be discussed and a methodology, which synthesizes some of these approaches will be proposed. This methodology attempts in a first step to draw on existing knowledge on metanarratives to avoid a purely inductive identification of frames. Additionally, automatic word mapping tools such as *Leximancer*, *Sphinx Survey Lexica* are suggested as interpretative aids. In a second step, the analyst identifies a set of keywords, key phrases, and possibly audial or visual symbols that indicate frames in his data. These indicators are then used in a third step to semi-automatically identify frames in the remainder of the data. Keywords that might acquire different meanings in different contexts are inspected in their contexts by the analyst, who decide on their coding. This method avoids both the rigidities that come with fully automatic keyword clustering, which may lead to the inclusion non-interpretable keywords as well as the exclusion of so-called stop words such as prepositions and articles, which under certain circumstances might indeed be the strongest indicators for certain frames. At the same time it allows for a degree of routinization and systematization in frame analysis, whose quality has notoriously depended on the creativity of the framing researchers.

Five CAQDAS – ATLAS.ti, Kwalitan, MAXqda, NVivo, and Qualrus – are examined with respect to their usability in this type of framing research.

Routinizing Frame Analysis through the Use of CAQDAS

Even though frame analysis has become a popular analytical framework in media studies and social movement research, the methodological underpinnings of the empirical identification of frames lack systematization and have consequently remained underdeveloped. This paper consolidates recent advances in the empirical measurement of frames and explores, in how far *computer-assisted qualitative data analysis software* (CAQDAS) can enhance these methodologies. Because framing has become a fairly widely used but ill-defined concept, the paper will start with a delineation of framing theory as it is understood for present purposes. Next, a methodology to empirically measure frames will be developed. The proposed methodology attempts in a first step to draw on existing knowledge on metanarratives to avoid a purely inductive identification of frames. In a second step, the analyst identifies through a hermeneutic analysis of data a set of keywords and key phrases that indicate frames in his data. These indicators are then used in a third step to semi-automatically identify frames in the data. Five CAQDAS – ATLAS.ti, Kwalitan, MAXqda, NVivo, and Qualrus – are examined with respect to their usability in this type of framing research. Finally, a short overview, on how to validate frame models with cluster analysis, factor analysis, and latent class/structure analysis will be made.

Framing Theory

Frame analysis is *en vogue* (Meyer 1999: 85; Reese 2001: 7; Benford and Snow 2000: 611f), although it was initially predicted to become a niche method at best. One *Contemporary Sociology* reviewer complained that *Frame Analysis* is cumbersome to read (Davis 1975: 603), the other one wondered, if an adequate systematization of frame analysis would be feasible (Gamson 1975: 605).

Probably the single most important factor for the success of Goffman's frame analysis is therefore its unorthodox application. Frame analysis is no longer *Goffman's* frame analysis, but is frequently only loosely connected to the original formulation. Notwithstanding the recurrent symbolic nods to Goffman, today's "frame analysis" spans a number of disparate approaches (D'Angelo 2002; Fisher 1997; Maher 2001: 81f; Scheufele 1999: 103, 118), some of which are even incompatible with each other (Scheufele 1999: 118), While not excluding the possibility of fruitful interaction between the heterogeneous frame analys*es* (D'Angelo 2002: 883), conceptual parsimony necessitates the clarification of the framing concept for present purposes.

This is not the place to overview the wide range of approaches that have been subsumed under the heading of frame analysis, a task that others (Benford and Snow 2000; D'Angelo 2002; Scheufele 1999) have already accomplished. Instead, I would like to merge at this juncture certain brands of framing approaches to a more specific theoretical framework. In his initial and widely quoted definition, Goffman characterized frames as follows:

> "I assume that definitions of a situation are built up in accordance with principals of organization which govern events […] and our subjective involvement in them; frame is the word I use to refer to such of these basic elements as I am able to identify" (Goffman 1974: 10f)

In other words, frames are basic cognitive structures which guide the perception and representation of reality. On the whole, frames are not consciously manufactured but are unconsciously adopted in the course of communicative processes. On a very banal level, frames structure, which parts of reality become noticed.

Todd Gitlin has summarized these frame elements most eloquently in his widely quoted (e.g., Miller 1997: 367; Miller and Riechert 2001b: 115) elaboration of the frame concept:

> "Frames are principles of selection, emphasis and presentation composed of little tacit theories about what exists, what happens, and what matters." (Gitlin 1980: 6)

While it is hard to improve theoretically on this definition, the trouble starts, when it comes to the identification and measurement of frames. Precisely because frames consist of tacit rather than overt conjectures, notorious difficulties to empirically identify frames arise (Maher 2001: 84).

The difficulty of measuring latent frames could partially explain the gradual theoretical shift towards a conceptualization of frames as being more actively adopted and manufactured. Particularly in media studies, it has become commonplace to treat the choice of frames as a more or less deliberate process. Entman's famous definition of frames led the way. For Entman,

> "[t]o frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation." (Entman 1993: 52)

Notice the shift towards active *selection* of frames, a conception that has become dominant in media studies. While indeed not agreeing with Entman on much else, D'Angelo (2002: 873) likewise treats frames as consciously pitched powerful discursive cues. Tankard (2001: 97) moves even beyond the mere conscious *selection* of frames, suggesting that journalists at times circulate frames to *deceive* their audiences. Reese (2001: 7) goes furthest in the direction of conscious framing suggesting that framing always implies an active process.

Consequently, he demands that the analysts "should ask how much 'framing' is going on" (*ibid.*, 13). In a Goffmanian framework, such a question would have been non-sensical, since framing is an innate property of all social processes, not only those most consciously manufactured. This paper sticks more to the original approach and thus treats frames as "conceptual scaffolding" (Snow and Benford 1988: 213).

Frame Typology

Since framing became a popular approach in the late 1980s, an extensive and disparate laundry list of frames has emerged in the literature (Benford 1997: 414). This disparity of frames leaves one wonder, whether anything can be framed as a frame. Unfortunately, many studies leave the reader in the dark about the actual process of empirical frame detection. Even otherwise exceptionally well argued studies laconically describe the frame identification process in a footnote with "[f]rames were analyzed from the actual language of the reported claim (direct and reported speech)" (Statham and Mynott 2002: 10, Fn. 6). In some cases, at least the measurement model for frames is clarified. In these cases the reader is presented with a list of more or less parsimoniously identifiable frame terms, "attributes" or "devices," which were used as manifest indicators for the identification of frames (e.g., Ferree et al. 2002; Koella 2003; Semetko and Valkenburg 2000; Semetko and Valkenburg 2000; Ullrich 1998). By making their entire coding scheme online available, Ferree *et al.* (2002) are in this respect the trailblazers for a new kind of transparency that has been made possible by the new digital technologies.[1] While increased transparency and accountability certainly render framing research more credible, they still do not solve the problem of the missing systemization of frame construction. We thus remain heavily so dependent on the creativity of individual scholars (Maher 2001: 84), that it has been alleged that frames are merely constructed through "researcher fiat" (Tankard et al. 1991: 5; Tankard 2001: 98).

To counter these objections, the frame identification process should be made more visible and systematic. A first step towards the latter direction is the construction of a frame taxonomy, distinguishing *structural* schemes ("generic frames") from frames that focus more on *content* (Benford 1997: 413; de Vreese 2002).

Within the list of *content* frames, we can further distinguish between so-called "master frames" or "metanarratives" that

(1) are so pervasive that they can be used in almost any situation, and
(2) posses a superior credibility, in that it has moved beyond empirical scrutiny.

[1] http://www.ssc.wisc.edu/abortionstudy/, accessed: October 6, 2003.

Three master frames surface repeatedly in the literature, i.e. the *ethno-nationalist* frame (Billig 1995; Brubaker and Laitin 1998: 428; Eder 1995: 4; Eder and Schmidtke 1998; Greenfeld 1999: 39; Statham and Mynott 2002: 13), the *liberal-individualist citizenship* frame (Berger 1971: 97f; Eder 1995: 4 McAdam 1996: 347; Somers 1995; Statham and Mynott 2002: 13) and the *harmony with nature* frame (Eder 1996: 191; Gamson 1992: 136).

With these clarifications and distinctions in hand, I will now propose a fairly systematic approach to identify *content* frames in *textual* data. Since the methodology rests on the selection of keywords and key phrases, it is less suited to identify structural frames such as the conflict frame, as these frames usually become manifest in the structure, and less in the wording of a speech.

Identifying Frames in Textual Data

Framing in the sense outlined above is a theoretically demanding concept, but – or, rather, as a result – it has proven elusive to measure (Maher 2001: 84). Even though on a conceptual level, frames, more often than not, are latent, read: not spelled out in their entirety, it seems reasonable to assume that *parts of* frames become manifest in speech. If, say, a speaker has adopted or keyed an ethno-nationalist frame, i.e., the conception that quasi-primordial culturally fairly homogenous groups of people can be delineated (and probably should be granted some degree of self rule), we would expect this speaker to refer some components of that frame in speech. She or he might, for instance speak about peoples, might allude to some historical continuities, might refer to specific (ethnic) nations, such as "the Dutch," etc. These speech figures in turn can be identified by keywords (Entman 1993: 53; Triandafyllidou and Fotiou 1998: 3.7; Miller and Riechert 2001a: 61ff), which can help to empirically identify frames in large corpora of data.

The first task in the empirical investigation of frames thus becomes the detection of these keywords. As keywords are manifest, this is a much simpler task than the identification of frames themselves. It has even been suggested to generate these keywords automatically, simply by mapping the most frequently words or strings within the data (Koella 2003: 7; Miller and Riechert 2001a: 70; Miller and Riechert 1994).

While avoiding researcher bias, this methods unfortunately creates three new problems. To begin with, it starts out with exactly a researcher *fiat*, that is in deciding *by convention* on the optimal number of eigenvectors (Miller and Riechert 2001b: 116). This decision might *sound* more "objective," as a number can be pegged onto, but that number is just as arbitrary as the decision on frames. Moreover, the procedure is deeply positivist, assuming that concepts should arise unmediated from the data. But even within a positivist logic, most statistical tests are based on *a priori* probabilities. By basing the decision in the choice of keywords on *ex post* covariances, these tests become meaningless. While this problem could be circumvented through a split sample, an even more severe problem is that empirically identified keywords clearly cannot be interpreted as indicator of meaningful frames. Miller & Riechert (1994), for instance, found besides "environmental," "any," and "major" to be identifiers of the "environmental protection" frame. It seems obvious that these are no meaningful framing terms. Indeed, Koella (2002: 8), who most closely follows Miller and Riechert, deviates in this point, wryly noting that "each set of frame terms was reviewed in context." This proceeding, of course, reintroduces research fiat through the back door.

Frequency counts might thus hint at possible keywords, but in the end an interpretative identification of relevant keywords seems to be the more appropriate and more common route (Andsager, Austin, and Pinkleton 2001: 129; Tankard 2001: 103; Tedesco 2001: 2053, more technically centered: Miller 1997: 369). Reading or listening over a reasonable amount of data, framing researcher should hermeneutically uncover frames and their corresponding keywords. The three master frames mentioned above could help the interpretation of data in this respect, as these frames are likely to surface in any communicative processes in modernity.

Once keywords have been obtained, they can then be used in conjunction with common CAQDAS and word maps such as *WordNet*[2]or *Wortschatz*[3] to code large amounts of data in a fairly short time. Initially, all keywords should become *lemmatized*, that is all their inflections forms are to be found. Next, their *listemes*, that is those linguistic representations[4] which correspond to the *mental lexemes* held by persons involved in the communicative practices that are researched, should be identified. Listemes are the actual conceptual categories in the minds of individuals, regardless of their linguistic representation. Typically, true synonyms represent different linguistic representations of the same listeme, so for any keyword synonyms should be retrieved from the relevant thesauri. Linguistic research has shown that the mind orders listemes in a network structure (Gallmann 1991: 274). It might thus be advisable to also group keywords with their listeme neighbors. I would term the set of a

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[2] http://www.cogsci.princeton.edu/~wn/, accessed: November 27, 2003.

[3] http://wortschatz.uni-leipzig.de/, accessed: November 27, 2003; for a selection of more electronic word maps, cf. http://www.lboro.ac.uk/research/mmethods/resources/analysis/linguistic.html, accessed: December 7, 2003.

[4] In written text, these are words, but audio and video data they also refer to visual and audial discursive cues.

listeme and its most closely related neighbors a *fuzzy listeme*. Figure 1 visualizes a fuzzy listeme for "car", highlighting all associated lemmata in green. If "car" is considered a keyword for a certain frame, then the fuzzy listeme might include the lemmata of "car", its synonyms "auto", "automobile" (as found in *WordNet*) and its significant[5] collocations "Ford,", "GM," "Chrysler," "Honda," "Nissan," "Toyota", "Saturn" as found in *Wortschatz*.[6] The question, if it is prudent to include these brand names in a fuzzy listeme for research purposes will depend on the context of your data.

Both word maps also tell you that "car" has "cable" as a significant left neighbor. A "cable car" hardly belongs to the same fuzzy listeme as "car." Likewise, in later keyword searchers homonyms might pose a problem (Bolden and Moscarola 2000: 453; Miller 1997: 369; Miller and Riechert 2001a: 65). In the current example, if "Saturn" is chosen to be included in the fuzzy listeme, the homonym planet "Saturn" would be required to be eliminated from analysis.

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5 Universal frequency and collocation data are still not available in desirable quality (Quasthoff and Wolf 2003: 1), but *Wortschatz* currently is the most reliable database in this respect.

6 It is apparent that the corpus of *Wortschatz* contains an US-American bias.

Figure 1 Fuzzy Listeme "Car"

Framing and CAQDAS

The approach to identify a fuzzy listeme through keywords sounds, as if it would be ideally suited to CAQDAS with its search and coding functions. Initially, interpretative coding of frames might detect relevant lexeme or combination thereof. Codes could then be automatically generated through searching by for the strings that identify lemmata. The instances, in which keywords take on a to be excluded specific meaning, such as "cable car" in above example could be excluded through Boolean search operations. Homonyms could by eliminated from analysis by visually inspecting the textual environment of the keywords in question and an according interpretative decision on the meaning of the homonym in question. Even better, words that may become extremely important, such as the use of pronoun "we," which might reveal underlying *tacit* assumptions, but which are meaningless outside of their context, can be retrieved in context and interpreted by a human coder in a fairly short amount of time.

These seem sufficiently circumscribed procedures to be performed by a computer algorithm with the odd human input decision. Alas, the grounded theory bias of CAQDAS (Carvajal 2002: 3; Coffey, Holbrook, and Atkinson 1996: 7.3; MacMillan and Koenig 2004: 182f; Lonkila 1995; Welsh 2002: 3) quickly showed and in the end only with a great deal of persistence and software tinkering it was feasible to obtain the desired analysis.[7]

Importing the Files

To assess the usability of CAQDAS for the methodology proposed here, we collected postings from an internet forum.[8] As with almost all internet data, postings from the forum came in HTML format. In this particular case, we obtained a single HTML page incorporating altogether 2,626 postings. We split this page using the *csplit*[9] program into separate files. Since none of the five CAQDAS we examined can actually directly process HTML, the files were stripped of their HTML tags using *NoteTab*. As a result we obtained 2,626 plain text files, with each file representing one posting. Of the five programs, *MAXqda* is the only software unable to process plain text files, requiring instead rich text format. We used *ABC Amber Text Converter*[10] to batch convert all plain text into rich text format for usage in MAXqda. While the conversion to plain text required only seconds, a Pentium 4 computer with 512MB RAM required more than three hours to convert to RTF.

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[7] By name, CAQDAS are designed for a wide variety of qualitative approaches, in practice many developers and users say "qualitative methodology" and think "Grounded Theory." Admittedly, there is neither a strict adherence among those who claim allegiance to Grounded Theory (Glaser and Strauss 1967; Glaser 2002; Strauss and Corbin 1990) to the procedures suggested by Glaser and Strauss (Bong 2002: 3f Lee and Fielding 1996: 3.1), nor is Grounded Theory an unequivocal paradigm in itself (Strübing 2002). But to jump from that observation to the conclusion that the centrality of Grounded Theory for CAQDAS is a myth (Gibbs, Friese, and Mangabeira 2002: 6; Bong 2002: 6), creates itself a myth (MacMillan and Koenig 2004).

[8] The forum in question (http://www.cdu.de/cgi-bin/forum.cgi?zeigealle=/forum/thema4/ilelEtrLM.ovr, accessed: December 10, 2003.) is hosted by the website of the Christian Democratic Union (CDU), the main conservative party in Germany. We downloaded the forum thread, in which CDU supporters debated the legitimacy of the dismissal of a CDU MP from the parliamentary ranks of the party. The dismissal had been triggered by a speech by the MP, which contained elements that were widely regarded as anti-Semitic. Many rank and file members considered the dismissal unjustified and hence a lively debate ensued in the forum.

[9] http://sourceforge.net/project/shownotes.php?release_id=151105, accessed: December 1, 2003.

[10] http://www.thebeatlesforever.com/processtext/, accessed: November 30, 2003.

Free Coding

Once all documents had been imported, simple interpretative keyword coding was performed. With the three master frames in mind, and an initial skimming of the documents, we started highlighting and coding those sections of the documents, which we deemed indicative for the frames we saw emerging from the discourse. As inductive coding is standard praxis in Grounded Theory, this type of coding unsurprisingly worked well in most programs. Still, we found some quibbles in the process.

Kwalitan offers an intuitive coding through highlighting keywords or phrases and a pop-up menu on right-click, which, unfortunately does not automatically show all available codes. Unlike in the other programs, codes can not be order hierarchically. They are also not shown when working on a document, which hinders the coding process considerably, as double or even triple codings likely occur.

NVivo permits quick coding of keywords with two mouse clicks; codes can be created at will and are neatly organized in a handy code menu. Unlike Kwalitan, NVivo offers a margin in the document window, where code stripes can be displayed. Alas, the display of the code stripes brings our computer to a standstill, a shortcoming is well known to the developers.[11]

MAXqda does not share NVivo's and Kwalitan's blind coding problems, but free coding is slightly slower than in other programs, because a code needs to be first created in the – still Windows 3.11 style – *Codes* Window and only then can be used for coding. Even though all codes are conveniently organized in the *Codes* Window, the drop down menu for codings is disorganized, which makes it at times difficult to find the desired code. There is a little bug in the coding procedure, as at times not all codes are available for coding. Double clicking the desired code in the coding window, solves this problem.

Finally, *Qualrus* and *ATLAS.ti* allow for the most intuitive and comfortable free coding procedures. Both open a well organized coding window after right-clicking a highlighted portion of the text and there display of codes in the document margins is impeccable. Qualrus offers additional help in suggestion codes based on correlations between existing codes (Brent and Slusarz 2003: 189), a procedure that is irrelevant for present purposes, though.[12] ATLAS.ti offers additional "quick" and "in vivo" coding procedures, which allowed for the most rapid coding of all programs in question.

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[11] http://www.qsrinternational.com/support/faq/FAQ/answer.asp?ID=137, accessed: December 9, 2003.

[12] It is in our view, hard to tell, if the suggestion algorithm, which is based on a positivist-inductive logic, would not be of more harm than help in most cases.

Altogether, free coding was easy enough in all five programs, with the missing coding views in Kwalitan and NVivo being the biggest, but still minor annoyances. From the reading, we distilled five hypothesized frames based on two master frames, whose corresponding lemmata are displayed in Table 1.

Automatic Coding

Four types of searches were to be performed. Unanimous lemmata such as "Gutmensch" ("do-gooders") require only simple string searches. Lemmata such as "Freiheit" ("freedom") are fairly unanimous, but acquire in specific contexts a different meaning. For instance, "Freiheit" could also be part of the newspaper title *Junge Freiheit*, a neo-right propaganda paper, in which case it would no longer belong to the lexeme "freedom." Boolean searches could automatically eliminate such double meanings. Then there are lemmata that only become the desired frame indicator, if they refer to specific lemmata. For instance, one hypothesized frame in the debate evoked a "normalization" of German ethnicity, claiming a *Sonderweg* in Germanness because of the atrocities during the Third Reich. In this frame, a calls for, or – in case of its "countertheme" (Gamson 1992: 135) – against, a normalization Germans' relationship to "their ethnicity." Two lexeme, "normal" and "pride", seemed to be related to this frame, but only if they referred to Germanness. Therefore, they were only coded in the normalization frame, if they were found close to the "German" lexeme. For this procedure, proximity searches were needed. Finally, there are searches that require the interpretative input of the coder, as their multiple meanings cannot be distinguished automatically. For instance, "Spiegel" could refer among others to the popular newsmagazine *Der Spiegel*, to the head of the main German Jewish association, Paul Spiegel, or could simply mean "mirror." These searches do not lend themselves to automatic coding, but require a case by case interpretation by the researcher.

Master Frame	Frame	Fuzzy Lexemes	Lemmata	Exclusions
Liberal Individualist Citizenship Rights	freedom of speech	freedom of speech	**Andersdenk**ende, -n **Freiheit** **Freiheit**en **Meinung**, -en **Meinungsfreiheit**, -en **Meinungsäuß**erung, -en **Meinungsäuss**erung, -en	**Junge Freiheit**
		repression of	**repressiv**, -e, -en, -er **Repressiv**ität **unterdrück**en, -t, -te, -ten **Unterdrück**ung **Maulkorb** **mündig** **Sanktion**en	
		censorship	**Zens**ur **Zens**or, -en, -s **zens**iert, -e, -er, -en **zens**ieren	
		taboo	**Tabu**, -isierung, isierungen **tabu**isieren, -iert, -ierte	
		Constitution (*Basic Law*)	**Grundgesetz** **Grundrecht** **Grundrecht**e **Verfassung** **Artikel**	
	rebuke of elitism	Political Correctness	**political correct**ness **political correct** **politically correct** **PC*** **politische Korrektheit** **politisch korrekt**, -e, -er **Berufsbetroffene**, -r, -m, -n **berufsbetroffen** **Gutmensch,** -en	
		second chance	**2. Chance** **2.Chance** **zweite Chance** **2 Chance**n **zwei Chancen**	
		witchhunt	**Hetz**en **Hetz**erei, -en **hetz**erisch, -e, -er, -en **Hatz**	
		metaphor "to keep cooking"	**Koch**en **koch**t hoch**koch**en	
		Basis	**Basis** **Parteibasis**	
		Christian Democrat leadership	**CDU-Führung** **Partei-Führung** **Parteiführung** **Merkel**, -s **Bosbach**, -s **Stoiber, -s** **Koch**, -s	
		Media	**Medien** **Presse** **Spiegel** **Stern** **Journalist**, -en	
		Social Sciences	**Soziologi**e **Soziologe**n **Benz**	**Mercedes-Benz** **Daimler-Benz**
		we, the common citizenry	**wir** **uns**, -e, -er, -eren	
Ethno-Nationalism	undue Jewish influence	*Zentralrat der Juden*	**Zentralrat** **ZdJ** **Friedman**, -s **Spiegel**, -s	**Der Spiegel** **Im Spiegel** **Spiegel Artikel**
		American Jews	**amerikanische Jüdin**	
		"Holocaust Industry"	**Holocaust-Industrie**	

			Holocaustindustrie **Finkelstein**, -s	
	normalization of German ethnicity	Germanness	**Deutsch**land **deutsch**, -e, -er, -es, -en **Deutsch**e, -er, -es, -en **andere Länd**er **anderen Länd**ern	
		patriotism	**Patriot**, -en **Patriot**ismus **patriot**isch, -er, -em, -en	
		collective guilt	**Kollektivschuld** **kollektiv schuld**, -ig	
		German	**Deutsch**land **deutsch**, -e, -er, -es, -en **Deutsch**e, -er, -es, -en	
		guilt	**Schuld** **schuldig**, -e, -er, -en **Schuldige**, -er, -en	
		nation of perpetrators	**Tätervolk,** -völker	
		normal	**normal**, -e, -er **Normal**es **Normal**isierung	
		pride	**stolz**, -e, -er **Stolz**, -es National**stolz**, -es	
		we, the ethnic Germans	**wir** **uns**, -e, -er, -eren	
	Anti-Semitism	anti-Semitism	**Antisemit** **Anti-Semit** **Antisemit**, -en **Anti-Semit**en **Möllemann**, -s **Karsli**, -s **Walser**, -s **Jenninger**, -s	
		Jews/Jewish/Jewry	**Jude**, -n **jüdisch**, -e, -er	
		Religion	**Religion**	
		Nazis	**braun** **Nazi**, -s **NSDAP** **Nationalsozial**ist, -en **nationalsozial**istische, -r ,-n, -m	

Table 1 Framing Devices (search terms set in boldface, homonyms in orange, interpretative codings in purple conditional searches in olive)

Ideally, simple, Boolean, and proximity searches would thus be coded automatically, while those searches that required user input (highlighted in orange in Table 1) would display the context, in which the word is found to facilitate a swift identification of the proper code. None of the programs fulfilled all our requirements, but there were substantial differences in the adequacy of the different programs.

Qualrus appeared to be a prime candidate for our tasks. It is the most recently developed program, and boosts automatic coding functions. Yet, Qualrus turned out to be the least suited for our purposes. Its search functions are not comprehensive and efficient, if fairly speedy. Using the *Q-Tools* search menu in *Qualrus*, simple string searches were completed within 23 seconds over all documents. When searching across paragraphs, the same search would take more than an hour. Since we were only interested in instances of frames within documents, the latter problem did not concern us. Boolean search is implemented, but it is only possible to combine "and" and "or," but not "not" operators. Proximity searches are not implemented, thus both more sophisticated search strategies we required were not available. Interactive coding turned out to be fairly cumbersome: From the search window a link for each document needs to be followed, after which the search window disappears, and cannot be retrieved through the familiar options ("ALT-TAB" or "CTRL-TAB" keystrokes or *Windows* menu), but only by reopening *Q-Tools*. In the document window, the search term needed to be found manually. The most important problem however was that *Qualrus* does not offer built-in automatic coding of keywords. It requires first a manual definition of analytic "segments," which cannot be generated automatically without the development of cumbersome routines in Qualrus' idiosyncratic programming language. The program is thus unsuitable for efficient automatic codings of large document samples.

So is NVivo, but for different reasons. NVivo's search functions, which owe much to earlier NUD*IST releases, no longer beat the competition "hands down" (Weitzman and Miles 1995: 248), but NVivo is still the only program that allows for *fuzzy searches*, that is, string searches, in which the finds differ in one or more characters from the search string. That function is of course of particular importance for Usenet, internet fora, listserv, and chat room research, where users all too frequently misspell words. In our case, for instance, NVivo found 851 cases of lemmata containing the "antisemit" string, while all other programs found only 848 instances. Yet, in 29 seconds a simple fuzzy string search was accomplished still 7 times faster than a regular search in ATLAS.ti, the slowest competitor. When interactive coding is required, the procedure become slightly cumbersome. Keywords cannot be display in their context, it is therefore necessary to open each document that contains a homonym going through three successive windows. Boolean searches of text strings also require somewhat lengthy procedures; the strings in question first need to be transformed into codes, which subsequently can be searched with all Boolean and operators. As in the other CAQDAS, but unlike in the freeware *Inforapid Search & Replace*,[13] which we used as a benchmark program, slightly more complex combinations of the type "A AND B AND NOT C" are not permitted and thus must be run successively. While these limitations might be mere nuisances, it would turn out that any Boolean or proximity search across more than 900 documents would last more than three hours. As the searching time rises exponentially with the number of documents (600 documents can be searched in about 12 minutes, 300

[13] http://www.inforapid.de/html/searchreplace.htm, acessed: December 11, 2003.

documents in 30 seconds), these searches became infeasible. Even though the automatic coding functions were working smoothly, if at times somewhat serendipitously, NVivo was thus not suitable for our tasks, an assessment that flies in the face of claims that "unique and innovative developments in QSR software [...] have contributed significantly to […] advances" in integration of qualitative and quantitative data and methodologies (Bazeley 2002: 230).

ATLAS.ti offers the widest range of autocoding options. It allows for single coded automatically with a wide range of coding options. Like in NVivo, Boolean and proximity searches, require prior coding of single strings. In the somewhat opaque search window, all Boolean operators can be combined, even though AND and OR are not available in a single search. In theory, this is an almost ideal autocoding environment. In practice, each search and coding procedure took between 6 and 15 minutes for all 2626 files, which meant quite a wait. Unlike NVivo, ATLAS.ti does not tie all system resources, however, so you can work in other programs in the meantime. However, ATLAS.ti appeared much more instable than NVivo. Roughly after every other autocoding, the program would crash by simply exiting, resulting in a loss of all previous work. Interactive searches require both *Code Manager* and document window to be open, so at times some juggling of windows is required, but altogether this constitutes the most facile interactive coding of all programs in question.

MAXqda features the most arcane user interface, clearly still grounded in the Windows 3.11 ergonomics. Its search functions are not as powerful as those offered by its competitors. Boolean search, for instance, does not allow for the NOT operator (even though via "logical activation" of text can partially be circumvented), proximity searches can only be limited to paragraphs, not to word distances as in the other programs. Yet, MAXqda is *more* suitable for the type of research proposed here. To begin with, its interface, while being old is quite intuitive. Boolean and proximity searches are performed in a fraction of the time that ATLAS.ti or NVivo require and interactive coding is as simple – or difficult, as MAXqda also does not allow for showing keywords in context – as in ATLAS.ti, while the program is much more stable. While MAXqda may have shortcomings for other methodologies, we were able to code above coding scheme within four hours, while in ATLAS.ti we needed a full working day to code only the first fuzzy lexeme[14] and in NVivo and Qualrus we were not able to accomplish our work at all. It might there fore be no accident that MAXqda's predecessor

[14] Partially, this slowness was due to us losing work because of program crashes.

winMAX was the only CAQDAS we know of that has been used for framing analysis (van de Steeg *et al.* 2003).

Unfortunately, we only evaluated the demonstration version of *Kwalitan,* which is restricted to four documents at a time. Therefore we cannot tell, how stable and fast the full version would have been. Its search function is somewhat counterintuitive, as Boolean searches can only be made using the *Filter* window, in which on top a few translations from the original Dutch are missing. Unlike all other CAQDAS is allows for complex combinations of Boolean searches. Proximity searches are limited to segments, i.e., paragraphs. Interactive coding is somewhat tedious, because of the lack of coding stripes. In summary, *Kwalitan* seems very well suited for our tasks.

Export of Data Matrices

The export of the coding matrices for work in statistical packages or spreadsheets was unproblematic in all programs. Most programs allow for both export of ASCII text and *drag and drop* into windows programs. The only minor problem arose with MAXqda, whose code names mirror the code position within the coding tree, including a backslash separator to separate tree levels. These names cannot be processed by several programs, notably SPSS, Latent GOLD, and *lem*, and therefore must be shortened in a text editor.

Task	ATLAS.ti	Kwalitan	MAXqda	NVivo	Qualrus	Inforapid
academic license	\$395 €390 £250	€315	\$370 €340 £255	\$445 £270	\$399	freeware
use of system resources	moderate	Low	low	very high	low	low
file format required	plain text	plain text	rich text format	plain text	plain text	HTML
batch converter from HTML	several freeware options	Several freeware options	ABC Amber Text Converter (US \$24.95)	several freeware options	several freeware options	not required
conversion time	<1s	<1s	3h20min	<1s	<1s	n/a
source import	8min	8min	8min	54min	8min	<1s
manual coding	efficient and intuitive	intuitive, but "blind"	efficient (codes are required to be created first)	intuitive, but codings cannot be displayed while coding	efficient and intuitive	not available
simple search	placeholders available	Yes	yes	fuzzy search and placeholders available	no automatic coding	placeholders available, no coding
timing	6min20s	…	10s	19s	23s	20s
Boolean search timing for one search[15]	all operators, but multiple combinations not possible 12min20	all operators, any combination …	AND *or* OR operators, no NOT operator 5min10	all operators, but multiple combinations not possible >>3h	AND *or* OR operators, no NOT operator 5min20	all operators, any combination 26s
proximity search	yes	Yes	yes, but only with respect to paragraphs	yes, but only with respect to paragraphs	not available	yes, combinable with Boolean search
timing	6min20	…	19s	>>3h	n/a	26s
auto coding	simple, but frequent system crashes	all searches	simple and Boolean	si	not available	not available
Interactive Coding	easy	Serendipitous	unhandy windows	unhandy windows	very cumbersome	not available, context shown, search term highlighted
Export of Coding Matrix	ASCII and *drag and drop*	*drag and drop*	efficient, but variable names not suited for direct import into SPSS	ASCII and *drag and drop*	ASCII and *drag and drop*	not available

Table 2 Suitability of CAQDAS for Methodology Proposed Here (serious problems set in orange)

[15] Includes precoding for NVivo and ATLAS.ti and manual recoding for MAXqda.

Table 2 summarizes the results of our attempt to use CAQDAS for the analysis technique proposed here. All programs contain strength and weaknesses. Qualrus excels in interactive coding, but lacks an automatic coding function. NVivo offers the widest variety of searches, but limits analysis to a couple of hundreds of documents. ATLAS.ti is the most versatile program, but its instability and time consumption pose serious problems. MAXqda is easy to use, much more stable than the previous three programs, but contains some limitations in input, output, and search versatility. Kwalitan has similar limitations to MAXqda, but it is more versatile in the import and export of files. Unfortunately, since we only tested its demonstration version, an assessment of its speed and stability cannot be made.

In the end, two of the five examined CAQDAS cannot be recommended for use with the methodology proposed here. Since Qualrus does not allow for automatic coding, it cannot be used in an efficient way, and must be dismissed as a candidate, particularly as the freeware InfoRapid would be an efficient helper in coding, if one were to code everything by hand. The two most popular CAQDAS, NVivo and ATLAS.ti were in principle suited for the analysis, but the fact that they become instable when used with larger amounts of files is a serious impediment for their use. In fact, NVivo is inherently incapable of handling more than 700 documents and must therefore be excluded from consideration. ATLAS.ti, is somewhat more erratically instable. At times the program works fine, performing ten to twenty autocodings without a problem. Then, there are instances, where a single autocoding is sufficient to crash the program. As we tested *Release Candidate 2*, these problems might disappear with the maturing of the program. What will not disappear, is the long time the program requires for each coding procedure. Each autosave operation and most searches took several minutes. That may not sound much, but the coding we performed within one working day with ATLAS.ti, took 20 minutes in MAXqda. ATLAS.ti can therefore only be recommended with some reservations. Particularly, for multi method approaches that involve data other than simple texts, ATLAS.ti's versatility with multimedia data might nevertheless make it a viable choice. That leaves us with MAXqda and the dark horse Kwalitan, both of which can be recommended with some reservations. They are fairly intuitive to use (which sets them apart from the rather idiosyncratic interface of NVivo and the shrouded terminology of ATLAS.ti) and do the job fairly efficiently. Of the two, Kwalitan seems the more versatile, but as we only evaluated the demonstration version, it is hard to tell, if a full analysis would have revealed some problems not anticipated here. The fact that the two lesser known programs turned out to be more suitable for the methodology proposed here in any case dispels the myth that "the most successful qualitative software packages are likely to be constructed in ways that meet a range of methodological approaches" (Jackson 2003: 100).

Validating Frames

To rebut criticism that frames can be practically identified at will by the analyst, it seems useful to develop a technique that tests the empirical adequacy of frame models. Basically, three statistical techniques have been suggested to measure adequacy of frames quantitatively, namely cluster analysis, factor analysis, and latent class analysis.

Currently, *hierarchical cluster analysis* seems to be the most popular method for statistical validation of frames. That is, if you can speak of "popular", when merely a handful of references exist (Dyer 1994; Koella 2003; Landmann and Züll 2004: 120; Miller 1997; Miller and Riechert 1994; Miller and Riechert 2001b; Miller and Riechert 2001a). There are a few problems with this methodology, though. To begin with, it requires specific chunks of data – documents with around 1,000 words –to perform best (Miller 1997: 369). While this problem could be alleviated by slicing or aggregating data appropriately, the a general problem of all cluster analyses – be it k-means or hierarchical – cannot be circumvented, namely that it does not offer any real goodness of fit tests (Aldenderfer and Blashfield 1984), which in turn makes it impossible to choose an optimum number of clusters on an empirical basis (Miller and Riechert 2001b: 116; Trochim and Hover 2003). That means that *any* number of frames could be posited throughout the texts, without any possibility to falsify any frame model, which, once again would return us to researcher *fiat*. On top, hierarchical cluster analysis assumes texts to belong to *either* one *or* the other frame. But it is entirely reasonable, and even likely, that speakers use any number of frames in a given text. In fact, many speakers actively engage in frame alignment processes such as frame bridging (Snow et al. 1986), which presuppose the existence of more than one frame in a text. Moreover, cluster analysis assumes a direct measuring model, but as has been discussed in the theoretical part of this paper, keywords are only indicators of latent frames.

Factor Analysis avoids these shortcomings of cluster analysis. It knows well-established goodness of fit criteria, it assumes a measurement model that does justice to the latency of frames, and it can decide on an empirical basis, which frame model is more adequate. Yet, to date we know only of one attempt to use frame analysis in framing studies (Risse and Van de Steeg 2003). While the headway made compared to cluster analysis is considerable, it seems puzzling that the authors do not even discuss the violation of the scale level assumptions of factor analysis, even though it has been shown that this violation can seriously affect the substantial results (Magidson and Vermunt 2004).

In contrast, *latent class analysis* exhibits all required features factor analysis offers, but at the same time does not contain the same shortcomings, making it very well-suited for the analysis of quasi-idealtypical concepts (Hagenaars and Halman 1989) such as frames. It should seem therefore straightforward to introduce it into frame analysis studies. Although the methodological principles of latent class analysis have been already developed in the fifties (Lazarsfeld 1950; Hagenaars 1993: 20), it has remained an esoteric statistical method for many social scientists (Reunanen and Suikkanen 1999: 3). Basically, latent class analysis can be considered the equivalent of factor analysis for ordinally and nominally scaled variables (McCutcheon 1987: 7). It examines, if a set of observable indicators can meaningfully be projected onto a smaller set of latent, that is, unobservable classes. Most important theoretical concepts, among them frames, do not translate straightforwardly into easily empirically observable, that is: measurable, indicators. Latent class analysis that expressly works with latent, read: unobservable, variables (Lazarsfeld 1950: 363) is therefore in the analysis of frames superior to other log-linear models that operate exclusively with observable data.

In comparison to cluster analysis, latent class analysis delivers more unequivocal results, as it allows for a number of well-developed goodness of fit measures. And while it shares with factor analysis the virtue of operating with latent variables, it does not contain the caveat of requiring hard to come by interval scaled data. We therefore recommend to validate frames with latent class analysis (Koenig 2004).

Quantifying through "Qualitative" Software

In conclusion, the methodology described here can enhance frame analyses in the way that it allows for efficient coding of large corpora of data, which aides quantification and reduces researcher influence, but, of course, does not eliminate it. Currently, only MAXqda is able to process the data in that way without causing too many problems. Atlas.ti, Kwalitan, and QDA Miner would be in principle suited, but we encountered many stability problems with this software. Because of its inability to handle huge projects, NVivo is not suited for this type of analysis, while Qualrus is very cumbersome to operate with automatic coding.

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