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FOR A STRUCTURAL ANALYSIS OF RELATIONAL CONTENTS

Results and discussion of a hierarchical ascending cluster analysis

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The first part of that communication was presented at INSNA Conference in Tampa (FL. USA 02-1989) under the title : "A WHOLIS-TIC APPROACH OF INTERPERSONAL RELATIONS - Is multiplexity a cumulative or structural index ?" At that time data analysis and improvement of the method were at a very beginning. The totally new version of part two and three discusses more seriously these points.
Data were collected during a research granted by Plan Construction 8261395 and Développement Spatial, Cadre de vie Mobilité 82.262 (MER),(Agencies of the Town Planning Ministry). Field work was done by B.Roudet and P.Terneaux. Preliminary data presentation was published in : "Amis et Associés" Fascicules 1,2,6. CESOL 1985 40 Allée Jules Verne 78170 La Celle Saint Cloud.France.
I want to thank M.O. LEBEAUX (CNRS-LASMAS) for tutoring me in the use of programs and for her help in data analysis.

That paper presents a step of a research oriented by two aims. One is "substantial", and can be summarized as an attempt to show content particularity of special relations which can be said created by and linked to life cycle events. Here, I wouldn't precise that aim. The second one is of more general concern: it deals with methodological and theoretical assumptions in person-nal network analysis, mainly with a way to take into account each "relation" not as a set of independent interactions or social exchanges but as a system in which partial contents are linked together.

Data should be used to illustrate the discussion which stand at the "zero level" of personal network analysis in so far as only relations between ego and alters are examined, without information and comments on alters-alters relations.

SUM, SET, OR SYSTEM, The three "S" dilemma of relational contents.

In such elementary network analysis, we deal with two kinds of observations:
a) Personal attributes of egos and alters;
b) Nature of ties ego-alters;
and analyses are performed either on the total sample of ties, or at the level of egos'networks by aggregating data on his/her whole set of relations to describe general properties of that set. Let us suppose that problems of "name generator" and "boundaries" are solved, to consider directly how nature of relations is empirically observed.

More commonly a group of questions ask respondent if he is engaged in different types of interactions with alters previously named. And other global information on relations can be collected : context in which people met (at the beginning) and meet (now); social label of relations (kin, coworker..); duration of the tie; subjective appreciation of closeness..

Now, at the tie level, the general logic form of a question on relational content is : if "x" then "y" ? Where "y" is any content characteristic and "x" any contextual indicator of relations or personal attributes of egos or alters. We can observe that neighbours are more helpful for house than kin who are more helpful for money than friends who... It means that we proceed analytically on the assumption that "a relation" is :
a) composed of elementary independent units of interaction or behaviour;
b) composed of few or many elementary interactions. (uni/multi-plexity; uni/multistrandiness).

The two assumptions are linked as long as we agree to measure multiplexity by the number of different interactions which compose a relation, and to consider that any combination of any type of four different interactions produce the same level of multiplexity.

In personal network research, multiplexity introduces the question of "a relation" as global reality, and anyone agree with the assumption that it is a pertinent empirical and conceptual unit.

What means "unit" ? What is it made of ? How is it made of ?

These points were discussed by BURT (in Applied network analysis 1983). The problem, said BURT, is that we can introduce artificial multiplexity if questions on interactions are in some way redundant, and if several items are used to define "different" interactions which, in fact, forme only one specific relational content. And all the discussion is based on relations between relational contents, in such a way that network concepts, measures, and computer programs could be used.

I understand Burt's purpose as:
a) an attempt to prevent in questionnaires the multiplication of items which could overlap, produce artificial multiplexity, and cost a lot of money;
b) as an attempt to adjust, to fit question formulation with various social groups understanding;

c) then, to allow researchers to go straight to the best possible question as indicator of a specific field of content.

I agree with some BURT 's ideas, mainly with the interest for analysing "relations" among relational contents. But my conclusions should be different, because I differ on a basic assumption. BURT 's analysis supposes that it exists different clear cuts fields of relational contents, and that all relations' contents, in a way or an other, refer to these fields. I should propose an another perspective which is also concerned by relations between relational contents, but under different basic assumptions.

The more important is that we can understand the realm of interpersonal relations as a continuum limited on one side by "role relations", at the other side by...nothing. The existence of imposed social patterns is evident. But all relations are not the simple execution of prescribed behaviour. About friendship, I should argue with PAINE (1969) that friendship "amounts to a kind of institutionalised non-institution": roughly speaking it is clear that very general patterns can say what is un-normal in that kind of relationship. But no pattern, and no control, can oblige two partners to interact in such or such a way. At that "end" of the continuum, we faced the effects of privacy and interpersonal liberty socially legitimated.

A second important assumption is that a relation is a process. It was said about friendship (MERTON & LAZARSFELD 1954, ALLAN 1979). But friendship is not a natural initial quality of a relation. Before friendship, most often, there was any kind of role relationship. To said that a relation is a process, implies:
a) actual content of the relation influences what can happen in future;
b) relation can be "stable" as well as "changing". If changing, extending or decreasing; it can finish.
c) it can move from a social, or contextual definition and regulation of the relation, to an interpersonal private definition and regulation.
d) inasmuch social context and social patterns change slowly, or not at all, a relation is more seemingly to be a changing process if it goes off contexts toward interpersonal regulation.
e) if relation goes under interpersonal regulation, it goes under a unified principle of regulation.

Translated in the empirical terms of personal networks analysis:
- change (b) means for example : substitution of an interaction by an another; addition or suppression;...These changes affect contents and multiplexity.
- type of regulation (c) : we can find strong or weak correlation between context and content, in so far as a "neighbour" which is now also something else, continues to be frequented in the neighbourhood..
- unity (e): as long as content multiplexity goes with a "multiplex" regulation (two partners do that "as" co-members, then that "as" kin, etc) each interaction which composes the relation can be regarded and computed as a discrete elementary observation (In fact only if we have good reasons to think there is no effect of kinship relations on membership and reciprocally, otherwise the real relation is to be "kin & co-member"). But when regulation falls under

partners' control, a specific interaction is a part of the whole process, of the "relational package". And then the content is not a sum but a system of interactions.

Another way to say that: multiplexity is an interesting empirical measure; it shows how much different interactions compose the relation. But it does not say how they compose it. Multiplexity recognizes that composition of a relation is an important characteristic, but from multiplexity index, comments are generally drawn to either the social insertion of ego, or the possible functions of the tie, never to the nature of the relation itself. In classical functionalist view, that should be understandable. Regarding the structuralist orientation of network analysis, the importance given, at least at the network level, to "formal or structural" characteristics as able to prevail over contents, it is curious to see that no substantial questions arise when we deal with different level of multiplexity.

Roughly, the question is to decide if a specific interaction (help around the house as well as lend money, or anything else..) can have the same meaning when it is the only one exclusive content of a relation and when it is one among other inter-actions which compose the relation.

More generally, the question is to decide if interaction "A", as part of a relation, have the same meaning when :
a) multiplexity is low or high;
b) it goes with interactions "X", or with "Y".

Multiplexity can be understood only as a cumulative quantitative characteristic.

Multiplexity can also be understood as a structural qualitative characteristic.

In the cumulative way of thinking, it is reasonable to compute any type of mean index on each interaction used to describe relational contents. In the structural way, we have to assume that interactions which compose a relation are linked, interdependent: if R1, R2, R3 three relations of the same ego; if A, B, C, D four interactions :

R1= (A-B);
R2= (A-C-D);
R3= (A);

The meanings of A in R1, R2, R3 must be regarded as different, and it is meaningless to sum "A", because in fact there are A(R1) ; A(R2) ; A(R3).

If we agree with the "interaction of interactions", or structural understanding of each relational content as a totality, interactions are no longer strictly independent variables, supposed to reach in empirical observations separate realities, but partial indicators of a more global reality : the relation itself, as a whole. And then, units of observation and analyses are relations. Questions on interactions are only methodological way to approach a very complex reality: what are relational contents as interdependent interactions ?

I should call a "relational pattern" any specific combination of interactions which constitutes an observed relation, like those presented above : (A-B), (A-C-D), etc

In the small survey I have done (egos=102; links=1810), I found 740 different patterns, formed by egos'answers to 23 possible interactions. The average number of relations by egos (personal network size) is 17.7, and the average number of patterns is 7.2; or there is one specific pattern for 2.4 relations.

One can argues that questions are crazy and that variety and diversity owe to random selection among either meaningless or redundant items. If so, I think that human lazyness should have produced an inverse result; people should have used few interactions and used them to qualify "all" their relations. (that happen indeed in some cases). Anyway, let us do "as if" there was no problem about questions.

A second more substantial argument is that survey produces an "instant photo" of divers relational process. Durations of relations are very different; if relations are process, if, for some relations it is a changing process, then instant photo cut process at different stages of development or recession. And that variety should reflect stages of only few types of relational process. That assumption is correct and meaningful. For the moment, I don't know how to manage data to ascertain if it is valid. It opens a complex field of research in which relational patterns should be defined as patterns of transformation. When we mind relational turn over, which is important through life cycle, to understand what a personal network is made of, and what we do with, to day, we have to understand how relations can be built, maintained, and killed. Again, let us do "as if" patterns were stable.

If we assume that correct level of analyse is relational pattern we have:

a) to find a way to reduce diversity to a number of patterns which should be usable and, if possible! meaningful;
b) to reanalyse network multiplexity in term of number of patterns;
c) to examine if that pattern-multiplexity is significant regarding egos' attributes and biography;
d) to focus attention, not on the fact that one can do that with an alter or obtain "x" from him, but on combinations of interactions which are possible/impossible in relational patterns. Perhaps (??) it should help to understand how some combinations of interactions are more flexible than other, can respond to new needs of individuals by compatibility with new types of exchanges, when others are exclusive.

The second part of the paper is an attempt to realize point "a" on a specific data set. Specific because the sample was designed to describe what kind of interpersonal relations can be produced by an important involvement in associations, clubs, humanitarian organizations, etc, and it is composed of associations' staff members. Specific because it represents (upper) middle class. Main characteristics of the sample are presented in annexes.

RELATIONAL PATTERNS a methodological "wholistic" attempt

Data, selection and transformation

After a biographical section which details professional, residential, and personal engagement in voluntary groups, the questionnaire asks respondents to list peoples they have known in:
- place where they live today, or where they have lived;
- place where they work today or where they have worked;
- any club, association, voluntary group to which they belong or have belonged;

and that they continue to meet as "personal relations". Respondents write on a sheet of paper first name or nickname in boxes with a pre-coded id-number. Up to 92 possibilities were given.

Then respondents are invited to say with whom they have such or such activity. They answer question by question. Each time, they use their list to answer, giving the pre-coded idnumber of all partners with which the interaction described by the question occurs or is possible. The 102 respondents have described 1810 relations. List of items is given Table 1.

In the previous presentation (FERRAND 1989), correspondence analysis and classification showed a powerful effect of few variables. Amongst them, three appeared ambiguously as content and contextual indicators: A4, A11, and A14. Indeed they mainly relate to physical distance between partners and how to stay in touch (see Annexes Table 1). After discussions it seemed better to get more homogeneity in data (I thank D.KNOKE, P.V.MARSDEN, and B.WELLMAN for their suggestions and advices).
. So, these variables are dropped out. And relations in which no other interactions occur are also suppressed. Size sample decreases from 1810 to 1740 relations.

Secondly, with dichotomous variables (0/1), hierarchical classification weights more relations with a larger number of "1", i.e., a high level of multiplexity. As we are looking for a structural qualitative typology of differences amongst relations, and as it is very simple to measure multiplexity in another way, we give an equal weight to each relation in the clustering process by doubling variables A(1-23) with a Z(1-23) inverse image (0 if 1). Doing so, we consider "0" not as a "no response", but as "response: no".

Results: decisions

Classification can work or not! The question is how dispersion of data can be captured by clustering process. The total data diversity should, of course, be represented at a 100% level by 740 classes corresponding to the 740 different patterns of relations known to exist in the data. Here we decide to retain 15 classes, able to account for 40% of the diversity. Given the fact that we used totally disjunctive data with which "a very low rate is often obtained" (FENELON 1981, p.164) we can say: "it does not work so bad! »

Results: analysis of clustering process.

For each class the mean of each activity is computed (Annexes Table 2). To contrast results, we present the position of the class' mean in the general distribution of the variable. (+ if >(mean+variance), - if <(mean-variance), " " other). On the right, the table displays classes'sizes, distance of the gravity centre of the class from centre of the cloud, and the dendogram (line space and length of == are approximatively proportional to the level of aggregation).

Classes' sizes indicate:
2 monsters, (C10, C14) with N around 300, gather more than one third of relations, (36%).
7 small, with 55<N<80, gather one quarter of relations (25%)
6 normal, with 90<N<135, gather 39% of the sample.
Apriori, we can only say that one of the two "monsters» is probably the "Trash" of clustering process. A direct lecture of dendogram shows a major opposition between 3 classes (C7+8+1; N=201) and all the other; and a secondary opposition amongst the remaining (C10+11+6+14+4; N=997) / (C2+3+12+13+9+5; N=542).

Now, mind that intuitive lecture of Table 2 creates a contradiction between our most usual dyadic way to compare pairs of patterns, and the logic of clustering process which takes into accounts the whole structure of data. It is very well illustrated by (C7+8+1). It seems obvious that C7 should have been aggregated first with C1 (they differ only on 1 variable), and after with, for example C12 (diff=11), better than with C8 (diff=16). In fact a variable (A19) have in the whole set of data a very discriminating distribution: present in few relations and absent from all the other in any kind of combination of other variables. It is largely because C7 (Ma19=.96) and C8 (Ma19=1.0) have both a very high mean frequency of A19 **and** because all the other have a null frequency, that they were gathered.

So, let us set away any attempt to uncover immediate meanings of each separated class' pattern suggested by activities over or under represented, and let us go back to the whole set of data. Here we are bound in a London fog. But, if no feature of the landscape is apparent, nevertheless we can understand step by step what is on the left and what is on the right, and study on which variable clustering process have recognize differences between classes.

Given the data cloud, each class captures elements in specific area, and the distance of the class from the centre of the cloud is displayed in the right column of Table 2. It shows a sort of ternary structure:
- The classes at the top of the dendogram (C7, 8, 1) are very far away from the centre.
- The two "monsters"(C10:1.7; C14:1.4) are very close to the centre.
- Others are at a distance of 2.0 to 5.5.
The classification puts apart:
- classes with an over representation of almost all the activities (top of the dendogram : many "+").
- classes with an under-representation of most of the activities (middle of the dendogram : many "-").

- classes which present an intermediate pattern (bottom).

The first and main discrimination reproduces the level of multiplexity. If, by doubling variables, we have given an equal weight to each relation, we have also reinforced the global discriminating power or each "1" or "0". That differentiation gives only formal global characteristics of classes' patterns. So we should not comment it longer, and, in point 4, we should spend more time with internal organization of each block, where real content differentiation appears.

Now let's look at the clustering process, (program outputs ordered listing of gathered classes- it is approximatively displayed Table 2 by line-spaces and the distance at which two clusters are linked). It can be summarized as:

- the central block is the first to be formed around the two "monsters" by attracting four classes.
- the lower block then finishes to be unified;
- it is unified with the central, and, only at that step, in the upper block, C1 is linked with (C7+8).

It means that the "mean", the centre, is less powerful than the differences: it's not directly around and by him that the world is organized; peripheries need a long and independent process of dedifferentiation before collapsing together. We should have to pay particular attention to classes such as C1 for the first block; C4, for the central one; C2, C3 for the last one, because they "resist" a long time in claiming their differences.

Classes' model contrasts.

Data cloud is structured, more or less, by variables axes, and each of them determines, more or less, the position of each class. In that sense, classes are, more or less, "correlated" with each variable. The (absolute) sum of their correlation coefficients through all variables is 1(x1000): the total definition of its position in the cloud. Variables are more or less powerful through all classes to produce differences and contrasts. Activities which are frequent and which appear with any other activities are unable to produce differentiation. It is shown in results by low correlations of these variables with gravity centres of classes. Theses variables are not inactive and meaningless. They form a sort of basic relational package very common. Seven variables are in that case:

1. To receive at home for dinner or visit for dinner. 2. To celebrate together a birth or wedding anniversary. 3. To enjoy chatting on the phone. 7. To go out together to the movies, a restaurant, or skiing. 9. To ask to care of your children for one or several days in case of emergency. 13. Not to be embarrassed by a surprise visit. 16. To feel close to someone, out of family circle, to go out and do something together.

We see that common undifferentiated basis of relational process is formed by day to day sociability.

So, in Table 3 we retain more powerful variables (12 among 40; no doubled one; these 12 variables explain from 50 to 90% of the position; the average value of a cell can be:

1000/40=25). Cells contents are, for a type, the proportion of its position explained by the variables.

The result of the classification is very clear-cut. Signs "+" or "-" confirm the multiplexity contrast between the three blocks. First block's relations are very polyfunctional, with a maximum degree of multiplexity, when other are more specialized.

The upper block, which contains 11.5% of the sample, is formed by very special relations: people interact in almost all the possible ways. That is evident for C7 and C1; but less for C8. The difference is that some relations are able to be a helper or a complice if one would "chuck all in his life"(A19). And we can say:
-C7: they do all, and also help in important life course breakdown ;("The absolute" N=55).
-C8: they essentially help for breakdown, and are even able to interact in all other ways ;("Crisis helper" N=56).
-C1: they do all, and are nevertheless able to help in important life disruption ;("All possibles" N=90).

Now the "monsters". We have seen that meaningless variables (dropped out in that presentation) describe day to day sociability. They form the indistinctive core of relational process. C14 (N=297) is the closest to the centre of the cloud, and his small difference owes to A12 (visit for New Year or Christmas thanksgiving) a less frequent exercise, but an essentially sociable one. I should name C14 "Basic day to day". It should attract C15 (N=78) which is marked by A15 (live together for holidays), that I should name "Basic-holidays".

C10 (N: 334) shows a very regular and exclusively negative pattern. It mixes relations with few randomly distributed interactions, it is probably, and can be named, "The trash" of the classification.

"Trash"(C10) will attract C11 strongly marked by A21 (To confide important personal health problems; 61%), that I should label "Health confident".

The classes' patterns of "Trash" and "Health confident" are structurally contrasted. Indeed, "Trash"(C10) is totally defined by a deep under representation on all variables, when "Health confident"C11 is marked by a strong positive value concentrated on one variable which accounts for 61% of its position. It means that the pattern of "Health confident" is much more specialized, and that it is attracted by "Trash"C10 because of a sharing "negative" quality: to under represent all the variables. If we have seen that some proximity owes obviously to specific positive common variables, we see now that another kind of proximity can owes to generalized common negative properties. So, "Trash" gathers differentially specialized relations, principally marked, but under marked by sociable interactions, which, in the whole set of data have only a weak power of differentiation. "Health confident"C11 is generally under marked because it is specifically over marked, as a specialized relation in the field of discussion about personal health problems.

C6 is also generally under marked, but less positively specialized, and marked by A22 (To reminisce with about your youthful excess). I should name it "Youth memory".

Theses two last classes of relations involve ego personally, one in the present weakness of the body and the risks of illness, the other in the memory of glorious days where ego was able to provoke risks. We have found "Basic day to day" and "Basic holidays", which involve ego in more familial role relations as other components of that central block. So, we are not in a chaotic melting pot: an opposition exists between [personally/familiarly] involve, and between [risky/quite]. But, later in aggregative process, C4 (N=101) arrives in a sort of intermediate position, marked by A20 (To go together on a difficult mountain hike or far away trip). "Hike" is concerned on one side by leisure, generally collective, as "Basic holidays" (C15), and on the other side by personal risk as "Health confident" (C11). I name it "Leisure risks".

Theses 6 classes gather 1000 relations, 57.3% of the entire sample.

The bottom of Table #2 shows 6 class whose sizes range from 55 to 130. Each class is marked by one or two interactions over-represented; but on other variables we can find either a slight under representation either a small overrepresentation. Generally speaking, these classes are less specialized than "Basic...» or "Health confident". But much more than those of the first block.

Typical example is C12, which is defined by A6 (To discuss job difficulties or hopes; 20.6%) and by A8 (To speak of one's childhood days and of one's relations with parents at this time; 18.6%), and by A22 (Youth excess; 8.7%). It shares two positive dimensions with the class "Youth memory" (on A8, A22), but it is much less specialized, and marked also by A6 (Discuss job). I should name it "Job and youth discussion". At the first step, it gathers with C13 ("Job discussion") which is more exclusively concerned by professional matters (A6=51%).

The job and youth oriented block they form then attracts C9 specified by A5 (To confide great anxieties about children's problems; 58.5%). That «Children anxieties» relation has also a pale coloration on personal health problems and youth excess.

After arrives C5 defined for 82.6% by A18 (To create a future business together). It is interesting to see that class ("Job creation") apart from "Job discussion". If they both deal with professional field, if they are concerned by the same kind of issues, they differ strongly by the degree of interpersonal engagement and trust: to speak of with, versus to do together and
To engage money.

In "Job creation", two other dimensions emerge: A17 (To discuss before a decision which involves you deeply, concerning your action in associations) and A10 (To lend or borrow an important amount of money). One specifies strongly C3 ("Militant" A17=70%) as a specialized relation, when C2 appears as a more polyvalent sociable relation but able to manage" money exchanges" (A10=44%).

So, in that last block, clustering process begins with "discussion" and verbal support multiplex relations and after appears more interpersonally actively engaged relations.

FROM CLASSIFICATION LOGIC TO SOCIO LOGIC

Discussion and conclusion

Classification logic.

a) We don't comment above all the activities which compose contents of relations clustered in a class, but only those which produce contrasts and differences. We describe oppositional marks. It says how the distance between classes was mainly produced by clustering process in the multidimensional space formed by 740 different patterns and 40 variables.

b) Above comments have mainly emphasized positive marks, because they are more intuitively meaningful. In classification logic, we are half the way: classification process works on common presence or absence of an activity.

c) Results are "chosen»: you should have decided to stop at 20 classes or 5 class's level. Ascending aggregative process of classification reorganizes permanently observations and modifies variables' distributions. Table 3 which shows more or less discriminating variables is specific to the 15 classes level. At a 5 classes' level, variables should have shown different values, even if comparatively the more discriminating should have been always be the same.

d) As a class is defined by its position in the whole cloud, as the cloud is defined by 40 variables-axes, each class is defined by a 40 variables vector: classes-patterns are built as "wholistic unit". As weight and orientations of variables-axes are defined by all classes' patterns, each class is defined as element of system of differences. The definition of a class is exclusively structural.

e) A global measure of discrimination is given by the distance of the class to the centre of the cloud. But as the first differentiation process mixes a strong effect of multiplexity with contents information, we need more analytic indexes to describe the structures of classes' patterns.

f) We have to mind that we are not really used to speak of observations and of essential effects of observations on variables, except when the matter is to drop out "silly" observations. When we have discussed specific variables, we have said that a variable is more or less "discriminating" and a class more or less "marked" by a variable. Words and syntax do as if variables were the actors, and class the objects of actions. It is not false, but half true, because we can say as well that a variable is marked by a class which is very discriminating. The two propositions are totally interdependent:
- To discriminate or to mark is to produce a difference such as few elements are isolated from all other.

- A variable is strongly "marked" by a class if that class gathers all the observations "yes" (or "not") when other classes gather observations "not" (or "yes").
- A class is very discriminating if the observations it gathers have generally a common pattern except on few variables. We can speak of a "contrasted" pattern of the class.
- A variable can be strongly "marked" by a class, only if that class is discriminating.

g) "Contrast» in results as Table 3 can be evaluated by the shape of the distribution of correlation coefficients which compose classes' patterns (lines). Coefficient of variation, as an "abstract" of that distribution, indicates the level of "contrast" of the pattern. The higher it is, the more contrasted the pattern, because one or few variables mark strongly that class, when all other are meaningless.

Sociological results

a) That classification is done on the whole sample of relations. The structure is the structure of that set of data which mixes relations of different individuals whose personal relational systems can possibly be organized by different rules. The general structure of data classification can be produced by the overlap of two, three, four..socially differentiated ways to organized ego-network. At that step, we can't argue that cluster structure is an image of individual's networks structuring. It is an image of an abstract diversified collective "personal" network with 1740 relations.

b) Given conclusion (1-e above) that procedure is coherent with the hypothesis that relations are "wholistic" combinations or arrangements of activities. Given conclusion 2-a, that procedure shows differences between relations which are artificially extracted and isolated from many different ego-networks. That procedure is coherent with the hypothesis that relations are autonomous "per-se" realities. Each kind of relation can be regulated by a type of interpersonal contract, regardless the other relations which compose ego-networks.

c) If we say that relations are process, and that some relations are under "contextual segmented control and regulation" when other are under "unified interpersonal regulation", it means that only some of the relations in the total sample could be analysed with a method which try to get them as "wholistic reality". But we have run the classification on the entire sample.

d) The method works quite well, and results don't seem meaningless. We should have to verify intra-class dispersion, but we can say that 740 relational patterns can reasonably be distributed in 15 classes. It does not "prove" that relations are "wholistic realities". It shows that if one wants to work with that postulate, it is possible.

e) Given the 20 interactions imposed by the questionnaire to describe relational contents, it shows that some interactions are distributed in such a way trough relational patterns that they don't produce differentiation. In any type of relations you should find several of them, in randomly formed arrangements, and combined with any other discriminating interactions.

They mainly cover sociable interactions, at home or out (A7), formal (A1) or casual (A13), familial (A1) or inter-individual (A16). Only one interaction (To ask to care of your children for one or several days in case of emergency) is in the field of practical social support. But other empirical analyses have shown that, where the survey was done, children are very important occasions of primary and permanent contact between families. To exchange children is as well a mutual help as an occasion to ratify an "alliance".

Theses sociable interactions don't look like a specific field, but like a prerequisite for any type of relations.

f) Classes' patterns have differentiated structures: 6 are much contrasted. For "crisis helper", "job creation", "militant", "leisure risk", one variable is able to define from 90% to 70% of the class' position. At a lower level, "money", "health confident", "child anxieties" have also a pattern strongly contrasted.

If we compare these contrasted patterns with the other, we can propose: the more a relation involves ego personally (as individual), the more contrasted it is.

g) There are different kinds of contrasted arrangements of interactions:
- Some are extensive, as "Crisis helper"(C8), "Children anxieties"(C9) or "Job creation"(C5). Others variables play a small role, but they can be positive. It means that these relations include some interactions in irregular arrangements and also one or two exceptional which mark the pattern.
- Other are exclusive as "Health confident" (C11), "Leisure risks"(C4) or "Militant"(C3). Other variables play a small role in the definition of the patterns, but are relatively under-represented. It means that if you interact in the dominant field of the pattern, you do only that. But interactions which characterize these "exclusive" patterns are also represented in "Absolute" or in "All possible". They can take place either in a specialized pattern or in a very polyfunctional and comprehensive one. They are not "essentially" exclusive. We can say: relations which include more interpersonal interactions can exceptionally be polyfunctional (C7+C8=111), more often they are much contrasted.

h) Anyone should have imagine that "job discussion" and "job creation", or that "basic holidays" and "leisure risks", should have been slightly differentiated indicators of underlying relational trends; and that we should have found them as common characteristics of one pattern. In the classification logic, it is not the case. It is as well because they are good non overlapping separate indicators as because they occur in arrangements differentiated by other interactions opposing deep personal / sociable activities.

But a problem remains: contrasted patterns are mainly characterized by one interaction and not by two, three..., activities that people should have systematically include in the same relations. We arrive to a paradox: we wanted to define relational contents as specific arrangements of several different interactions; classification results show that, for contrasted patterns, one interaction dominates the arrangement. That method, on that sample of relations, shows that the general logic to define specific relations is more:

"no no no yes no no no no"

Than:

"- - - yes - yes - yes".

To do something together implies more that you don't do many other things, than you do also some other specific activities. That negative proposition means that if social definitions of relational patterns exist, they say more what activities must not than what activities must, be engaged with the same partner. In the boundaries of prohibitions, actors manage free random arrangements of activities.

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Contents of relations

1. Recevoir à la maison pour un dîner ou aller dîner chez quelqu'un.
2. Fêter ensemble un anniversaire de naissance ou de mariage.
3. Avoir plaisir à discuter de tout et de rien au téléphone.
4. Faire un effort particulier pour rencontrer quelqu'un qui habite loin.
5. Confier les inquiétudes graves qu'on peut avoir à propos de ses enfants.
6. Parler de difficultés ou d'espoirs professionnels.
7. Sortir ensemble (cinéma, ski,restaurant, etc.).
8. Parler de son enfance, des relations avec ses parents à l'époque.
9. Confier les enfants pour un ou plusieurs jours en cas de coups durs.
10. Prêter ou emprunter une somme importante.
11. Avoir une correspondance suivie.
12. Inviter ou rendre visite à l'occasion du réveillon.
13. Ne pas être gêné de voir arriver quelqu'un chez soi ou d'aller voir quelqu'un sans prévenir avant.
14. Avoir plaisir à rencontrer "comme ça" dans le quartier.
15. Vivre en commun pendant les vacances, partager un studio, une maison, un bateau.
16. Se sentir en complicité avec quelqu'un, en dehors du cercle familial, pour sortir ensemble, faire quelque chose ensemble.
17. Discuter avant de prendre une décision importante qui engage très personnellement concernant les activités associatives, militantes.
18. Engager son avenir professionnel, éventuellement son argent, pour se lancer dans une affaire, pour créer un commerce, une entreprise, etc.
19. Si vous deviez "tout plaquer" dans la vie, chez qui iriez-vous ou avec qui souhaiteriez-vous partir ?
20. Partir pour une excursion difficile, une expédition lointaine.
21. Faire des confidences sur de graves problèmes de santé.
22. Evoquer les "400 coups" de sa jeunesse.
23. Engager dans une discussion ses convictions profondes, ses valeurs personnelles.

```
                        ---- TABLE 2 ----

C  |Activities :          | S | D |    Size : Number of relations
L  |AAAAAAA AAAAAAAAAAAAA | I | I |    in the class.
A  |0000011 0001111112222 | Z | S |    Dist : distance of class
S  |1237936 5680257890123 | E | T |    from data cloud center.
----------- ------------------------

 7  +++++++ ++++++++++++  | 55|19.0|  ---+
                                        +==+
 8               + ++     | 56| 7.9|  ---+  |
                                            +=======+
                                            |       |
                                            |       |
                                            |       |
 1  +++++++ ++++++ +-++++ | 90|14.5|  -------+       |
                                                     |
                                                     |
                                                     |
                                                     |
10   -  -   ------------  |334| 1.7|  --+           |
                                         ++          |
11  -           ----- +   | 54| 4.3|  --+|          |
                                         |+          |
 6  -- -    --+-- -----+- |133| 3.1|  ---+|          |
                                          |          |
                                          +=+        |
                                          | |        |
14    -     --  +  ------ |297| 1.4|  --+ |        |
                                         +=+         |
15      -   ---- +------  | 78| 2.6|  --+ |        |
                                          +          |
                                          |          |
                                          |          |
 4                 -+-   |101| 3.4|  ----+ |        |
                                          |          |
                                            +=======+
                                            |
                                            |
 2  + ++++     +  ---     |106| 4.7|  ----+ |
                                          | |
                                          | |
 3            - -+ -  -  |116| 4.0|  ----+ |
                                          | |      Legend :
                                          +=+      Mean of the cla.
12  + ++    +++ +   -- +  | 68| 4.2|  --+ |       + :>moy+var
                                         ++|       - :<moy-var
13      ---  +--  -----   | 67| 3.4|  --+||    Blank :other
                                          ++    Moy and var. are
 9   +  +   +       -     |130| 2.0|  ---+|    computed on the
                                          |     1740 relations.
                                          |
 5           + +   +-     | 55| 5.5|  ----+
```

---- TABLE 3 ----

CLA	A 5	A 6	A 8	A 10	A 21	A 25	A 27	A 28	A 29	A 30	A 31	A 32	Sum cor tabl
7	19	11	16	59	5	48	6	104	340	37	45	14	704
8	1	2	0	-1	0	14	0	5	883	5	2	2	915
1	70	67	80	46	8	54	11	67	-2	51	67	28	561
10	-54	-56	-63	-51	-78	-75	-40	-27	-19	-40	-43	-58	604
11	-14	-6	-1	-9	-18	-19	-15	-11	-7	-1	612	-4	717
6	-26	-29	99	-27	-28	-10	-21	-15	-10	-24	-23	257	549
14	-55	-53	-40	-17	120	-35	-25	-31	-22	-48	-40	-54	540
15	-36	-32	-28	-27	20	372	-25	-17	-12	-28	-27	-35	649
4	-9	-4	-9	0	0	17	-14	-10	-9	730	-18	0	820
2	4	0	0	439	4	6	-12	-10	-7	-3	-5	-8	496
3	-11	0	-10	-17	-10	-19	702	-9	-8	-9	1	-20	816
12	55	206	186	0	31	-14	-2	0	-7	-17	7	87	612
13	-13	508	-20	-25	-9	-11	-15	-13	-9	-17	-21	1	662
9	585	-7	0	-25	-4	5	1	-15	-15	-1	12	15	685
5	0	14	0	17	-1	0	22	826	-6	1	0	0	887

Cells display correlations between the centres of class' clouds and variables.
General correlations sum (line sum, for 40 variables) =1.000.
Right column= sum of corr. for variables shown in the table.
Signs are convention to indicate if the frequency of that variable in the class is under/over the general mean.

SAMPLE CARACTERISTICS: N=102 from a middle and upper middle class suburb (Meylan,pop=15.000) of GRENOBLE (Isère-France). Half were selected as members of voluntary groups boards.
Warning : This sample gives only a possible image of (upper) middle class.

SEX	Freq	Percent
MEN	38	37.3
WEMEN	64	62.7

KINSHIP PROXIMITY.
A least one (=<2 degree) kin

	Freq	Percent
SAME SUBURB (MEYLAN)	29	28.3
SAME URBAN AERA(GRENOBLE)	36	35.4
NO LOCAL KIN	37	36.3

AGES(mean=41)	Freq	Percent
20-34	21	20.6
35-49	65	63.7
50-70	16	15.7

NUMBER OF CHILDREN

NB	Freq	Percent	Cumul. Percent
0	14	13.7	13.7
1	12	11.8	25.5
2	35	34.3	59.8
3	26	25.5	85.3
4	12	11.8	97.1
5	1	1.0	98.0
6	2	2.0	100.0

(Mean=2.21)

MARITAL STATUS.

STATUS	Freq	Percent
Single	13	12.7
Married	78	76.5
Divorced	6	5.9
Widow(er)	2	2.0
Concub.	3	2.9

PROFFESIONNAL MOBILITY.
(Number of jobs)

NB	Freq	Percent	Cumul Percen
1	17	16.7	16.7
2	25	24.5	41.2
3	25	24.5	65.7
4	16	15.7	81.4
5	9	8.8	90.2
6	5	4.9	95.1
7	4	3.9	99.0
8	1	1.0	100.0

(Mean=3.1)

RESIDENTIAL MOBILITY.
Number of residences.

NB	Freq	Percent	Cumul. Percent
3	8	7.8	7.8
4	15	14.7	22.5
5	22	21.6	44.1
6	15	14.7	58.8
7	17	16.7	75.5
8	8	7.8	83.3
9	9	8.8	92.2
10 and +	8	7.8	100.0

(Mean=6.2)

LEVEL OF STUDIES	Freq	Percent
LESS THAN BACCALAUREAT	17	12.6
BACCALAUREAT OR EQUIV.		
PROFESSIONAL DIPLOMA	29	28.5
BACCAL. + 2 YEARS	12	11.8
BACCAL. + 4 YEARS	21	20.6
6 YEARS UNIVERSITY		
AND MORE	23	22.6

Baccalaureat ends secondary school (17/19 years old)

SOCIO-PROFESSIONNAL STATUS.	Freq	Percent
2 CRAFTSMEN,TRADESMEN,BUSINESSMEN	2	2.0
3 MANAGERIAL STAFF, PROFESSIONAL MEN	38	37.3
4 LOWER SALARIED STAFF	21	20.6
5 EMPLOYEES (SHOP,OFFICE,STATE)	13	12.7
6 WORKERS	1	1.0
8 UNACTIVE PEOPLE (not retired,not unemployed)	27	26.5

PERSONNAL NETWORKS (N=102) :
Warning : kinship relations were excluded.

NUMBER OF PERSONS (by personnal network)

NB	Freq	%	%+
2	2	2.0	2.0
3	1	1.0	2.9
5	2	2.0	4.9
6	3	2.9	7.8
7	3	2.9	10.8
8	3	2.9	13.7
9	4	3.9	17.6
10	8	7.8	25.5
11	8	7.8	33.3
12	9	8.8	42.2
13	3	2.9	45.1
14	3	2.9	48.0
15	4	3.9	52.0
16	5	4.9	56.9
17	7	6.9	63.7
18	2	2.0	65.7
19	5	4.9	70.6
21	2	2.0	72.5
22	2	2.0	74.5
23	2	2.0	76.5
25	1	1.0	77.5
26	2	2.0	79.4
27	2	2.0	81.4
28	2	2.0	83.3
29	2	2.0	85.3
30	1	1.0	86.3
31	2	2.0	88.2
34	1	1.0	89.2
35	1	1.0	90.2
36	1	1.0	91.2
37	1	1.0	92.2
39	4	3.9	96.1
40	1	1.0	97.1
42	1	1.0	98.0
47	1	1.0	99.0
51	1	1.0	100.0

(Mean=17.75)

NUMBER OF DIFFERENT ORIGINS OF RELATIONS

NB	Freq	%	%+
2	4	3.9	3.9
3	12	11.8	15.7
4	20	19.6	35.3
5	20	19.6	54.9
6	18	17.6	72.5
7	11	10.8	83.3
8	11	10.8	94.1
9	2	2.0	96.1
10	3	2.9	99.0
11	1	1.0	100.0

(Mean=5.45)

MULTIPLEXITY: by network, number of different interactions.

NB	Freq	%	
3	2	2.0	2.0
6	1	1.0	2.9
7	1	1.0	3.9
8	1	1.0	4.9
9	2	2.0	6.9
11	1	1.0	7.8
12	2	2.0	9.8
13	3	2.9	12.7
14	8	7.8	20.6
15	1	1.0	21.6
16	5	4.9	26.5
17	10	9.8	36.3
18	9	8.8	45.1
19	8	7.8	52.9
20	16	15.7	68.6
21	14	13.7	82.4
22	13	12.7	95.1
23	5	4.9	100.0

(Mean=17.89)

Warning There were 23 interactions proposed in the questionnaire. That index gives only the number of different interactions each ego uses to describe relations in his whole network. It is not an index of mean multiplexity of relations by network. It can be also understood as a measure of the extent to which interactions proposed by questionnaire fit with egos'relational patterns.

IN EACH NETWORK, PERCENTAGE OF PERSONS KNOWN AT THE BEGUINNING IN :

	Mean	Std Dev
PLACE OF DWELLING	55.97	20.87
WORK PLACE	22.26	15.68
CLUBS AND VOLUNTARY GROUPS(anywhere)	21.77	18.64

Warning : These % are on origins of relations and not on actual context.

Arrondi aux dizaines

C L A	A 5	A 6	A 8	A 10	A 12	A 15	A 17	A 18	A 19	A 20	A 21	A 22	Sum cor tabl
7	2	1	2	6	0	5	1	10	34	4	5	1	704
8	0	0	0	0	0	1	0	1	88	1	0	0	915
1	7	7	8	5	1	5	1	7	0	5	7	3	561
10	-5	-6	-6	-5	-8	-8	-4	-3	-2	-4	-4	-6	604
11	-1	-1	0	-1	-2	-2	-2	-1	-1	0	61	0	717
6	-3	-3	10	-3	-3	-1	-2	-2	-1	-2	-2	26	549
14	-5	-5	-4	-2	12	-4	-3	-3	-2	-5	-4	-5	540
15	-4	-3	-3	-3	2	37	-3	-2	-1	-3	-3	-4	649
4	-1	0	-1	0	0	2	-1	-1	-1	73	-2	0	820
2	0	0	0	44	0	1	-1	-1	-1	0	-1	-1	496
3	-1	0	-1	-2	-1	-2	70	-1	-1	-1	0	-2	816
12	6	21	19	0	3	-1	0	0	-1	-2	1	9	612
13	-1	51	-2	-3	-1	-1	-2	-1	-1	-2	-2	0	662
9	59	-1	0	-3	0	1	1	-1	-2	0	1	2	685
5	0	1	0	2	0	0	2	83	-1	0	0	0	887

C L A	A 5	A 6	A 8	A 10	A 12	A 15	A 17	A 18	A 19	A 20	A 21	A 22	Sum cor tabl
7				6		5		10	34	4	5		704
8									88				915
1	7	7	8	5		5		7		5	7	3	561
10	-5	-6	-6	-5	-8	-8	-4	-3		-4	-4	-6	604
11											61		717
6	-3	-3	10	-3	-3							26	549
14	-5	-5	-4	-	12	-4	-3	-3		-5	-4	-5	540
15	-4	-3	-3	-3		37	-3			-3	-3	-4	649
4										73			820
2				44									496
3							70						816
12	6	21	19		3							9	612
13		51		-3									662
9	59			-3									685
5								83					887