

# The Structure of Public Opinion Concerning Social Conflicts as a Fractal Structure for Society

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**Abstract:** Twenty years of Agoramétrie survey research in France on opinions concerning social conflict has shown that a small set of approximately 40 "trunk" questions appear in each annual sample of media coverage of social conflicts, independent of economic crises, international or political crises, or other enviroing events. These trunk questions -- such as "are there too many immigrant workers", "are doctors trust-worthy", "should women have the same rights as men", "are politicians corrupt" -- appear as basic human interrogations concerning society, and the use of the Agoramétrie method in Great Britain, Russia and Costa Rica reinforces this surprising result. The trunk questions define an overall structure with two fundamental dimensions: first, an opposition between an ouverture toward society and its problems (social problems and conflicts can be addressed and dealt with) and closure ("we were better off in the past"); second, an opposition between emotive/conflictual and non-emotive/cooperative reactions to social conflict. Research results show that this general structure is scale independent, apparently of unlimited applicability to human society, and very similar to human cerebral affect asymmetry. These results imply that we are in the presence of a fractal phenomenon and we will try to develop some of the sociological implications such as possible interpretations of a power law and a fractal dimension.

Structure of society, Opinions on social conflict, Survey research, Fractal dimension of society.

## 1 Introduction

With a social phenomenon considered to be so unstable and easily influenced by recent events as public opinion, one can wonder how it would ever be possible to speak not only of a stable general structure, but even of a scale-independent structure. But that is the surprising result at which we arrive when analyzing twenty years of annual Agoramétrie surveys of French public opinion concerning social conflict. In a classic study of variability in polls and surveys, Converse and Traugott (1986) noted that direct measurements of public opinion about national affairs were appearing with increasing frequency in the mass media. Discrepancies were often noted between multiple surveys done at the same time on what seemed to be the same topics. The authors compared products of different survey institutions and reviewed several sources of variability and fixed bias in such surveys, including sampling error, variability in sample composition, interviewer variability, and questionnaire variability. Groves (1989) also published a thorough review of the question. Since then, major progress has been made in most of these domains (De Heer, de Leeuw and van der Zouwen, 1999). The means of arriving at the necessary methodological rigor to significantly reduce that variability do exist, but, as Groves has shown, there is a cost for the reduction of variability.

## 2 "Representative Sampling" for Questionnaire Construction

One of the traditional concerns in surveys is questionnaire construction, and, although there has been extensive research concerning question format, response format, question wording, question order or "halo effects" (Schwarz and Sudman, 1996), there seems to have been very little research on setting up a formal process by which questionnaire content is determined in such a manner to provide a statistically valid "representation" of the social phenomenon the survey is supposed to study. In short, there is a certain "lopsided" aspect to polls and surveys. On one hand, there are formal procedures for generating a statistically representative sample of a nation, of a specific population, or of many types of social groups. On the other, a "panel of experts" often determines the content of questionnaires for major national surveys in a very empirical or even pragmatic manner, based on the experts' own "personal knowledge" and past experience with similar surveys.

It is in this particular aspect that Agoramétrie's survey methodology differs from traditional surveys and has been able to produce results that are so stable that major French institutions -- governmental and non-governmental -- have found it possible to do strategic planning and to make projections several years into the future based on these survey results. From one to several months before a survey, a specialized media research center analyzes an extensive representative sample of French printed media for all articles concerning topics of social conflict. For the 1992 survey, the press was analyzed between 15 December 1991 to 31 January 1992. The representative media sample included seven nation-wide dailies (*Le Monde*, *Libération*, *Le Quotidien de Paris*, *Le Figaro*, *L'Humanité*, *La Croix* and *France-Soir*), two regional dailies (*Ouest-France* and *La Voix du Nord*), nine nation-wide weeklies and two monthlies. For the 1997 survey, the press was analyzed from 1 July 1997 to 10 October 1997. This time, the representative media sample included only six dailies -- *Le Quotidien de Paris* and *L'Humanité* were replaced by *Le Parisien* -- but five regional dailies, ten weeklies and three monthlies.

The collected set of individual topics of social conflict is considered a representative sample of the universe of public discourse on social conflict in France at that time. The individual entries are reorganized into 27 thematic categories which have proven to be both useful and more or less exhaustive. They are: national politics, international politics, scandals, natural catastrophes, economy, security, justice, family, work and labor, health-medicine, urbanization-housing, armed forces, energy, education-teaching, religion, agriculture, environment-ecology, transportation, morals-social problems, science, information-media, the elderly, consumers-food, the arts-show business, sports, leisure, fashion-beauty. Within each of the 27 categories, individual entries are regrouped according to content to constitute subthemes, and, sometimes, sub-subthemes, depending on the number and content of the sampled entries.

For example, in 1997, the category, "National Politics", had the following subthemes: legislative elections, cohabitation, new government, major policies, 1998 budget, job policies, working hours, social policy, naturalization and immigration policy, political parties and Corsica. The subtheme, "political parties", was organized into the following sub-subthemes: parliamentary majority (two entries), Socialist Party (one entry), French Communist Party (four entries), Ecologists (one entry), parliamentary opposition (five



entries), RPR conservatives (one entry), National Front (seven entries). One can see that the themes of social conflict are focused around the extreme right (National Front), the opposition and the Communists.

Using this reorganized thematic sampling of media production concerning social conflict, a large panel of expert observers of social problems from many walks of life (often up to 15 persons) is brought together and proposes a list of questions that is as representative as possible of the thematic sample. For each survey, the composition of the panel has been different with 50 percent or more new members. The suggested list of questions is used by Agoramétrie to construct the survey questionnaire which varies in length from 70 to 100 closed questions on social conflict. The questions are typically written in the form of a declaration -- "God exists" or "There are too many immigrant workers" -- that encourage a respondent to "take a position" or "make a stand". The closed five-point scale of response categories is: "Don't agree at all", "Don't agree very much", "Perhaps agree", "Agree somewhat", "Very much in agreement"; English translations of "Pas du tout d'accord", "Pas tellement d'accord", "Peut-être d'accord", "Bien d'accord", "Entièrement d'accord". There is also a "non-response" category.

### **3 Agoramétrie Survey Methodology at Home and Abroad**

The survey questionnaire constructed in this manner by Agoramétrie is submitted to a representative sample of the French population with usually between 1,000 and 2,000 respondents. The questionnaire is administered by a major professional French survey organization. The data is analyzed by a form of correspondence analysis called principal component analysis which is essentially an eigen value factorization of the data matrix (persons by questionnaire responses) to extract the principal axes. The first axis has systematically designated "engagement" or "participation in the survey", meaning the respondent avoided massive use of the "non-response" and "perhaps" categories. In the remainder of this article, we will not take that axis into consideration when talking about the "first", "second" or "third" axis.

Much of what we have related above is not known in Anglophone sociology for the simple reason that this work has been done almost exclusively in French, and published and distributed by Agoramétrie directly to a specialized but rather small audience. In 1986, the *Bulletin de Méthodologie Sociologique* (BMS) published (Van Meter, 1986) a review (in French) of *Les structures de l'opinion en 1985* (Agoramétrie, 1986), and, in 1987, an article (in French), "Les structures de l'opinion: Enquêtes et méthodologie" (The Structure of Opinion: Surveys and Methodology; Agoramétrie, 1987), based on the two methodology chapters of Agoramétrie (1986). A doctoral thesis was defended in 1988 on the basis of Agoramétrie research and presented Agoramétrie's survey methodology in detail (Iliakopoulos, 1988). One of the very few publications in English concerning Agoramétrie research appeared in the *International Journal of Public Opinion Research* (Durand et al., 1990).

Nonetheless, this lack of involvement in mainstream North American sociological research has not kept the method from being applied elsewhere. Vladimir O. Rukavichnikov, former deputy director of the Institute of Socio-Political Research of the Russian Academy of Sciences and deputy editor of the journal, *Sotziologicheskie Issledovanija*, used the method in opinion surveys in 1991 and 1992 in Russia and presented results during the "Current Developments in Environmental Sociology"



symposium in Woudshoth, the Netherlands, in June 1992 (Rukavishnikov, 1992). He explicitly noted that: "VARIMAX analysis (Sherin, 1966) shows a remarkable stability of public opinion structures ... The first principal component corresponds to the dimension opposing traditionally-conservative views to modern-radical ... The second principal component -- 'material' -- seems to characterize the dimension opposing frustration to satisfaction ..." (*ibid*: p. 7). These are precisely the two first axes that were found in French surveys.

Rukavishnikov clearly noted: "For us, it was an extraordinary insight that even the labels of axes in French colleagues' study were the same as in our one. But we worked independently." (*ibid*) The results also "showed a very high degree of similarity" with those of a Radio Free Europe-Radio Liberty study (1990). It should be noted that the Russian survey results were generated by a set of 38 questions that are quite different from those found in our French surveys.

Rukavichnikov's use of Agoramétrie methodology is not unique in Eastern Europe. Rasa Alisauskiene, former director of Baltic Surveys Ltd. in Vinius, Lithuania, told the author she has also been using the methodology. The 1992 "Questionnaire of a Sociological Study on Public Opinion about Environmental Risks", constructed by the Institute of Sociology of the Bulgarian Academy of Sciences, consisted of 65 questions largely inspired by Agoramétrie research.

In Western Europe, the Agoramétrie approach was used by a British survey firm, the Mori Institute, for its *Living in Britain 1989* study which, like the Russian study, found the same two principal axes in the structure of public opinion on social conflicts. Again, the set of questions, generated by the Agoramétrie method, concerned British media discourse on social conflict and was not a direct copy of French survey questions.

Outside the "First" and "Second" Worlds, the Agoramétrie method has been used in Costa Rica at the School of Sociology of the University of San Jose in opinion research concerning social conflicts and, once again, similar results have been found (Poltronieri, 1999).

#### **4 Survey Results Over Twenty Years**

What exactly are these results that have been found in France, Russia, Great Britain and Costa Rica? Beginning in 1977, in France, each Agoramétrie survey has produced a typical two-dimensional graphic whose axes are the first two principal factors in the eigen-value decomposition of the data matrix. In the upper right-hand corner (first quadrant), one can see "Feeling of insecurity" ("Sentiment d'insécurité"), "Bring back the death penalty" ("Rétablir la peine de mort") and "Too many immigrant workers" ("Trop de travailleurs immigrés). We will see below that these three responses not only characterize the upper right-hand area of the graph, but also form one of the tightest and most stable networks of opinions. The reader can easily imagine what sort of person would hold this particular network of opinions and what other positive and negative ties with other opinions would likely exist.

In the lower left-hand corner, in the third quadrant, one can find "Hashish on sale in public" ("Hashish en vente libre"), "The right to become a French citizen" ("Pouvoir



devenir Français) and "In favor of naked women on TV" ("Pour des femmes nues à la télé"). Here, again, these three items characterize an area of the graph, but they are far less tightly and stably tied between themselves in a network of opinions when compared to the three preceding items (to which they are in strong opposition [negative correlation]).

In the upper left-hand corner, in the second quadrant, one can find "Earlier retirement" ("Retraite plus jeune"), "Equalize revenues" ("Egaliser les revenus") and "[there are] Major industrial risks" ("Risques industriels importants") which are also relatively loosely associated between themselves and to that area of the graph.

In the lower right-hand corner, in the fourth quadrant, one can see, closely grouped together, "Nuclear power plants have been necessary" ("Il fallait des centrales nucléaires"), "Confidence in the legal system" ("Confiance en la Justice"), "Politicians are good people" ("Hommes politiques intègres"), "Police does its job" ("La police remplit sa mission"), providing a clear characterization of this area of the graph, but without these items forming a tight or stable network of opinions.

On the right-hand limit of the first or horizontal axis, one finds "For my country" ("Pour la patrie"), "God exists" ("Dieu existe") and "For [my country's] nuclear armament" ("Pour la force de dissuasion"), characterizing a clearly conservative attitude toward society and social conflict. On the opposite left-hand limit of the first axis, one finds "For the 35-hour working week" ("Pour les 35 heures"), "Against working" ("Contre le travail") and "Homosexuals just like other people" ("Homosexuels comme les autres"), characterizing a clear rejection of dominant social attitudes.

On the second or vertical axis, we find, at the top, "Fewer robots" ("Moins de robots"), "Energy crisis is preoccupying" ("Crise de l'énergie préoccupante"), "Europe will never work" ("L'Europe ne marchera jamais"), and, at the bottom, "Long live the Euro" ("Vive l'Euro"), "Increase taxes on diesel fuel" ("Augmenter le diesel"), "Build Europe with the East" ("Construire l'Europe avec l'Est"), both of which lack apparent thematic coherence but do show emotional coherence with "cooperation" or a non-emotive response toward the bottom and with "conflict" or an emotive response toward the top.

These same characterizations of the first and second axes, and the thus constructed four quadrants, were found in all the more or less annual surveys in France and the other surveys abroad mentioned above. The readers can easily compare the two-dimensional graphs for the Russian, British and French surveys and see the similarity in structure both of the axes and often the items -- or types of themes -- themselves.

Thus, we can describe a general structure of how society sees social conflict by stating that the first most important factor is an opposition between adherence to dominant conservative attitudes with a certain "closure" toward social conflicts, and different non-conservative attitudes with a certain "ouverture" toward social conflict. The second most important factor is the opposition between a cooperative non-emotional attitude toward social conflict and a conflictual emotional attitude. The quadrants thus become characterized by conflictual closure (first quadrant), conflictual overture (second), cooperative overture (third) and cooperative closure (fourth).



Let us stress, once again, that this very stable general structure has been found in several rather different countries and over a relatively long period of time in France, twenty years. Thus, we can state with a high degree of confidence that these results are independent of the economic context, the political context, the social context and even the international context, including such monumental changes as the crumbling of the Communist Bloc, the end of the Cold War and major wars in the Persian Gulf and the Balkans. This clearly raises the question of what are the limits of application of these results. To which human societies are these results not applicable? At what scale are these results applicable: national populations only, regional populations, cities, social groups, families, or even individuals? These questions will be addressed below after examining some of the surprisingly stable results of these surveys.

## **5 "Trunk" Questions of Social Conflict**

From the description above, the reader can easily understand that the media sampling process implies that topics or themes only recur systematically if they actually represent an essential aspect of public debate and not the vested interest of any particular social institution, even that of the media itself. The great variability of context over the past twenty years in France lends weighty support to that affirmation.

So what has this sampling process of social conflict turned up over twenty years of generating 70 to 100-item questionnaires? The 1997 survey provides a complete list of the 351 questions which have figured in the 19 Agoramétrie surveys since 1977 (Agoramétrie, 1998: 43-66). There are only a certain number of themes-questions that systematically recur. There are eight questions that were "sampled" even time: liberalize abortion, build nuclear power plants, God exists, equalize revenues, confidence in the legal system (in various formulations), reduce defense spending (and similar questions), government is ineffective (and the formulation "politicians are good people") and a feeling of insecurity (and associated variants). Three other themes appeared in 18 out of 19 surveys: too many immigrant workers, against working and the energy crisis in preoccupying. There were also three other themes which appeared in 17 out of 19 surveys: abolish/bring back the death penalty, TV considers us all stupid and censor certain books.

The full list of themes-questions that have appeared in several questionnaires can be reduced or concentrated by regrouping various formulations or similar questions to produce a list of 42 themes, beginning with those mentioned above. How many could be considered strictly "French" themes that would not be "sampled" in a foreign context? Perhaps the "35-hour working week", but it is closely tied to other "labor" themes and will in all likelihood become a topic of debate throughout the developed world in the near future. In short, the list of 42 themes is not limited to French social conflicts alone. Is it limited only to social conflicts in the developed world? Indeed, questions concerning "nuclear arms", "energy crisis", "ecologists" and "computers" or "robots" would seem to limit the field of application to the more developed countries. But each of these more-developed-country questions tends to be tied to similar and more universal themes: nuclear arms with defense spending and feelings of insecurity; ecologists with the destruction of the environment, and computers-robots with fear of new technologies. There remains the possibility that these questions are associated specifically with "Christian" cultures and similar surveys should be carried out in Iran, India and Japan, for example, to examine that possibility.



We call this set of 42 recurrent themes the "trunk" questions ("questions souches" in French) of social conflict not only because they come back systematically over time and in different societies, but also because they determine in large part the general structure described by the two principal axes. This double determination by trunk questions is reinforced by several other statistical results from the analysis of the survey data. The distribution of item non-response values extends from "the Boy's Band is 'out'" (15.3%), "give more power to parliament" (10.6%) and "I like Lady Di" (10.2%) all the way down to "you can trust doctors" (0.5%) and "feeling insecure" (0.4%). The mean rank (56.83) and the mean non-response value (3.09%) for trunk questions are not particularly significant by themselves, but are when compared to the mean rank (45.17) and mean non-response value (4.42%) for "non-trunk" questions.

Along with a few current "hot issues" -- Lady Di, Algeria, hunting -- the trunk questions show the highest correlation with the set of descriptive variables including locality, sex, age, diploma, religion, social-professional category, political tendency, political party (Agoramétrie, 1998: 69-70). In the Procrustean rotation (Shönemann, 1966; Mulaik 1972) to graft the 1997 principal component analysis diagram onto the 1992 diagram, the 47 common themes in 1992 and 1997 include all but three trunk questions (students, women and school items). Out of these 47 variables, the 31 most stable ones, which were used as active variables for the graft, were all trunk questions. The next ten most stable variables were projected onto the resulting graphic to control for the stability of the Procrustean rotation. See below Figure 1, 1997 Procrustean Rotation. Of the ten, all were trunk questions or closely related variants, except for a few "current" issues: "make an effort for the Olympic Games", "Make some sacrifices for Europe".

Of the 31 variables that reconstruct the 1997 principal component analysis diagram best, on the basis of multiple correlation coefficient regression analysis (Agoramétrie, 1998: 91), all but two -- "in France the truth about Chernobyl has been hidden", "Build Europe with the East" -- are trunk questions, although the former of these two can be associated (negatively) with "politicians are good people" and the latter of the two with "Aid under-developed countries". Finally, the trunk questions also figure among the groups of variables most highly correlated with the data matrix factors, according to VARIMAX analysis.

In summary, trunk questions provide a topographical background map on to which society projects how it sees social conflict. The major "landmarks" or trunk questions are known and change position or amplitude only very slowly. It's the "current" or immediate terrain which can change far more quickly. But even if this result seems fairly well established, it does not go far toward answering the question of "why" or how widely applicable to human society this result is. We will try to address these questions below.



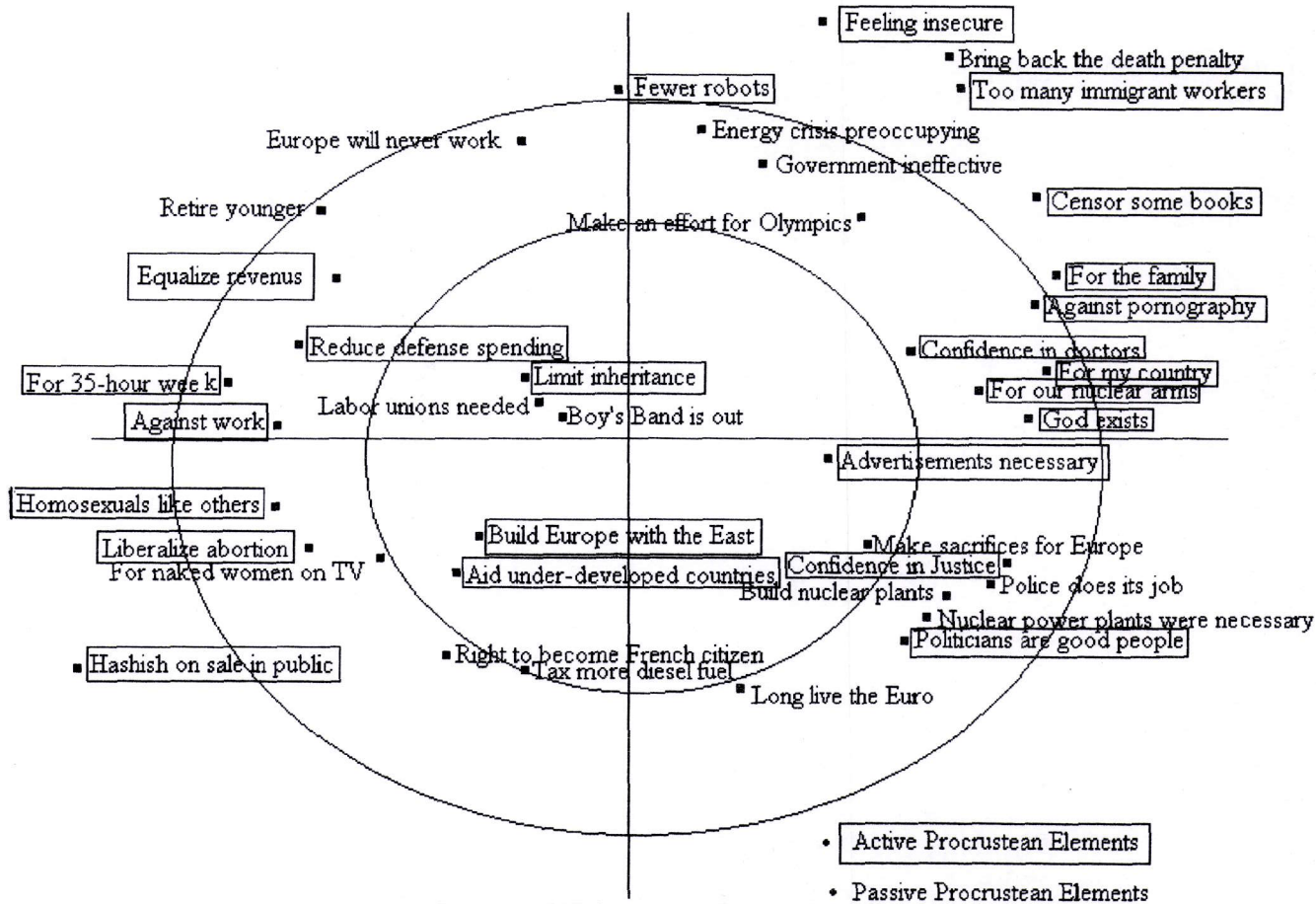


Figure 1: 1997 Procrustean Rotation



## 6 General Structure of Social Conflict

### 6.1 A Three-Dimensional Topographical Interpretation

The idea that trunk questions can provide a topographical background map on to which society projects how it sees social conflict can be expanded to provide an operational three-dimensional cartography of public opinion concerning social conflict. We have already defined and established trunk questions as the major "landmarks" which change position or amplitude -- "altitude" -- very slowly and very little, while "current events" -- media attention or transient conflicts -- describe the immediate or "local" terrain and, above all, the "sea level". Indeed, by limiting from 70 to 100 the number of questions in each Agoramétrie survey, one defines a "sea level" below which a question of social conflict will not figure in the questionnaire. But this does not mean at all that a particular question, not included in one year's questionnaire, has changed its position in the general structure of social conflict. It simply means that its level of media attention did not put it "above sea level" or the cut off point for inclusion in the questionnaire.

A characteristic example is "nuclear power plants", a strong point of conflict in France until the election of François Mitterrand as president in 1981. Within four years, "nuclear power plants" was no longer reported in the media as a major problem of social conflict. But then, on 26 April 1986, a reactor in Chernobyl caught fire, exploded and produced one of the world's worst nuclear accidents. This, of course, caused media attention, brought "nuclear power plants" back into the public debate and placed it above the cut off point -- "sea level" -- for the next Agoramétrie questionnaire. Nonetheless, the position of "nuclear power plants" had changed only slightly on the next two-dimensional general structure of social conflict. "Held in position" by its ties with other opinions on social conflict, it had simply "reappeared above sea level" on the Agoramétrie cartography. In short, current events, the media and public debate determine a level of activity that can vary widely and even describe cycles of attention or fashion, but have only minor influence on the evolution of the general structure.

In this cartography, where principal components analysis provides the first two dimensions, the third dimension or "altitude" of a theme would correspond to the weight of its contribution to the construction of the general structure. This, by definition, places trunk questions as the dominant and relatively immobile peaks or summits of this social conflict cartography. Each annual survey could be represented in this manner with an associated "sea level". These annual cartographies could be compared for modifications in position, altitude (importance) and presence or absence of particular questions. For our present purposes, the most revealing representation would be a cumulative cartography with results of successive surveys simply superimposed in an additive manner. In this way, a trunk question, which had hardly changed position, would have an "altitude" resulting from the sum of those of the successive surveys. Such a representation would clearly show the transient or "local terrain" character of many non-trunk questions. A similar difference between "local" and "transient" activity, relative to larger-scale and longer-term activity, also appeared in research concerning the sociology of scientific innovation and resulted in the development of a bounded chaos model of scientific innovation (Van Meter, 1995).



## 6.2 The Trunk-Question Construction of the General Structure

If we except that trunk questions provide a topographical background map of social conflict, as we mentioned above, it still does not go far toward answering the question of "why" or how widely applicable to human society this result is. At the level of the general two-dimensional graphic resulting from the principal component analysis, the first two axes are defined by the oppositions closure-ouverture and cooperation-conflict we have described above. These oppositions, found in survey data in France, Russia, England and Costa Rica, are therefore independent of any specific set of questions. Each survey of social conflict will generate such a general structure in which appropriate items will appear in the areas we have described. Over time, a series of such surveys will generate the trunk items which, in turn, can be expected to be included in the questionnaire year after year and in particular areas of the graphic. One cannot state *a priori* that, for example, a series of surveys of social conflict in the United States will result in having "too many immigrant workers" in the upper right-hand corner and being a trunk question.

Nonetheless, the general structure is constructed by trunk questions which can be found by longitudinal analysis as we have done above, but the specific content and formulation of any set of trunk questions will be influenced by the survey context, meaning the time at which it was carried out and the society which was surveyed. The set of trunk questions will cover the same fundamental themes as the French Agoramétrie trunk questions, and vice versa, but the questions may well not be the same. In the Russian surveys, "feelings of insecurity" were strongly associated with "will Russia break up?" and "will the armed forces take over?", while, in France, insecurity is tied to "too many immigrant workers" and "bring back the death penalty", all of which are trunk questions in France for the last twenty years.

At the "local" level or the level of association between items on the general diagram, we have defined networks of opinions on the basis of statistical correlation, meaning their ties are of a probabilistic nature (Van Meter, 2000). One cannot take a declared extreme right-wing voter, who believes there are too many immigrant workers in France, and state that the person will also be in favor of the death penalty. However, there is a high probability that that will be true. These networks of opinions at the "local" level define a socially-recognized thematic coherence, and labels, such as "leftist trouble-makers", "environmental activists", "religious fundamentalists", "right-wing racists", "anti-government business people", "active patriots" and "technocrats", can be applied rather easily to many such "local" networks. But these identifiable networks do not consist solely of trunk questions. As stated above, the networks always seem to include at least one, and often several, trunk questions. This, in turn, implies that the other members (opinions) of these networks are susceptible to change and are dependent on the time and the society studied.

On the general level, the local networks and the trunk questions, imbedded in the local networks, construct the ties and oppositions operating at the overall level, thus defining larger and looser networks and, ultimately, building up the entire structure. See below, Figure 2, *Le Ciel de Décembre 1997*.



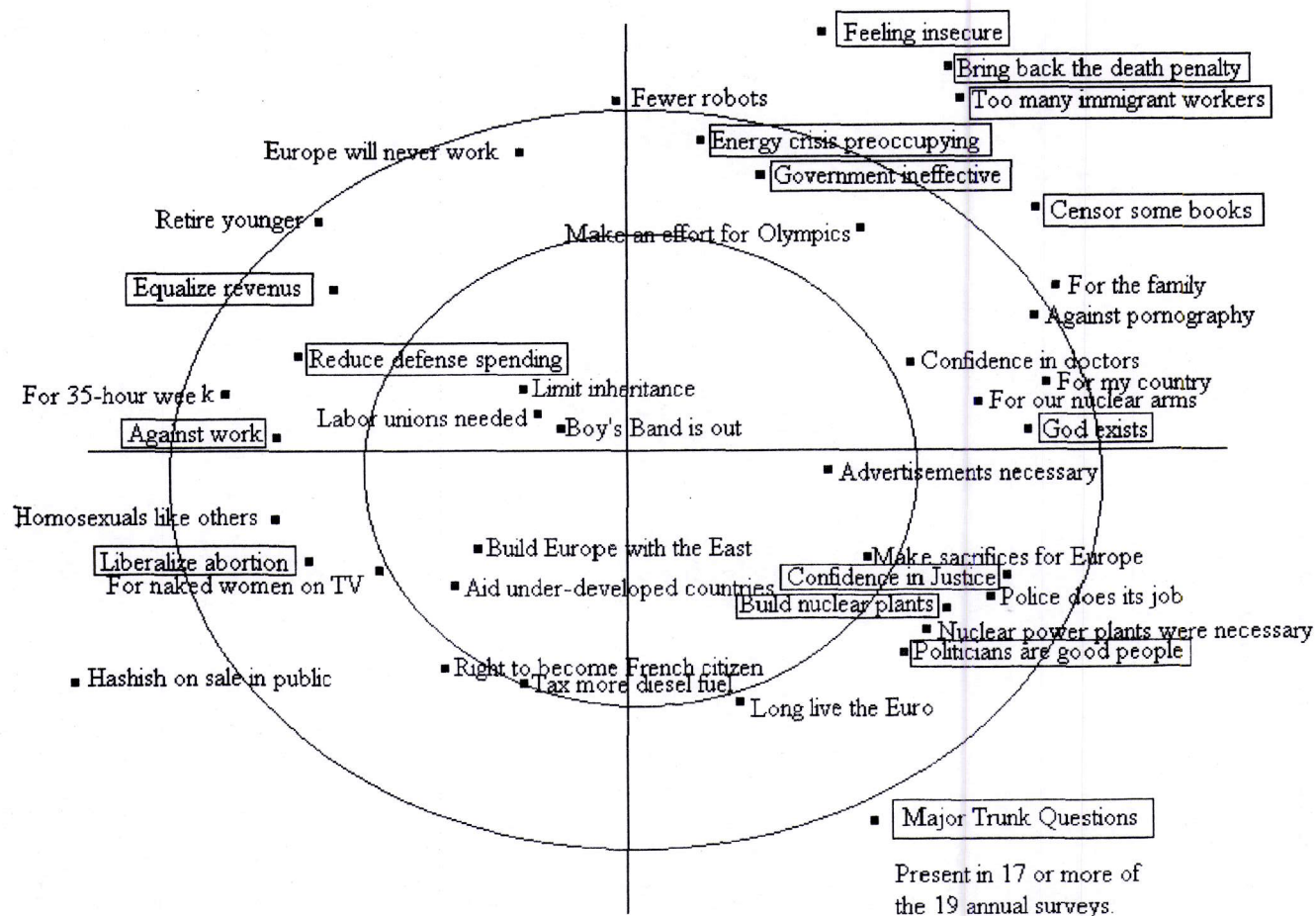


Figure 2: December 1997 Sky ("le ciel en decembre 1997")

## 7 Basic Human Interrogations Concerning Society

### 7.1 Questions of Applicability in Scale

The above summary and clarification of the differences between the general and local levels, and role of networks of opinions and trunk questions, doesn't answer the questions concerning scale and extent of applicability of these results. In short, where can this type of analysis be applied and these results be expected? In terms of scale, there is little doubt that the analysis of national populations will produce the stated results, since we have such survey from France, Great Britain, Russia and Costa Rica. Does this work at a smaller scale such as social groups? Rock climbers in the forest of Fountainebleau near Paris were surveyed using the Agoramétrie method and the same general structure for the French population was found (Corneloup, 1993). A current thesis project using Agoramétrie's methodology and studying attitudes toward food and genetically-modified products generated a similar French population general structure for 250 respondents selected arbitrarily from fellow graduate students and students' family members (Quillet, 1998).

These results imply that the general structure of social conflict we have presented is "scale independent", would be found in any social group of any size and would only be dependent on size for furnishing a more detailed and complete replica of the general diagram. A corollary to this statement is that the scale of application has no fixed upper or lower bounds. Indeed, current research in functional neuroanatomy, particularly at the Laboratory for Affective Neuroscience, University of Wisconsin at Madison, under the direction of Richard J. Davidson, has established the laterality of the cerebral frontal cortex activity in reaction to emotive imagery. In Davidson (1998), the author reviews his laboratory's research on the role of the prefrontal cortex and amygdala in individual differences in emotional reactivity (what he calls "affective style") and affective disorders. In Davidson and Irwin (1999), the authors review brain lesion and neuroimaging studies of emotion and affective style, focusing on the normal mechanisms of emotion. The neuroimaging work is based on PET (positron-emission tomography) and fMRI (functional magnetic resonance imaging) analyses (Weng, 1999).

This research implies that right-handed affect laterality is associated with reactions of withdrawal or closure when faced with emotional imagery. The left-handed affect laterality is associated with more open and inquisitive types of reactions. The similarity with the first axis of the general structure of social conflict is evident and implies that human beings may carry with them an evolutionarily-selected capacity that situates their individually-developed reactions to social conflict somewhere along the first axis we have described. Whether or not this situating is a conscious or unconscious process, influenced by culture or education, and fixed or modifiable in adult life, are questions for further research in neuroscience and social psychology.

An interesting consequence of the potential association between the general structure of social conflict and the laterality of reactions to emotional situations is that every human society, and every social group of any size, will have people distributed along the closure-ouverture axis due to natural variability. Any decision by a group of persons to forbid, exclude, do away with, repress or eliminated people on any segment of the first axis will be fighting an unending battle against human development. At different



periods in its evolution, a society could require the contribution of persons situated in different segments of the first axis. In a war or survival situation, a maximum of closure and a minimum of *ouverture* may be the best strategy. In a period of calm and plentiful resources, a maximum of *ouverture* and a minimum of closure could be the best. Over extended periods of time, a society that has deprived itself of people associated with any segment of the first axis would be at a competitive disadvantage and risk disappearing.

This same argument holds for the second axis of cooperation-conflict but we have not yet found similar research on its possible scale-independent character or association with individual cerebral activity. Notwithstanding, if these two axes prove to be as fundamental to human social activity as we believe, then their inclusion in the repertory of human capacities at some point in time must have represented an evolutionary advantage that could be investigated. Although our sociological research method requires the use of language for communication, with other methods -- such as long-term observation -- it would be possible to see if animals, other than human beings, are distributed over a closure-*ouverture* axis concerning social conflict or whether other structures, such as rigid hierarchies, handle such problems.

## **7.2 Questions of Applicability in Extent**

On the upper extremity of the scale of application, there seems to be no fixed boundary imposed by the scale but this can only be confirmed by Agoramétrie-type surveys in non-Christian cultures, as we mentioned above. The upper extremity of application is much more likely to be defined by our applicability criteria which, concisely stated, are the possibility of constructing a representative sample of public discourse concerning social conflict. Clearly, if there are communication barriers -- different languages, geographical separation, social exclusion, separation in time, repressive regimes -- then no such sample can be constructed and the methodology and results described above do not apply in the form they have been presented. For example, a sampling of Soviet media in the late 1980s for themes of social conflict would surely not have produced the same results as Rukavichnikov's research a few years later. These criteria of applicability would impose an upper limit on the scale of method application. However, recent protests in Seattle, Washington, against the World Trade Organization show that the process of globalization concerns not only commerce but communication and public discourse on social conflict on a world-wide scale. Therefore, the upper bound of scale applicability for this method is moving higher all the time and can be expected to include the entire human population in the not too distant future.

The method, as we have presented it here, is based on sampling the press for topics of social conflict, but that is, of course, not the only way in which public debate can be sampled in a representative manner. Other public media could be sampled and in most developed countries with high Internet use, sampling public chat room discourse could be used. For historical studies, sampling archive material would be possible, although not necessarily representative. In short, sampling the press, when possible, is an efficient procedure but far from being the only possibility.

## **8 Conclusions: Fractal Character of Social Conflict**

If one accepts the scale-independent nature of social conflict, we can proceed to ask questions about its fractal character and attempt to define a fractal dimension. Our two-

dimensional general structure and our three-dimensional cartography are clearly complex structures for which the following definition of a fractal dimension  $d$  has been suggested:

$$d = \lim_{e \rightarrow 0} [\log N(e)/\log(1/e)] \quad (1)$$

where  $e$  is the diameter of each of the  $N(e)$  circles which entirely cover and define the structure under study. If the limit does not exist, its upper bound is taken to define the fractal dimension (Brezinski, 1990: 11).

Mathematically, this means we would have to have at least enough circles  $N(e)$  to cover the trunk questions and distinguish between them and other questions. This means between 40 and 100. Their diameter would have to be small enough on the two-dimensional general structure diagram so that no two themes-questions would figure inside a single circle. This could furnish the initial value of the series defined above. The scale-independent character of social conflict also implies that the introduction of other themes-questions changes neither the structure, nor the fractal dimension, meaning that  $N(e)$  and  $e$  should be calculated only for trunk questions. Moreover, scale-independence implies that there is only one fractal dimension for all human societies, for all human cultures and for all individuals.

It is not evident from this formulation of the fractal dimension what it implies in terms of reaction to social conflict. This is also true of the associated power law:

$$N(e) \sim c \times (1/e)^d \quad (2)$$

but in this case a conjecture is possible. In Davidson's work, mentioned above, affect asymetry, which we associate directly with the general structure of social conflict, involves excitation time, amplitude, duration and drop-off time of emotional reactions. Excitation seems to be an exponential phenomenon for everyone, but amplitude, duration and drop-off time -- which characterize "affect style" -- tend to vary between slow, linear drop-off and steep, exponential suppression. Clearly, managing emotional reactions does not involve a linear mechanism, and Davidson hints at a possible fundamental role played by the amygdala. This could involve unleashing a "flight/fight" reaction or avoiding such a more or less uncontrolled reaction by "managing" emotional reactivity in some other active -- non-linear -- manner. Such "management" is a capacity recognized only for *Homo sapiens* and chimpanzees, and, therefore, in all likelihood, for our common ancestors. Improving this affect "management" capacity would clearly seem to be of evolutionary advantage, and human culture, child-rearing and education all seem to be involved in this non-linear and probably exponential process.

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