Differences and similarities between European drivers in opinions about traffic measures

A cross-national study of the results of the SARTRE-survey

R-94-9
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1. Introduction

1.1. General background

The SARTRE survey: An international project

As the result of a collaborative effort of 15 research institutes, led by the French Institut National de Recherche sur les Transports et leur Sécurité (INRETS), a representative survey of drivers was conducted in 15 European countries. This project was named 'SARTRE' which stands for 'Social Attitudes to Road Traffic Risk in Europe'. This survey covers a wide spectrum of biographical driver data as well as opinions and attitudes to practically all subjects of road safety. More specifically, the survey focuses on drivers road behaviour, attitudes and opinions concerning drinking and driving, speeding and seat belt use, opinions on accident causation and on traffic measures, experiences with police enforcement, perceptions of behaviours of other drivers, car preferences, experiences with driving in foreign countries, and risk perception.

It has been carried out by national poll institutes, partly by means of the random-route method and partly by the quota method. Altogether more than 17000 drivers participated in the survey. Information on countries, sample sizes and timing of the surveys is given in Table 1.

Country	Research Institute	Survey starting	Survey ending	Sample size
1. Germany-East	BAST	06-12-91	03-1-92	1067
Germany-West	BAST	06-12-91	03-11-92	1021
2. Austria	KfV	31-10-91	20-11-91	1086
3. Belgium	IBSR	02-11-91	28-11-91	1104
4. Denmark	RfT	10-3-92	03-4-92	1260
5. Spain	Udv-Fdp	27-10-91	30-12-91	1207
6. France	INRETS	05-11-91	28-1-91	1008
7. United Kingdom	TRL	18-11-91	06-12-91	1449
8. Ireland	ERU	06-1-92	21-2-92	835
9. Italy	CENSIS	05-2-92	25-2-92	1000
10. Netherlands	SWOV	01-10-91	09-11-91	1009
11. Portugal	PRP	10-2-92	25-3-92	1048
12. Sweden	VTI	15-11-91	13-2-92	1266
13. Switzerland	BPA/BFU	01-11-91	01-1-92	1000
14. Hungary	KTI	15-9-92	05-11-92	999
15. Czechoslovakia	USMD	25-9-91	30-10-91	1071
Total				17430

Tabel 1. *An overview of countries, research institutes, sample sizes and surveys dates involved in the SARTRE-project.(Source: INRETS, (1993).*

The SARTRE survey presents us with an unique database on traffic-related attitudes, behaviours and experiences in fifteen different European countries. This database enables us to make comparisons between countries, to study determinants of traffic behaviour and to determine the

degree of societal support for different traffic measures. The possibilities for analysis are numerous, both from a fundamental theoretical viewpoint and from a practical, policy-relevant viewpoint. For instance, the association between traffic legislation and self-reported behaviours and attitudes could be examined, or the degree to which Europeans can agree on different traffic measures, could be investigated.

1.2. Research questions

An important aim of the SARTRE survey is to assist European policy makers in their decision making about traffic legislation, measures and campaigns. The planning of an unified traffic policy and the attempt to harmonize traffic measures can benefit substantially from knowledge about cross-national differences and similarities in traffic-related behaviours, attitudes and experiences. Therefore we need to understand how car drivers from different European countries compare with each other on traffic-related experiences, attitudes, preferences and/or behaviours.
In this report we focus on the following research questions:
(a) Are there important national differences with regard to opinions, attitudes and behaviours concerning traffic?
(b) How can we describe or interpret the dimensions along which European car drivers differ?
(c) Which groupings of European countries are similar or dissimilar on a particular dimension?
As we we have explained before, the SARTRE survey contains questions on various traffic topics. In this report we limit ourselves to study the above mentioned questions for two specific topics, opinions about traffic measures in general and opinions and behaviours concerning speed and speeding. The survey data on these two broad issues, traffic measures and speed and speeding, were analyzed to answer the research questions a, b and c.
In Chapter 2 we will present a short description of the statistical method. In this paragraph we'll also give some attention to the statistical program 'CANALS' which was used to execute the statistical analysis.
In Chapter 3 we will describe and discuss the results of the analyses.
Finally, Chapter 4 gives a summary of the main findings and a general discussion of these findings.

2. Method

To study the European differences on matters of traffic measures and of speed and speeding, a non-linear canonical correlation analysis was used. In this paragraph we'll briefly describe this analysis technique and the program 'CANALS' which was used to perform the analysis. A more thorough discussion of the analysis technique is presented in Appendix 1. In this chapter the use of some technical jargon can not be avoided. We follow the explanation of concepts in Van der Burg (1983) and in SPSS (1990). The presentation of the results in the next chapter will be as non-technical as possible.

2.1. Canonical correlation analysis

Canonical correlation analysis (hereafter abbreviated as CCA) can be applied when we are dealing with two sets of variables. Our research problem also involves two sets of variables. We want to know how European car drivers differ from each other and are similar to each other on a number of questions concerning traffic. Thus the research problem may be framed as the study of the relationships between one set of variables indicating different nationalities and another set of variables indicating attitudes, opinions, and behaviours concerning traffic. In essence, CCA is an exploratory technique. The primary aim of this technique is not to test any specific hypotheses, but to reduce the complexity of a large data set.
In CCA, a weighted sum of variables is constructed for each set of variables in such a way that these weighted sums have a maximum correlation. This maximum correlation is called the *canonical correlation* and the corresponding weighted sums are called the *canonical variates.* The variables in the analyses have correlations with the canonical variates, called 'canonical loadings'.
We may consider the canonical variates as dimensions underlying the differences between countries; the canonical loadings can be seen as coordinates or positions on these dimensions. In our interpretation of the results we rely on visual plots of these canonical loadings.
If we are not satisfied with a single pair of canonical variates, a second pair can be computed which has a maximal correlation after the effect of the first pair has been removed. This means that the second pair of variates is perpendicular to the first pair. The number of pairs is also called the number of *dimensions* because it gives the dimensionality of the canonical solution.

2.2. The software program: CANALS

Many scales in the SARTRE survey are not metric, or there may be some doubt as to their metric qualities. Therefore, in the case of the SARTRE data, an analysis program should be used which both (1) can handle variables of a non-metric nature and (2) can perform canonical correlation analysis. The program CANALS fulfils these two criteria. CANALS (see Gifi, 1990; Van der Burg, 1985; Van der Burg & De Leeuw, 1983, SPSS, 1990) can perform a non-linear canonical correlation analysis on data of different measurement levels (nominal, ordinal, numerical). CANALS has been called a non-linear technique because it uses non-linear transform-

ations to re-scale variable values in order to maximize the canonical correlation between two sets of variables; CANALS (together with related programs like HOMALS for homogeneity analysis, PRINCALS for non-linear principal components analysis) has recently become part of the SAS and SPSS/PC software packages so that it is now widely available.

2.3. Design and interpretation of the analyses

In the following chapter the results of the analyses are presented and discussed. Before we take a closer look at these results, some preliminary remarks on our use of non-linear CCA are in order.

1. In all analyses one set of variables consisted of variables indicating nationalities and a second set of variables consisted of a selected subset of questions concerning traffic. For each country, a dummy variable was created by coding all respondents from that country as '1' and all other respondents as '2'. In this way 16 dummy variables were created for 15 countries (two dummy-variables were created for Germany-West and Germany-East). Each dummy variable can be seen as the indicator of one nationality.
2. In all analyses three dimensions were specified. This means that the analysis aims to reduce the multitude of international differences to three more general dimensions along which various national groups may differ.
3. The results of the analyses are based on a re-scaling of the original data. We specified a nominal measurement level for nearly all the survey questions. On the basis of this specification, the analysis program seeks to re-scale the original variable values so as to optimize the relationship between the two sets of variables. More relevant to our research questions, it may be stated that the re-scaling ensures an optimal discrimination between countries along the dimensions.

In the technical Appendices 4 and 7 the original variable values and the re-scaled values (called 'category quantifications' in the Appendix) are reported. For instance in Appendix 2 concerning the results of the first analysis, we see that Question 38g ('Would you be in favour of an obligation to use motor vehicle lighting during the day-time?') has the following original variable values: 1 (In favour), 2 (Not in favour) and 3 (Don't know). The re-scaled values for this variable are respectively -1.341, 0.785 and 0.507.

A last point we'd like to make concerns the interpretation of the results. As we have explained before, the variables in the analyses have correlations with the canonical variates, called 'canonical loadings'. We may consider these canonical variates as 'underlying dimensions' and the canonical loadings as coordinates or positions on these dimensions. In our interpretation of the results we rely on an inspection of graphical plots of these canonical loadings. As we will see in the next paragraph, these plots enable us to see very easily which countries lie close together on a dimension and which countries lie far apart, and moreover, which topics are involved in a dimension.

In order to give one example of an interpretion of such a plot, let's direct our attention to Figure 1 (see page 10) where the countries and questions on the first dimension are positioned (For the sake of clarity a lot of information concerning the positions of other countries and questions is left out of this plot. Plots with all information are always presented in the Appendices). The general reference point in the plot is point (0,0). In the plot we see for instance that the dummy-variable representing Sweden (with values

1 = Swedish; 2 = non-Swedish) and Questions 38g concerning the obligation to run lights during day-time (with re-scaled values -1.341 (In favour), 0.785 (Not in favour) and 0.507 (Don't know)) are lying close together and a distance away from the reference point. This means that there is a close relationship between those two variables in the sense that low values on one variable will tend to be associated with low values on the other. Specifically, being Swedish (value 1) tends to go together with being in favour of the obligation to run light during day-time (value - 1.341). If two variables lie far apart in a opposite direction, e.g. the dummy-variable representing Italy and Question 38j, low values on one variable tend to be associated with high values on the other. Thus, being Italian tends to go together with not being in favour of the obligation to run light during day-time. The further apart the variables lie from the zero-point either in opposite directions or in the same direction, the stronger the relationship between the variables will be.

As we have seen just yet, the interpretation of a plot of a dimension requires that we know the direction of the range of scores for the variables. The range of scores for the questions is not the original range as coded by the interviewers, but a transformed range of scores as a result of the re-scaling. In our interpretations of the plots we have taken account of the re-scaled values of the variables. For the sake of readability we generally won't refer to these rescaled values. The reader can implicitly infer from our interpretation the scale of the variables. Of course, the reader can always check upon the exact nature of the relevant variable values by consulting the Appendices. Morover, the interpretation of the plots is further clarified by tables providing the answer percentages for those countries and questions that dominate a certain dimension.

3. Results

Paragraph 3.1 presents the results concerning the international differences on matters of traffic measures. In total, three analyses were performed. The results of the analyses on the questions concerning speed and speeding are described in paragraph 3.2.

3.1. International differences in opinions about traffic measures

First analysis
In the first analysis the first set of variables consisted of 15 dummy-variables representing 14 countries: Germany-East, Germany-West, Austria, Belgium, Denmark, France, United Kingdom, Ireland, Italy, Netherlands, Portugal, Sweden, Switzerland, Czechoslovakia, Hungary. The second set of variables consisted of a selection of 34 questions from the SARTRE-survey which all concern opinions about traffic measures. These questions are described in Appendix 2. A nominal measurement level was stipulated for these variables with the exception of Questions 13a, 13b, 13c and 13d referring to preferred speed limits. An ordinal measurement level was specified for these four questions; 'don't know' answers on these questions were treated as missing values.
Two countries, Spain and Czechoslovakia, had only missing values for one of the questions about measures. Czechoslovakia had only missing values for Question 30c ('There should be a lower limit of alcohol for inexperienced drivers'), and Spain had only missing values for Question 13b ('What do you think the speed limit should be in residential areas?'). If a country has only missing values for a question, there will be a perfect correlation between that country and the answer values for that variable. Inevitably, the result will be that one dimension in the analysis is strongly dominated by this perfect, but meaningless correlation between country and question. Therefore, it makes no sense to include in one analysis both a country and a question for which that country only presents missing values. For the design of the first analysis, it was decided to include Czechoslovakia and exclude Question 30c, and to exclude Spain and to include Question 13b (about the speed limit in residential areas). In a later section of this paragraph, we'll discuss the results of analyses in which Spain or Question 30c were included.

The canonical correlations for each of the three dimensions were respectively: 0.72, 0.70, 0.59. The first two correlations are nearly the same and clearly higher than the third. This indicates that the major distinctions between the countries will be found on the first two dimensions. The correlation for the third dimension is high enough to warrant a closer look at the possible meaning of this dimension.
A plot of the main opposing countries and questions along the first dimension is given in Figure 1. For the sake of clarity we have left out a lot of information concerning the positions of countries and questions that do not add anything to our understanding of the first dimension. The same plot containing all information may be found in Appendix 4. All the other plots in this paragraph are also 'cleaned' plots with only the most essential information given. The same plots with more detailed information can always be found in the Appendices.

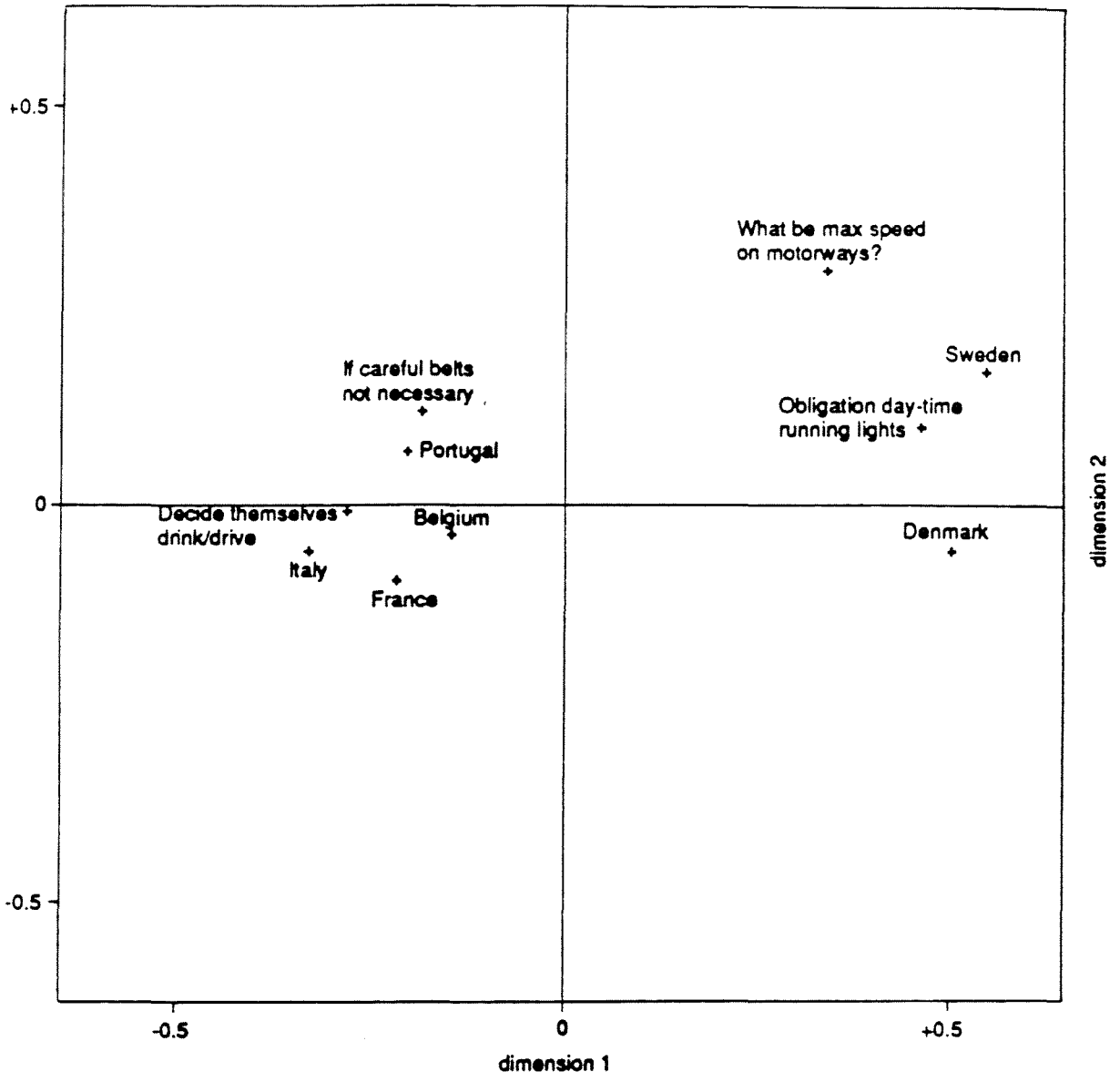

Figure 1. *International differences in opinions about traffic measures: a plot of the first dimension*

We may remind you that the plot in Figure 1 is a graphical display of the canonical loadings. The actual canonical loadings for all the variables in the analysis are also given in Appendices 4, 5, 6, 7 and 8.
Let's turn our attention now to the interpretation of the first dimension. The first (horizontal) dimension seems to tap into the degree of strictness in matters of traffic safety. On one side of this dimension we find a cluster of countries (Sweden and Denmark) that prefers lower maximum speeds on motorways, advocates day-time running lights, and that is strict in matters of drinking and driving and seat belt wearing. Located on the other side of the dimension is a group of countries (e.g. Italy, Belgium, France, Portugal) that, relatively speaking, has a less strict attitude towards seat belt wearing and drinking and driving, and that permits higher speeds on motorways and does not prefer the obligation to run lights in day-time.

How strong are the differences between the countries lying along this first dimension? In order to get a more precise impression of these differences and in order to verify the results of our analysis, we inspected for the Swedish, Danish, Italian, French and Portugese citizens the percentages of those that can agree with the measures involved in the first dimension. These (rounded) percentages are presented in Table 2. This table clearly shows that the strongest differences between the 'Scandinavian' countries and the 'Mediterranean' countries are on the subjects of the obligation to use lighting during day-time and of the freedom a driver should have concerning drinking and driving. Somewhat lesser, but still important differences are found for the subjects of the necessity of belt use and the maximum speed on motorways.

	Question 28j Obligation running light daytime	Question 3c Self-decide drink/drive	Question 20a If careful, belts not necessary	Question13d Maximum speed limit on motorways	
	In favour	(Strongly) agree	Agree	110 km/h	140-150 km/h
Sweden	91%	2%	4%	47%	2%
Denmark	86%	2%	14%	17%	4%
France	14%	30%	21%	6%	31%
Italy	13%	27%	31%	7%	30%
Portugal	23%	27%	27%	4%	23%

Table 2. *Percentages of respondents agreeing with different measures (Source: Cauzard, 1993).*

Note that the international differentation on the first dimension illustrates a close correspondence between public opinion and attitudes and existing legislation. Those countries that have a lower speed limit on motorways, that have the legal obligation to run lights during day-time and that have very strict measures against drinking and driving (Sweden and Denmark), also show a public opinion which is most in favour of these measures.
In Figure 2 a plot of the main countries and questions along the second (vertical) dimension is presented. The second dimension seems partly to correspond with the degree of economic affluence of countries.

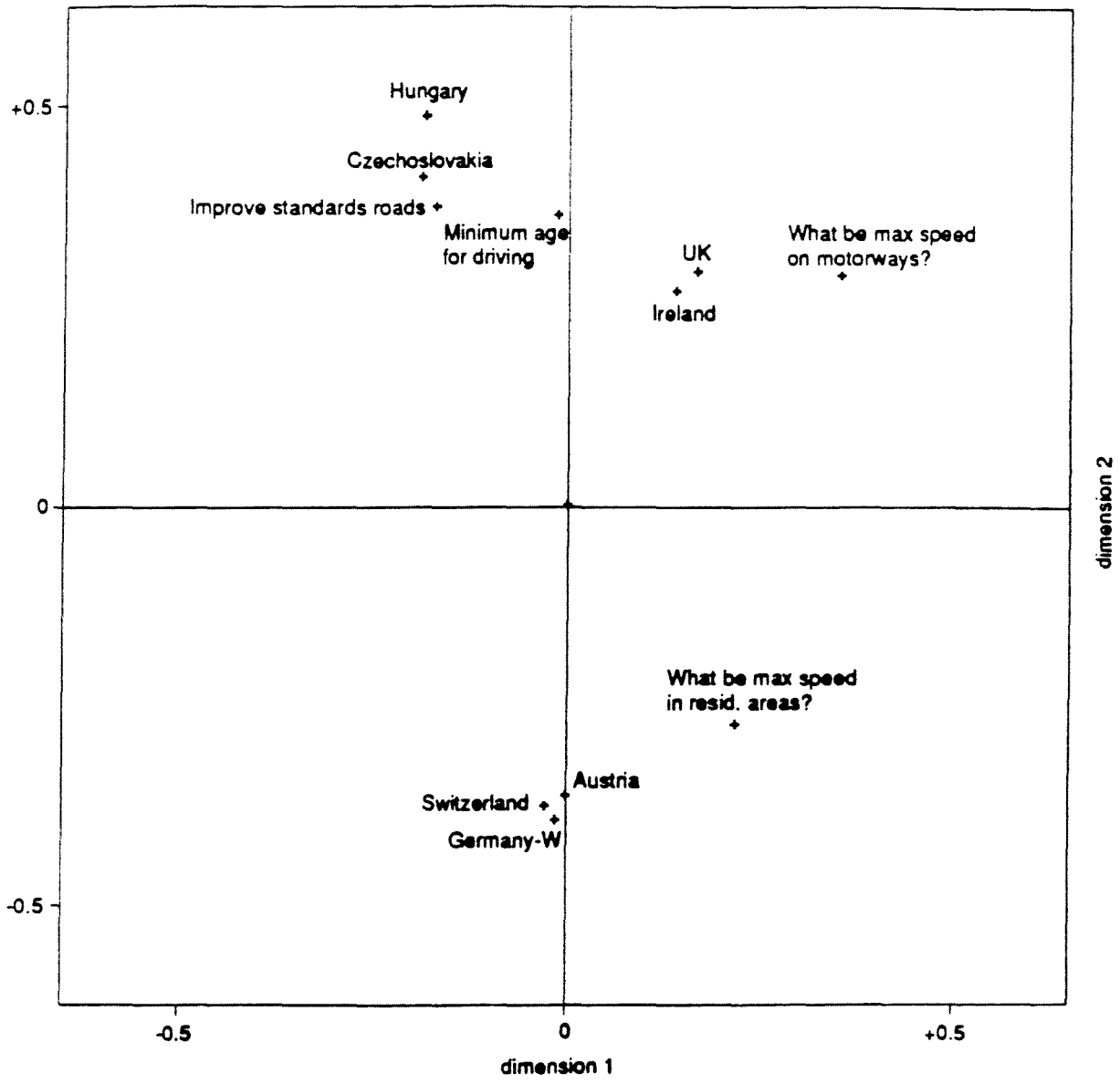

Figure 2. *International differences in opinion about traffic measures: plot of the second dimension.*

On the upper side of this dimension we find economically less well-of countries like Hungary, Czechoslovakia, and Ireland. On the lower side of the dimension the economically affluent countries Austria, Switzerland and Germany (west) can be found. The affluent countries are strong advocates for low speed limits in towns and in residential areas and, not surprisingly, these countries do not see a particular need for improving the standards of their roads. The less affluent countries, on the other hand, do not care very much about a low speed limit in residential areas and are much more concerned with the improvement of the conditions of their roads. The figures in Table 3 indicate the magnitude of these differences.

	Question 2e Improve standards roads	Question 38a Minimum age 17 for driving	Question 13c Maximum speed limit in residential areas	
	(Strongly) in favour	In favour	30-40 km/h	50-60 km/h
Germany-West	66%	38%	73%	19%
Austria	64%	24%	56%	34%
Switzerland	50%	20%	58%	34%
United Kingdom	93%	86%	26%	69%
Czechoslovakia	97%	56%	47%	43%
Hungary	97%	80%	2%	85%

Table 3. *Agreement with improvement of roads and minimum age 17 for driving, and preferences for speed limits in residential areas (Source: Cauzard, 1993).*

It should be noted, however, that the association between economic affluence and the positioning on the second dimension is not perfect. For instance, despite its considerable economic prosperity United Kingdom is located nearer to Ireland on the second dimension than to Austria or Germany-West. The agreement of Czechoslovakia, Hungary, United Kingdom and Ireland with the minimum age of 17 for driving a car is explained by the fact that this particular measure is already implemented/effected in these countries. Again, we find a correspondence between existing legislation and public opinion.

Figure 3 presents a plot of countries and questions along the third dimension. The third dimension involves a specific contrast between the United Kingdom and Ireland on the one hand, and Czechoslovakia and Germany/-East on the other hand.

The results in Table 4 further elucidate this contrast. (The figures for Hungary are also mentioned in this table, for the specific contrast between Czechoslovakia/Hungary versus United Kingdom/Ireland has been found in other analyses which we will discuss in a moment.)
We see in Table 4 that the contrast between Czechoslovakia and United Kingdom mainly involves opinions on the legal alcohol limit, with Czechoslovakia having a much larger proportion of respondents who prefer

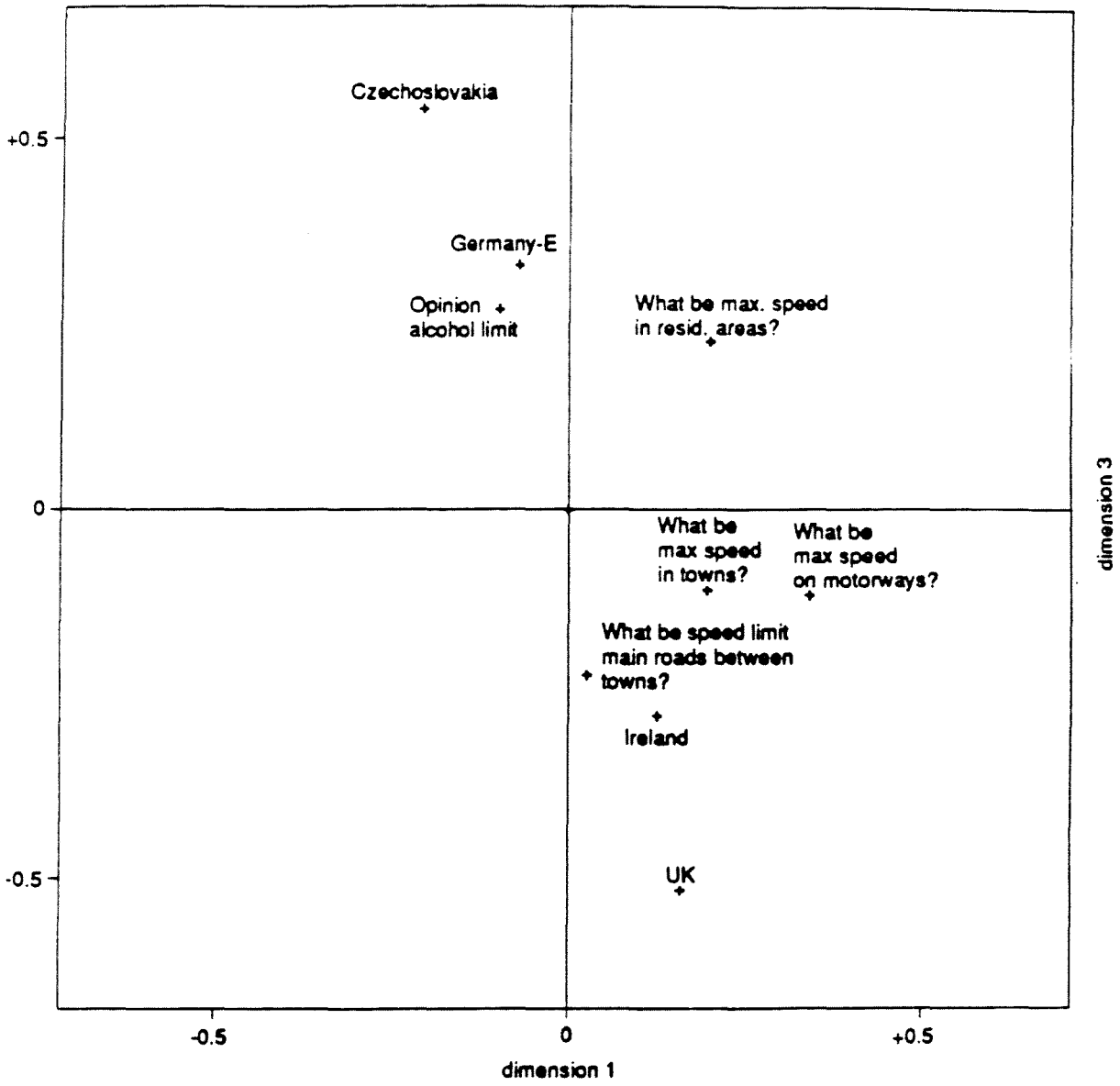

Figure 3. *International differences in opinion about traffic measures: a plot of the third dimension.*

a total prohibition of drinking and driving. The contrast between Germany-East and United Kingdom not only involves differences in opinion on the legal alcohol limit (with Germany-East having a larger proportion who prefer a total prohibition), but also differences in preferred speeds on motorways and in residential areas. The citizens of Germany-East prefer lower speeds on these types of roads than the citizens of the United Kingdom.

An inspection of the re-scaled variable values (or category quantifications) for Question 29 on opinion about the legal alcohol limit (see Appendix 4) shows that both answers 'higher limit' and 'total prohibition' have negative quantifications, whereas the answers 'limit stay the same' and 'limit should be lowered' have positive quantifications. This means that countries who are located near this question in the plot may have both a a relatively large number of respondents who want a total prohibition, but also may have a relative large number of respondents who prefer a higher limit. This is true for Czechoslovakia and Hungary, but not for Germany-East (see Table 4). In the next section on the results of other analyses we'll return to this point.

	Question 13a Maximum speed in towns		Question 13b Maximum speed in residential areas			Question 13c Maximum speed on main roads	
	50 km/h	60 km/h	30 km/h	40-50 km/h	60 km/h	80-90 km/h	100-110 km/h
Czechoslovakia	26%	55%	15%	55%	21%	44%	45%
Hungary	25%	62%	0%	25%	62%	42%	47%
Germany-East	67%	17%	59%	33%	1%	57%	38%
Ireland	55%	10%	15%	68%	10%	47%	37%
United Kingdom	65%	16%	26%	55%	14%	31%	36%

	Question 13d Maximum speed on motorways		Question 29 Opinion legal alcohol limit	
	100-110 km/h	140-160 km/h	Total bar	Higher limit
Czechoslovakia	20%	19%	72%	22%
Hungary	8%	22%	75%	17%
Germany-East	15%	20%	71%	5%
Ireland	52%	4%	38%	5%
United kingdom	49%	10%	52%	2%

Table 4. *Preferences for speed limits and for legal alcohol limit (Source: Cauzard, 1992)*

Results of other analyses

The first analysis on the measures questions excluded Spain and excluded one measure question (Question 30c 'There should be a lower limit of alcohol for inexperienced drivers'). Would the result of the analysis be very different when Spain was included, and Question 13b (for which Spain has missing values) was excluded in the analysis? Or when Question 30c was included, and Czechoslovakia (with only missing values for this question) excluded? To check upon these matters we conducted two other analyses on the measures Questions. In one of these analyses we included all countries in the first set of variables and excluded Questions 13b and 30c from the second set of variables. The results of this analysis are reported in Appendix 6. In another analysis we included Questions 13b and 30c and excluded Spain and Czechoslovakia. The results of this analysis are presented in Appendix 7.

The first and the second dimension which emerged from these two additional analyses were essentially the same as the first two dimensions in the first analysis. The first dimension again concerned a general attitude towards traffic safety with the Scandinavian countries (Sweden, Denmark) having a more strict attitude than the Mediterranean countries (France, Italy, Portugal). The second dimension again involved the issues of improvement of roads - coveted by United Kingdom, Hungary and Ireland - and a low speed limit in residential areas - coveted by Germany-West, Switzerland and Austria. The specific countries which lie opposed to each other on the third dimension depend in part upon the questions and the countries which are included in the analysis. In Table 5 a summary of the results of the three analyses is given.

Analysis	Countries and issues determining the third dimension		
1. Spain excluded, Question 13b included	*Czechoslovakia/Germany-East* Large proportion of citizens favor total prohibition of drinking and driving, Germany-East favors lower speeds in residential areas than U.K., Ireland, Czechoslovakia and Hungary	vs	*U.K./Ireland* More moderate opinions on legal limit
2. All countries included, Questions 13b and 30c excluded	*Hungary/Czeschoslovakia* Favor somewhat higher speeds (60 km/h) in towns, large proportion favor total prohibition of drinking and driving, especially Hungary is not so much in favor for a common lower alcohol limit in Europe	vs	*Ireland/U.K.* Favor relatively low speeds (50 km/h) in towns, more moderate opinions on prohibition a large majority favours a common lower alcohol limit in Europe
3. Spain and Czechoslovakia excluded, Questions 13b and 30c included	*Hungary* Prefers higher speed limits in towns (60 km/h) and in residential areas (60 km/h)	vs	*Ireland/U.K.* Prefer lower speed limits in towns (50 km/h) and in residential areas (50km/h)

Table 5. *Summary of findings concerning contrasts between countries on the third dimension.*

An important finding is that the inclusion or exclusion of Question 13b ('What should the speed limit be in residential areas?') does not fundamentally change the dimensions that were found in the analysis. There were some translation problems with the concept of 'residential areas'. In some countries the term 'residential areas' is not known as an urban concept designating a part of the city with specific driving rules. For example the connotation of this concept in France is: that part of town where the upper class people live in expensive houses. However, since inclusion or exclusion of Question 13b in the analysis does not fundamentally change the results, we do not have to worry too much about the validity of the results produced by this question.

Finally, we'd like to make a last remark about the differences of opinion on the legal alcohol limit. In the analysis on all countries we have found that Czechoslovakia and Hungary are specifically opposed to United Kingdom and Ireland on the matter of the legal alcohol limit (Question 29). The same pattern of re-scaled values for this question was found as in the first analysis, i.e., negative values for the answers 'higher limit' and 'total prohibition'. This means that among Hungarian and Czechoslovakian drivers there is a greater preference for a total prohibition, and at the same time also a greater preference for a higher limit than among English and Irish drivers (see Table 5). This may seem somewhat paradoxal. But the paradox is solved if we remember that in Czechoslovakia, Hungary (and also in Germany-East) the legal blood alcohol concentration is 0, whereas it is 0,8 promille in the United Kingdom and Ireland. Seen in the light of these international differences in legislation, the various national preferences for a 'higher limit' cannot be meaningfully compared and interpreted. In the end, the main conclusion is that Hungarian and Czechoslovakian drivers are more in favour of a total prohibition than the English and Irish drivers. Again, the close relationship between official legislation and drivers' opinion may be noted.

3.2. International differences regarding speed and speeding

In this paragraph we report the results of the analyses on the speed-related questions. In total, two analyses were done.

Results of first analysis

In the first analysis of the speed-related questions, the first set of variables comprised 15 dummy-variables representing 14 countries with Spain excluded (for Germany two dummy-variables were created, one representing Germany-West and one representing Germany-East). The inclusion of Question 13b about the preferred speed limit in residential areas required the exclusion of Spain which has only missing values on this particular question. A selection of 28 questions was chosen for the second set of variables. These questions are reported in Appendix 3. A nominal measurement level was stipulated for these variables with the exception of Questions 13a, 13b, 13c and 13d referring to preferred speed limits and Question 62 about number of kilometres driven. An ordinal measurement level was specified for these five questions; 'don't know' answers on these questions were treated as missing values.

A three-dimensional solution was specified for the analysis. The canonical correlations for the first, second and third dimension were respectively 0.68 0.60 and 0.57. Clearly, the first dimension is the most important

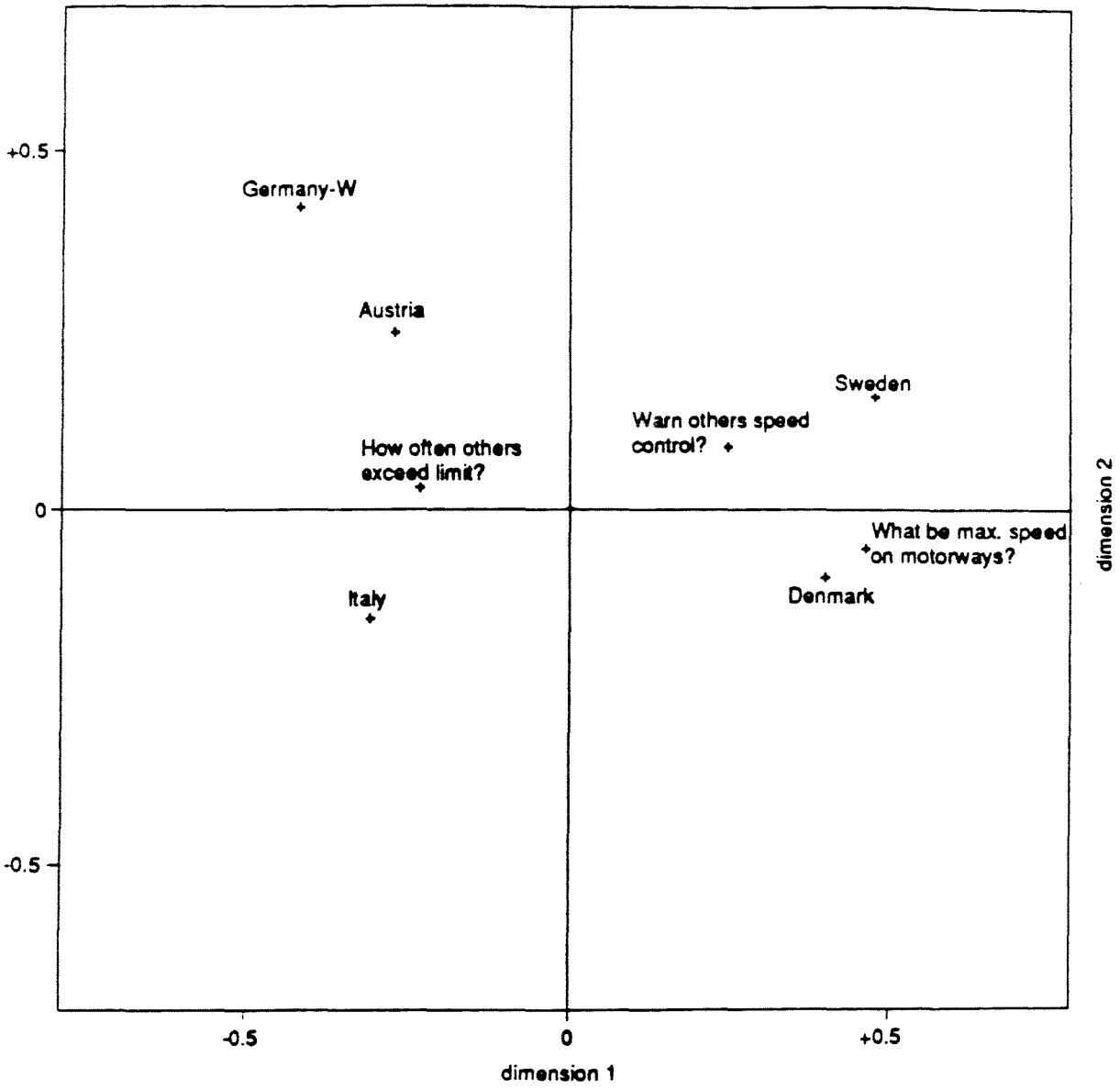

Figure 4. *International differences concerning speed and speeding: a plot of the first dimension.*

dimension. The canonical loadings and re-scaled variable values pertaining to this analysis are presented in Appendix 7 of this report.
Again, we checked upon the validity of the results by comparing the national differences which are suggested by the analysis, with the percentages of answers for separate countries. Tables 6 and 7 contain the (rounded) percentages which are most relevant for this purpose. We did not find any apparent discrepancy between the results of our analysis and the simple answer percentages for each separate country. When we are referring to the differences between countries, the reader can easily inspect these tables to get a better idea of the strength of the international differences.
In Figure 4 main countries and questions along the first dimension are plotted. As can be seen in the figure, the first dimension mainly concerns the differences in preference for a certain speed limit on motorways. Specifically, Sweden and Denmark prefer a lower limit on motorways than Germany-West, Italy and Austria. Also involved in this dimension are the questions concerning violations of limits by other drivers and warning other drivers of a speed control. More often than the German, Italian and Austrian drivers, the Danish and Swedish drivers report that they see violations of the speed limit and that they never warn others of speed controls (see Table 6).

	Question 13b Maximum speed in res. areas			Question 13d Maximum speed on motorways		Question 9 How often do other exceed limit?			Question 17i Warn others speed trap?	
	30-40 km/h	50 km/h	60 km/h	110 km/h	140 km/h	Some-times	Often	Very often	Never	Often
Sweden	64%	33%	0%	47%	1%	8%	41%	47%	59%	3%
Denmark	44%	44%	9%	17%	3%	7%	27%	57%	68%	3%
Italy	27%	38%	19%	7%	18%	47%	22%	21%	48%	10%
Germany-West	74%	17%	2%	1%	11%	23%	39%	21%	24%	11%
Germany-East	78%	13%	1%	6%	9%	9%	42%	41%	46%	4%
Hungary	2%	23%	62%	3%	15%	8%	48%	38%	15%	14%
Portugal	33%	33%	26%	4%	17%	27%	36%	29%	38%	9%

Table 6. *Preferences for speed limits, speed violations by others and warning of others (Source: Cauzard, 1992)*

A plot of the main countries and questions along the second dimension is presented in Figure 5. The second dimension distinguishes between countries with different preferences about the speed limit in residential areas and in towns. Germany-East, Germany-West and the Netherlands tend to prefer a lower limit for these areas than Hungary, Portugal and France (see Table 7).

The questions about speed limits differ in that some questions ask after a preferred speed limit (Questions 13a, 13b, 13c, 13d), whereas other questions ask after an opinion about a harmonized limit (Questions 38d and 38e). An inspection of the canonical loadings (presented in Appendix 7, Tabel 7.1) shows that the questions on the harmonization of speeds

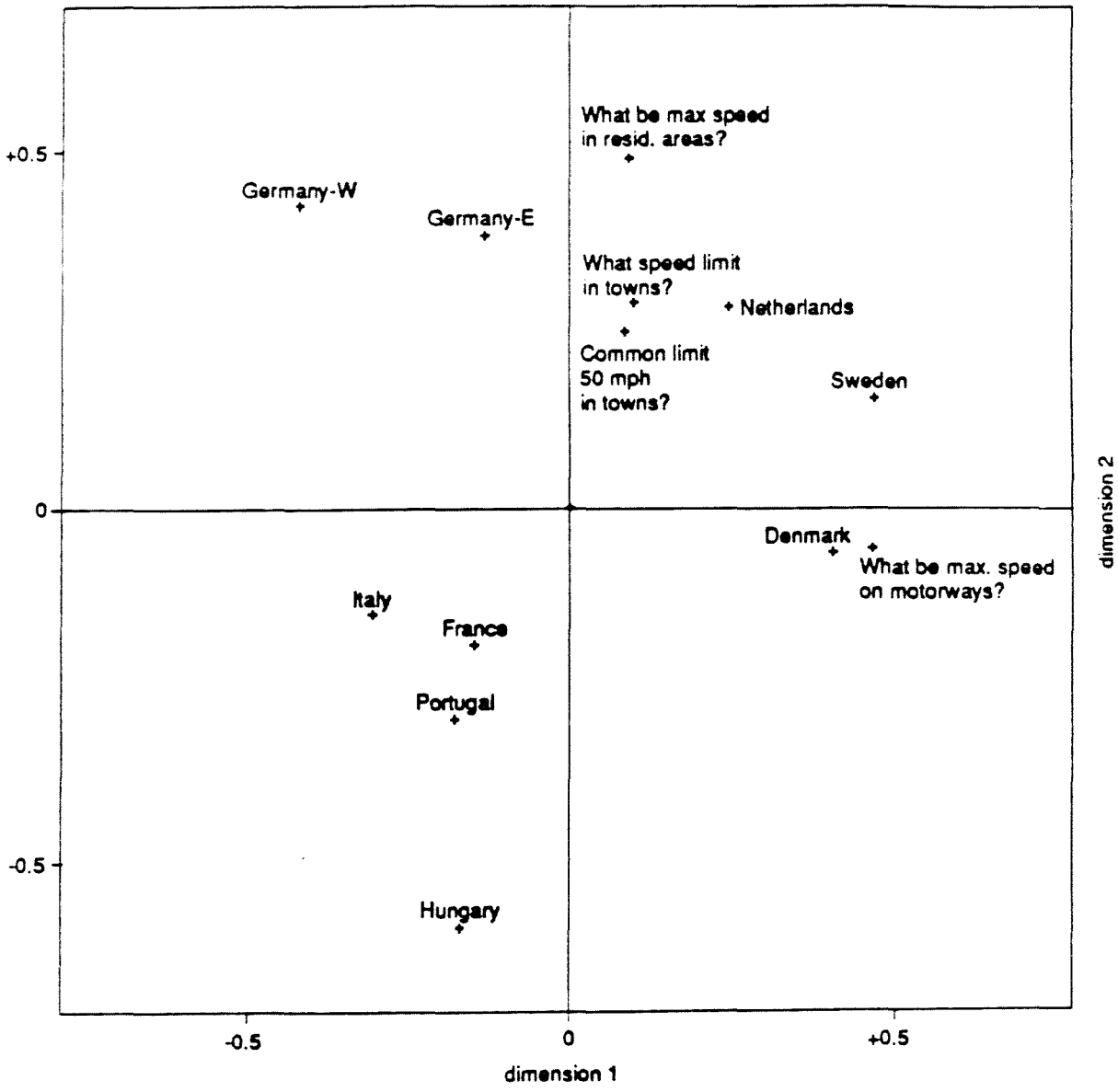

Figure 5. *International differences concerning speed and speeding: a plot of the second dimension.*

	Question 13a Maximum speed limit in towns		Question 13b Maximum speed limit in residential areas	
	30-40 km/h	60 km/h	30 km/h	60 km/h
Germany-West	22%	12%	49%	2%
Germany-East	13%	17%	59%	1%
Netherlands	24%	8%	58%	0%
Hungary	2%	62%	0%	62%
Portugal	27%	31%	7%	26%
France	11%	40%	12%	21%

Table 7. *Preferences for speed limits (Source: Cauzard, 1992)*

Questions 38d and 38e) have only moderate canonical loadings for the first two dimensions, whereas the questions on the preferred speed (Questions 13a, 13b and 13d) have moderately high or very high canonical loadings for these dimensions. In plain language, this means that European drivers differ more in their opinions about the most preferred speed limit than in their opinions about the harmonized speed limits. In Chapter 3 of the INRETS-report on the SARTRE-data the same conclusion has been reached. "Interestingly, there was markedly more agreement between drivers of different countries of what would be appropriate limits when this was considered in terms of having a common speed limit throughout Europe to achieve harmonisation" (INRETS, 1993).
A slightly different way of viewing the plot in Figure 5 is to recognize three general directions. Taking the (0,0) point as a general reference, the direction left upward points towards countries that prefer low speed limits in towns and residential areas, but do not prefer low maximum speed limits on motorways (Germany-East and Germany-West, Austria). The direction to the right points towards countries that prefer relatively low speed limits on all types of roads (Denmark, Sweden, Netherlands). The direction left-downwards indicates those countries that generally prefer relatively higher speed limits on all types of roads (Hungary, Portugal, Italy, France).
As was found in the first analysis on opinions about traffic measures, the third dimension is dominated by the specific opposition between Czechoslovakia and United Kingdom, with the latter preferring lower speed limits on main roads and in towns and attaching more importance to the fastness of a car as an accident cause than the former (see Table 8).

Results of second analysis
A second analysis on the speed questions was performed with Spain included and Question 13b ('What should be the speed limit is residential areas?') excluded. The results of this analysis are presented in Appendix 8. The first dimension was the same as found in the earlier analysis with adifferentiation between countries on the subject of the maximum speed limit on motorways. The second dimension involves differences of opinion on the maximum speed limit in towns and on to somewhat lesser extent differences of opinion on the maximum speed limit on main roads.

	Question 13a Maximum speed in towns?			Question 13c Maximum speed on main roads?			
	40 km/h	50 km/h	60 km/h	60-70 km/h	80 km/h	90 km/h	100-110 km/h
Spain	19%	24%	36%	2%	8%	16%	53%
Czechoslovakia	5%	26%	55%	3%	14%	30%	45%
Hungary	2%	25%	62%	2%	21%	21%	46%
U.K.	0%	65%	16%	25%	31%	0%	36%
Ireland	23%	55%	10%	12%	24%	23%	37%
Germany-East	8%	67%	17%	3%	28%	29%	37%
Germay-West	14%	61%	12%	7%	16%	10%	49%

	Question 38f Manufactures should restrict speed vehicles?	Question 6e Cause accident vehicle too fast?		Question 4f Cause accident driving too slow?	
	In favour	Seldom/ sometimes	Very often	Seldom/ sometimes	Very often
spain	48%	49%	15%	61%	11%
Czechoslovakia	32%	63%	9%	76%	3%
Hungary	20%	41%	21%	76%	3%
U.K.	55%	35%	29%	61%	12%
Ireland	62%	26%	34%	64%	11%
Germany-East	42%	30%	30%	76%	5%
Germany-West	32%	31%	28%	64%	8%

Table 8. *Preferences for speed limits, and opinions about accident causation and restriction on speed vehicles (Source: Cauzard, 1992).*

However, since Question 13b on the speed limit in residential areas has been left out and does not contribute to this dimension, the opposing groupings of countries are somewhat different from those in the earlier analysis. In the earlier analysis, Germany-East and Germany-West on the hand and Hungary on the other hand, were opposite extremes on this dimension. In the second analysis, Germany-East, Germany-West, United Kingdom, Austria and the Netherlands constitute one cluster of countries that prefer relatively low speeds in towns and on main roads, whereas Spain, Czechoslovakia and Hungary opt for higher speeds on these types of roads (see also Table 8).

The third dimension pertains to differences in opinion about the role of speed in causing accidents and the responsibility of the manufacturers (see Table 8). On one side of this dimension we find Czechoslovakia and Hungary who attach little importance to the speed of vehicles or to slow driving as a cause of accidents and who are not very much in favour for restrictions on manufacturers relating to speed. On the other side of the dimension are Spain, Ireland, United Kingdom, Portugal and Belgium who

tend to accord an important role to speed in causing accidents and who are much more in favour of obliging manufacturers to restrict the speed of their cars and to downplay speed in their advertisements.
Spain takes up a special position in this analysis. In the one hand, Spain takes sides with Hungary and Czechoslovakia as regards the maximum speed on main roads and, although in lesser degree, the maximum speed in towns. On the other hand, Spain is more in line with United Kingdom and Ireland in preferring that manufacturers restrict the speed of cars and realizing the importance of slow driving as a cause of accidents (see Table 8).

4. Summary and conclusions

In this paragraph we summarize the main findings, present the general conclusions and discuss possible implications for European traffic policy. The analyses of the opinions on traffic measures indicate the following major dimensions along which countries can be ordered:
1. The first dimension involves several opinions on different traffic issues and can be conceptualized as the degree of strictness in matters of traffic safety. The more 'strict' countries (Sweden, Denmark) prefer relatively low speeds on motorways and an obligation to run lights during daytime, they consider belt use absolutly necessary and they tend to reject the individual freedom to drink and drive. For the relatively speaking, less 'strict' countries (Italy, Portugal, France), the opinions on these issues tend to be less outspoken or to be in the opposite direction.
2. The second dimension is partly but not perfectly correlated with the economic prosperity of the countries: on one side of this dimension are relatively poor countries (Hungary, Czechoslovakia, Ireland) who are very much in favour of an improvement of the quality of their roads, whereas the richer countries (Germany-West, Switzerland, Austria) on the opposite side of the dimension are more concerned with restricting speed in residential areas and in towns.
3. The third dimension orders countries according to prferences for speed limits in towns and on main roads with English and Irish drivers preferring lower limits on these types of roads than Hungarian or Czechoslovakian drivers.
The analyses on the questions about speed and speeding indicated three dimensions of international differentiation. On all three dimensions differences of opinion on speed limits are involved.
1. The first dimension involves an ordering of countries on the basis of their preferred speed limit on motorways. At one extreme of this dimension we find Swedish and Danish drivers who prefer relatively low speed limits on motorways in contrast to German, Italian and Austrian drivers.
2. The second dimension differentiates between countries in terms of their preferred speed limits in residential areas and in towns. At one extreme of this dimension are German and Dutch drivers who prefer low speed limits in towns and in residential areas; on the other extreme we find Hungarian, French and Portuguese drivers who tend to prefer somewhat higher limits in these areas.
3. The third dimension involves differences of opinion on the maximum speed limit on main roads and on the causes of accidents. The countries that tend to attach little importance to speed as an accident cause (Hungary, Czechoslovakia), prefer a higher speed limit on the main roads.

Instead of interpreting our results in terms of dimensions, we may think of them as indicating a network of opposing clusters of countries where specific issues give rise to specific oppositions between groupings of countries (see Figure 6). Seen in this way the results have revealed the following opposite clusters of countries:*

* We only mention here the most extreme countries in the clusters. The terms 'opposing' and 'opposite' refer to opposing positions on a statistical dimension. These terms are in no way meant to imply that these countries intentionally oppose each other's traffic policy.

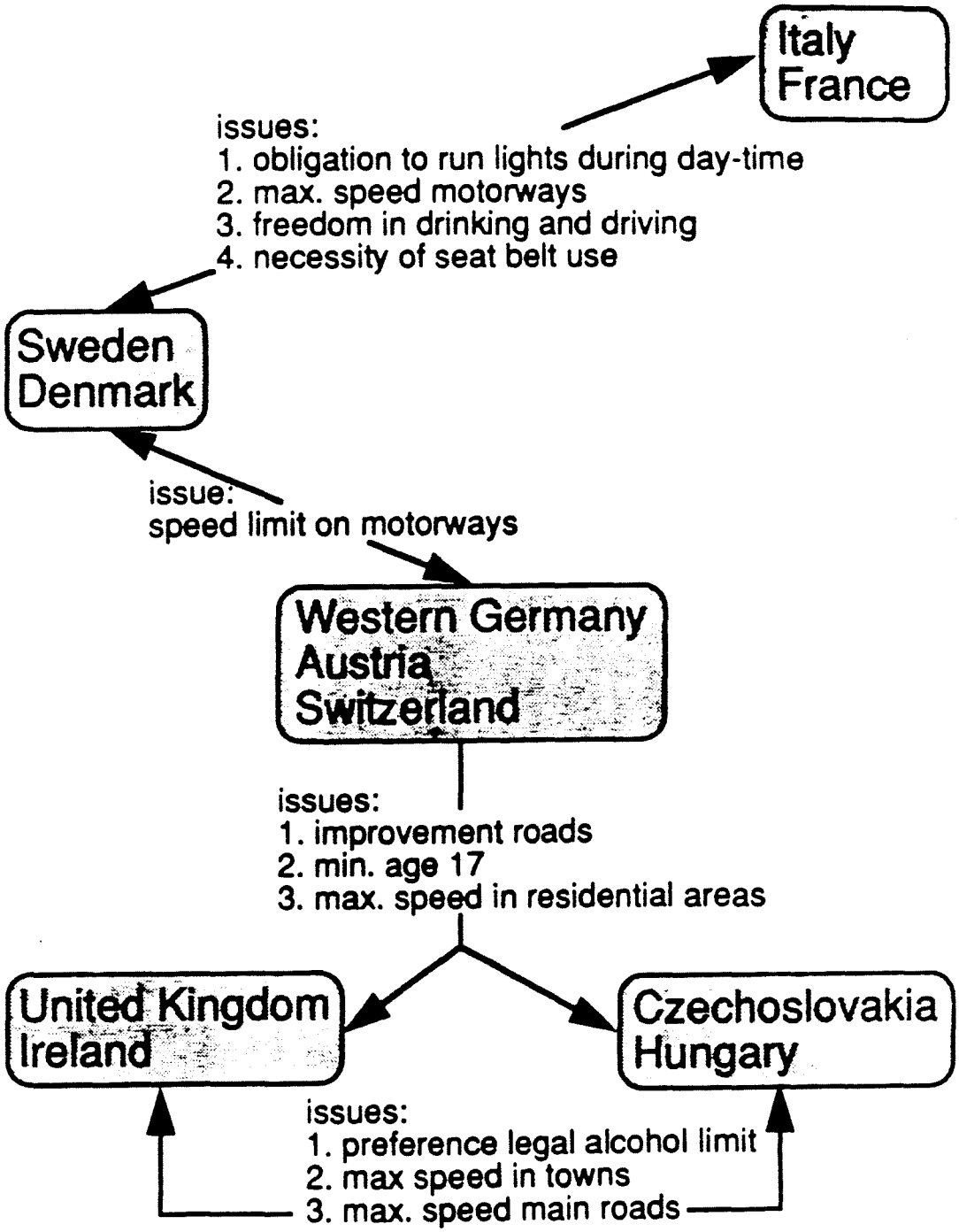

Figure 6. *The network of international differences*

- Sweden and Denmark vs. Italy and France (topics of difference: obligation run lights day-time, speed limit on motorways, attitude seat belt use, freedom in drinking and driving)
- Sweden and Denmark vs. Germany-West, Austria, Switzerland and Italy (topic of difference: speed limit on motorways)
- Hungary, Czechoslovakia, United Kingdom, Ireland vs. Germany-West, Austria and Switzerland (topic of difference: need for improvement of roads, minimum age 17 for driving speed limit in residential areas)
- Hungary and Czechoslovakia vs. United Kingdom and Ireland (topics of difference: preferred alcohol limit, speed limits in towns and on main roads)

It may be asked how 'robust' this structure of findings is. Some survey questions posed difficulties for a complete or a valid comparison of the results. The question about the speed limits in residential areas (Question 3b) posed translation problems with respect to the concept of 'residential areas'. Furthermore, this question was not answered by the Spanish respondents. The question about the preferred legal alcohol limit (Question 29) provided non-comparable answer categories (e.g. the category 'higher limit') because of differences in existing legislation. The question asking after the opinion about a lower limit for inexperienced drivers (Question 30c) was not answered by Czechoslovakian drivers. However, the contrasting clusters of countries in the presented network were found in several analyses in which the Questions 13b, 30c or 29 were either included or excluded. Therefore, despite the difficulties with these questions, we believe that the network of international differences as presented in Figure 6 is essentially valid.

The more general conclusions about international differences in opinions, attitudes and behaviours concerning traffic and traffic regulations are:
1. When only speed related opinions, attitudes and behaviours are taken into account, international differentiation is to a large extent dominated by differences of opinion on the preferred speed limits on different types of roads. The questions about speeding behaviour, causes for accident, technical devices for restricting speed, experiences with speed enforcement, engine size and about yearly amount of kilometres driven were not important in differentiating between the European countries on these two dimensions.
2. When several measures are taken into account, differences of opinion on preferred speed limits are still very important in characterizing international differentiation.
3. The most general conceptual dimension of international differentiation includes opinions on several traffic measures (speeding limit on motorways, seat belt use, drinking and driving, the obligation to run lights during day-time). This means that a more general attitude towards traffic safety can be postulated rather than several, independent attitudes towards specific issues.
4. Differences of opinion about the speed limit on motorways, the speed limit in towns and in residential areas, and about the speed limit on main roads, are reflected in different dimensions of the analysis. This means that general tendency to prefer either high limits or low limits, irrespective of the type of road, is not typical for most of the European countries. In other words, the international differences of opinion about the speed limits change with the type of road that is being considered.

5. The questions about the harmonization of speed limits throughout Europe have lower canonical loadings for each dimension than the questions about the preferred speed limits, indicating that there is more general agreement on 'harmonized' limits than on 'the most subjectively preferred' limits.
6. There is a close correpondence between official traffic legislation and public opinion. E.g. the citizens of countries that have a legal obligation to run light during daytime or that legally require a minum age of 17 year for driving a car, tend to favor these regulations, whereas citizens of other countries who lack these regulations tend to disapprove of these regulations. Likewise, the differences of opinion about speed limits on different types of roads, are associated with existing differences in speed limits.

What are the possible implications of these results for the development of an European traffic policy? On the one hand, some differences between countries seem to reflect a more general attitude towards traffic safety. This attitude may include deep-seated beliefs about the role of state interference and of individual responsibility in the traffic area. It may be difficult to find a middle ground between countries who differ in overall traffic philosophy as seems to be the case in the division between Scandinavian and Mediterranean countries. In this case, it may be difficult to find a compromise between these countries since their fundamental assumptions about the responsibility and the duty of the state and the individual citizen for traffic safety may differ far too much. It may be worthwhile for European countries to have a more general discussion about these assumptions before embarking upon the negotiation of specific issues or measures.
On the other hand, differences between countries may reflect very concrete, specific interests without too much ideological subcurrents. Such a concrete, business-like interest seems to be the concern of Hungary and Czechoslovakia for road improvement or the concern of Germany-West for restricted speeds in residential areas. These specific, concrete interests may prove to be a good starting point for initial negotiations.
Finally, it may be asked how the close correspondence between official legislation and public attitudes and opinions has come about. Did public opinion or social climate lead to the political acceptance and implementation of specific measures? Or did public experience with the law and its results lead to endorsement of its underlying message. Following the lead of several authors (e.g. Andenaes, 1988; Snortum, 1988) we surmise that both these processes have been at play. In the words of Snortum: 'law is both a cause and an effect of 'moral climate'' (Snortum 1988; p. 206). Generally, there will be a base of social support for a measure before its actual enactment; after the implementation of the measure, the social support for it may grow even stronger as the result of experiences with its enforcement.
The law may even create a new social norm. The creation of such a new norm is certainly not an automatic process, but depends in part on the degree to which the law is perceived as reasonable, is promulgated by legitimate authority and is impartially administered (Andenaes, 1977).
For some measures, e.g. the obligation to run light during daytime or a common limit of 30 km/h in residential areas, the base of support is strong in some specific countries, but very weak in many others. Obviously, an initial broad base of support for a particular measure would have to exist before a discussion about its acceptance and implementation can be useful. However, a broad base of support does not necessarily mean

majority support. It is conceivable that moderate or low support for a certain measure can be enhanced by persuasive communication or by experiences with or feedback about the positive results as a consequence of the new measure.
The other side of the medaillon is that measures for which a majority support exists, may loose their appeal if they are not strictly and consistently enforced. If road users observe that many other road users violate a certain regulation without any consequences as a result of this violation, they may come to doubt the necessity or the reasonables of the new regulation. As one researcher puts it: 'Normative behaviour becomes attractive, if road users perceive that most road users comply to it, and that those who do not comply get confronted with the negative consequences.' (Rothengatter, 1990; p. 93).

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Appendices 1-8

Appendix 1. Canonical correlations analysis

Appendix 2. Questions concerning traffic measures

Appendix 3. Questions concerning speed and speeding

Appendix 4. Results first analysis on measure questions

Appendix 5. Results second analysis on measure questions

Appendix 6. Results third analysis on measures questions

Appendix 7. Results first analysis on speed questions

Appendix 8. Results second analysis on speed questions.

Appendix 1. Canonical correlation analysis

In the following description of basic terminology we follow the explanation of concepts in Van der Burg (1983) and in SPSS (1990).

Canonical corrrelation analysis
Canonical correlation analysis can be applied when we are dealing with two sets of variables. In canonical correlation analysis, a weighted sum of variables is constructed in such a way that these weighted sums have a maximum correlation. This maximum correlation is called the *canonical correlation* and the corresponding weighted sums are called the *canonical variates.* If we are not satisfied with a single pair of canonical variates, a second pair can be computed which has a maximal correlation after the effect of the first pair has been removed. This means that the second pair of variates is perpendicular to the first pair. The number of pairs is also called the number of dimensions because it gives the dimensionality of the canonical solution.
The underlying model of a canonical correlation analysis with a three-dimensional solution is given in Figure 1.1.

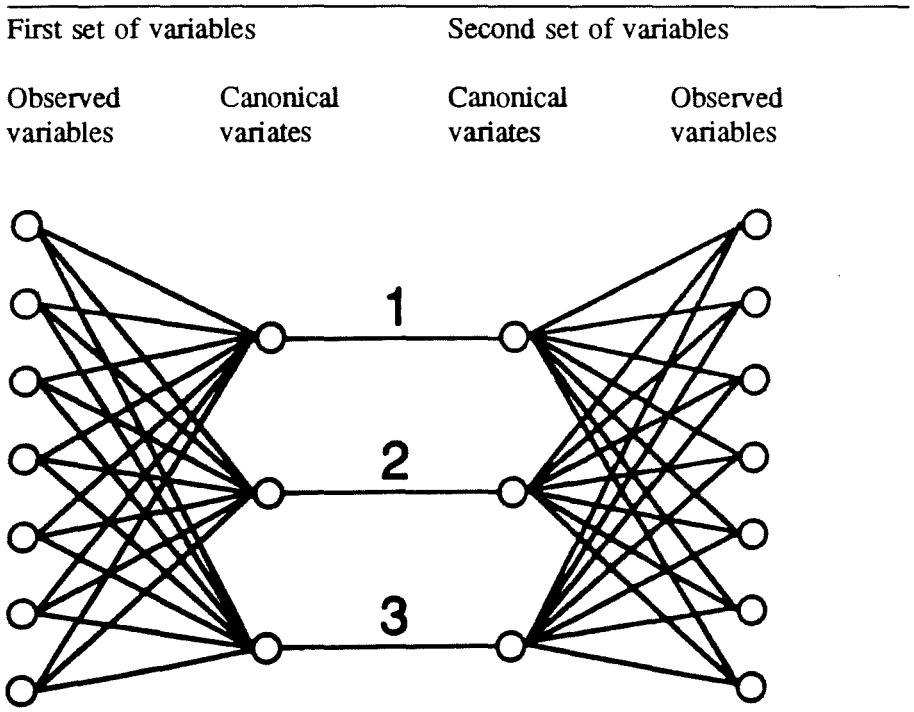

Figure 1.1. *The model of a CCA with a three-dimensional solution.*

To illustrate the relationship between variables and canonical variates, a plot can be made in which variables and variates are depicted together. Assuming unit length for both variables and canonical variates the latter form a referential frame of perpendicular axes on which the variables can be projected with coordinats equal to the correlation between the variables

and the canonical variates. These correlations are also called *canonical loadings*. Tables and plots of the canonical loadings are given in Appendices 4, 5, 6, 7 and 8.

The software program: CANALS
Traditionally, CCA analysis is applied when the variables are metric, i.e. numerical. However, many scales in the SARTRE survey are not metric, or there may be some doubt as to their metric qualities. Therefore, in the case of the SARTRE data, an analysis program should be used which both (a) can handle variables of a non-metric nature and (b) can perform canonical discriminant analysis.
The program CANALS fulfils these two criteria. CANALS (see Gifi, 1990; Van der Burg, 1985; Van der Burg & De Leeuw, 1983; SPSS, 1990) can perform a non-linear canonical correlation analysis on data of different measurement levels (nominal, ordinal, numerical). CANALS has been called a *non-linear* technique because it uses non-linear transformations to re-scale variable values in order to maximize the canonical correlation between two sets of variables; CANALS (together with related programs like HOMALS for homogeneity analysis, PRINCALS for non-linear principal components analysis) has recently become part of the SAS and SPSS/PC software packages so that it is now widely available.

The output of CANALS specifies the projections of the optimally scaled variables on both the canonical space of the first set of variables and the canonical space of the second set of variables. In our analyses the dummy-variables representing the countries always constituted the first set of variables and the selection of survey questions the second set of questions. The plotting of projections in the canonical space of the first set means that the variables are geometrically projected onto a space in which the differences between countries are maximally represented. The plotting of the variables in the canonical space of the second set means in this case that the variables are projected onto a canonical space in which the differences between the questions are maximally represented. The higher the canonical correlations between the two sets of variables, the more similar these plots will be. With correlations higher than 0.70 these plots will generally only differ in less important details.
Of course, our first interest was the differences between countries. Therefore, in our exposition of the results we rely on the canonical loadings of the variables on the canonical variates of the first set (the dummy-variables representing the countries). The canonical loadings of the variables on the canonical variates of the second set are given in Appendix 4. In this report we do not go into the subject of differences between these two.
Let's give an example of the interpretation of a plot of canonical loadings. The canonical loadings of the first analysis are presented in Appendix 4, Tables 4.1 and 4.2. The plot of the canonical loadings in the canonical space of the first set is given in Appendix 4, Figure 4.1. The general reference point in this plot is point (0,0). What does it mean when two variables in the plot, e.g. the dummy-variable representing Sweden and Question 38j - obligation day time running lights - are lying close together and a distance away from this point? It means that there will be a close relationship between those two variables in the sense that low scores on one variable will tend to be associated with low scores on the other. If two variables lie far apart in a opposite direction, e.g. the dummy-variable representing Sweden and Question 3c, low scores on one variable tend to

be associated with high scores on the other. The further apart the variables lie from the zero-point either in opposite directions or in the same direction, the stronger the relationship between the variables will be.
Of course, the interpretation of the canonical loadings plots requires that we know the direction of the range of scores for the variables. The range of scores for the questions is not the original range as coded by the interviewers, but a transformed range of scores. For nearly all survey questions in the analyses a nominal measurement level was specified with as a result that an optimal scaling procedure leads to the transformed scores for these variables.
The plots of the canonical loadings often can be interpreted in different ways. One can try to interpret the plot according to the horizontal and vertical dimension of the plot itself. However, it is also possible to interpret the plot according to an diagonal or oblique direction. Furthermore, sometimes it is easier to interpret the plots in terms of specific oppositions between certian countries than in terms of more general (conceptual) dimensions. Of course, the different interpretations do not really exclude each other.

Relationship with other multivariate techniques.
CCA and canonical discriminant analysis are closely related multivariate techniques. Simple discriminant analysis involves deriving linear combinations of two or more independent variables that will discriminate best between two or more a priori defined groups*. The linear combinations for a discriminant analysis are derived from an equation that takes the following form:

$$Z_{ij} = W_1X_{1j} + W_2X_{2j} + W_3X_{3j} + ... + W_nX_{nj}$$

where
Z_{ij} = Discriminant score for each group i and object j
W = Discriminant weight for each independent variable
X_j = Independent variable for object j

Discriminant analysis multiplies the value each independent variable by its corresponding weight and adds these products together. The result is a single composite discriminant score for each individual or case in the analysis. The weights are chosen in such a way that the discriminant scores correspond as much as possible to the group membership of the individuals. This means that the within-group variance of discriminant scores is minimized and the between-group variance is maximized. By averaging the discriminant scores for all of the individuals or cases within a particular group we arrive at the group mean, or the so-called 'centroid'. When the analysis involves a two-group classification, there are two centroids; with three groups there are three centroids, and so forth. A comparison of the group centroids shows how far apart the groups are along the dimensions being tested.
If there are more than two groups, then we speak of *canonical discriminant* analysis. In such an analysis we often have more-dimensional solutions. The discriminant scores for a two-dimensional solution can be represented by points in a plane and groups with regions in the plane.

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* With regard to the analyses in this report, the terms "group-membership" should be thought of as pertaining to country and nationality.

The traditional approach used in interpreting discriminant functions involves examining the sign and magnitude of the standardized discriminant weights. Because of interpretation difficulties with these weights, discriminant loadings have increasingly become the basis for interpretation. Discriminant loadings measure the simple linear correlation between each independent variable and the discriminant function. These loadings reflect the variance that the independent variables share with the discriminant function and can be interpreted in a way similar to factor loadings in assessing the relative contribution of each independent variable to the discriminant function.

Under certain conditions CCA reduces to canonical discriminant analysis. If we use CANALS together with dummy group indicators for each group (e.g. belong to group = 1, not belong = 0, or scoring the individuals on one variable with categories 1 to m for the m groups), then in fact we are performing a canonical discriminant analysis. In that case the 'canonical loadings' are identical with the 'discriminant loadings' and the 'canonical variates' are identical with the 'discriminant functions'.
To illustrate the relationship between variables and discriminant functions, a plot can be made in which variables and variates are depicted together. Assuming unit length for both variables and canonical discriminant functions the latter form a referential frame of perpendicular axes on which the variables can be projected with coordinates equal to the correlations between the variables and the discriminant functions. All the plots of canonical loadings in this report may at the same time be read as plots of the discriminant loadings. Thus, in our interpretation of the results we have for a large part relied on the inspection of the plots of discriminant loadings.

Appendix 2. Questions concerning traffic measures

The 34 questions concerning *traffic measures* selected for analysis (the numbering of questions is identical to the numbering in the survey).

Question 2. Would you be in favour, or against, the Government devoting more effort to the following road safety measures?
(Strongly in favour 1 2 3 4 5 Strongly against, 7 Don't know).
a. Improving driver training; b. Have more enforcement of traffic laws; c. Have more road safety publicity campaigns; d. Test the road worthiness of more vehicles; e. Improve the standards of the roads.

Question 3. Do you agree or disagree with the following statements
(Strongly agree 1 2 3 4 5 Strongly disagree, 6 Don't know).
a. Penalties for driving offences should be much more severe; b. There are too many traffic regulations; c. People should be allowed to decide for themselves how much they can drink and drive; d. Car manufacturers; should not be allowed to stress the speed of cars in their advertisement; e. More consideration should be given to pedestrians and cyclists when planning towns and roads.

Question 11. Devices are now available to control speed of cars. This could be made either compulsory or for use optionally on the part of the driver. Would you be in favour of such a device?
(1 = Yes, 2 = No, 3 = Don't know).
a. When you are free to put it on and off? b. When you are able to exceed the speed limit of motorways, only for short periods? c. Making it impossible (for all cars) to exceed a certain limit?

Question 13. What do you think the speed limit should be?
(30-160 km/h, No limit at all, Don't know)
a. in towns; b. in residential areas; c. on main roads between towns; d. on motorways?

Question 20. I'll read some statements to you concerning seat belts. Please tell me in each case whether you agree or disagree
(1 = Agree, 2 = Disagree 3 = Don't know).
a. If you drive carefully seat belts aren't really necessary;

Question 29. People have different opinions about what the legal limit should be. Which of the following statements best matches your opinion. Do you think that drivers should be allowed to drink ..?
1. No alcohol at all; 2. Less alcohol than at present; 3. As much alcohol as at present; 4. More alcohol than at present; 5. As much as they want; 6. Don't know.

Question 30. I'm going to read out a list of measures that have been proposed to reduce drinking and driving. How much are you in favour or against the introduction of each of these measures?
(1 = In favour, 2 = Against, 3 = Don't know).
a. More breath tests by the police; b. Harsher penalties for drivers found to be over the limit; c. There should be a lower limit of alcohol for

inexperienced drivers; d. Hosts should be encouraged to limit the amount of alcohol their driver guest drink.

Question 38. There is a possibility of having similar laws and regulations applied to driving throughout Europe. In order to achieve this 'harmonisation' would you be in favour or against the introduction of the following measures throughout European countries?
(1 = In favour, 2 = Against, 3 = Don't know).
a. A minimum age for driving cars of 17 years; b. A tougher standard driving test; c. A penalty points system for traffic offences which results in loss of licence when exceeded; d. A common speed limit of 30 mph (50 km/h) in towns; e. A common speed limit of 70 mph (120 km/h) on motorways; f. A requirement that manufacturers modify their vehicles to restrict their maximum speed; g. There should be a uniform low limit; h. Regular technical check-ups for all types of vehicle for safety reasons; i. Regular technical check-ups for all types of vehicle to protect the environment; j. An obligation to use motor verhicle lighting during daytime; k. Installation of a third braking light; l. An obligation to use seat bealts on front to use seat belts on front and rear seats.

Appendix 3. Questions concerning speed and speeding

The 28 questions concerning *speed and speeding* selected for analysis (the numbering of questions is identical to the numbering in the survey).

Question 4. How often do you each of the following factors - relating to drivers - are the cause of road accidents?
(Never 1 2 3 4 5 6 Always , 7 Don't know)
d. Following too closely to verhicle in front; e. Driving too fast; f. Driving too slow.

Question 6. How often do you think each of the following factors - relating to vehicles - are the cause of road accidents
(Never 1 2 3 4 5 6 Always, 7 Don't know)
e. Vehicle too fast.

Question 9. How often do you think other drivers break speed limits (Never 1 2 3 4 5 6 Always, 7 Don't know).

Question 10. Compared with other drivers do you generally drive?
(Much faster 1 2 3 4 5 Much slower, 6 Don't know).

Question 11. Devices are now available to control speed of cars. This could be made either compulsory or for use optionally on the part of the driver. Would you be in favour of such a device?
(1 = Yes, 2 = No, 3 = Don't know)
a. When you are free to put it on and off? b. When you are able to exceed the speed limit of motorways, only for short periods? c. Making it impossible (for all cars) to exceed a certain limit?

Question 12. In general how often do you drive faster than the speed limit on the following types of road when traffic conditions allow you to set your own speed?
(Never 1 2 3 4 5 6 Always, 7 Don't know)
a. on motorways; b. on main roads between towns; c. on country roads; d. on main roads in towns; e. in residential areas.

Question 13. What do you think the speed limit should be?
(30-160 km/h, No limit at all, Don't know)
a. in towns; b. in residential areas; c. on main roads between towns; d. on motorways.

Question 14. Have you ever been stopped by the police for exceeding the speed limit? (1= Yes, 2 = No)

Question 17i. How often do you signal other drivers to warn them of a police speed trap ahead?
(Never 1 2 3 4 5 6 Always, 7 Don't know).

Question 38. In order to achieve this 'harmonisation' would you be in favour or against the introduction of the following measures throughout European countries?

(1 = In favour; 2 = Against; 3 = Don't know)
d. A common speed limit of 30 mph (50 km/h) in towns; e. A common speed limit of 70 mph (120 km/h) on motorways; f. A requirement that manufacturers modify their vehicles to restrict their maximum speed.

Question 40. How important do you think each of the following qualities are in a car?
(Very important 1 2 3 4 Not at all important, 5 Don't know).
d. Performance

Question 41. Could you answer yes or no to the following statements?
(1 = Yes, 2 = No, 3 = Don't know).
b. I enjoy driving fast; f. I sometimes get involved in unofficial races with other drivers.

Question 58b. And when you drive a car is it ..?
1. A car with engine size less than 1000cc; 2. A car with engine size from 1000 to 1999cc; 3. A car with engine size of 2000cc or more; 4. A car (but really don't know engine size)

Question 62. In total about how may thousand miles (kilometres) have you driven in the last 12 months.

Appendix 4. Results first analysis on measures questions (Spain excluded)

The canonical loadings in Tables 4.1 and 4.2 are plotted in Figures 4.1, 4.2 and 4.3 in this Appendix. The location of each variable in the plot is indicated by the last digit of the variable number. For instance, Question 38e has variable number 42 (see Table 4.2) and thus is indicated by a '2' in the plot. The letter 'M' in the plot refers to two or more variables lying so close together that seperate digits could not be printed.

For the variables Q13a, Q13b, Q13c, Q13d and Q62 the frequencies for certain categories were very small. It was decided to reduce the original categories of these variables to a smaller number of categories in order not to waste memory and computing space of CANALS. Since only very small frequencies were involved, this reduction of number of categories does not affect the results of the analysis in any way. In Table 4.3 'old' codings and the 'new' codings are given.

Table 4.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

Table 4.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Figure 4.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

Figure 4.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

Figure 4.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Table 4.3. The reduction of categories for variables Q13a, Q13b, Q13c, Q13d, Q62. (1-4 means categories 1,2,3,4).

		1	2	3
1	Germany-East	-0.085	-0.047	0.324
2	Germany-West	-0.037	-0.396	0.101
3	Austria	-0.018	-0.370	0.006
4	Belgium	-0.173	-0.058	0.053
5	Denmark	0.510	-0.076	-0.081
6	France	-0.249	-0.103	-0.217
7	United Kingdom	0.159	0.283	-0.517
8	Ireland	0.127	0.264	-0.280
9	Italy	-0.378	-0.067	-0.103
10	Netherlands	0.157	-0.159	0.316
11	Portugal	-0.238	0.048	-0.334
12	Sweden	0.593	0.151	0.194
13	Switzerland	-0.048	-0.388	-0.051
14	Czechoslovakia	-0.226	0.405	0.536
15	Hungary	-0.216	0.484	0.090

Table 4.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

		1	2	3
16	Q2a Improving driver training	-0.062	0.093	-0.092
17	Q2b More enforcement	-0.130	0.129	0.067
18	Q2c More safety publ. campaigns	-0.091	-0.033	-0.143
19	Q2d More vehicle tests	-0.126	-0.007	-0.067
20	Q2e Improve standards roads	-0.205	0.375	-0.048
21	Q3a Penalties be more severe	0.112	0.057	0.042
22	Q3b Too many traff. regulations	-0.023	0.130	0.185
23	Q3c Decide themselves drink/drive	-0.312	-0.013	-0.059
24	Q3d No stress speed advertisements	-0.105	-0.097	-0.115
25	Q3e More care pedestrians/cyclists	-0.034	0.110	0.016
26	Q11a Put speed device on or off?	-0.029	0.052	0.018
27	Q11b Exceed limit for short time?	0.117	0.014	-0.039
28	Q11c Unable to exceed limit?	-0.176	-0.023	-0.057
29	Q13a What be speed limit in towns?	0.208	-0.164	-0.105
30	Q13b What speed limit resid.areas?	0.211	-0.281	0.223
31	Q13c What be speed on main roads?	0.025	0.041	-0.227
32	Q13d What be speed limit motorways?	0.353	0.285	-0.105
33	Q20a If careful belts not necessary	-0.225	0.111	0.076
34	Q29 Opinion legal limit alcohol	-0.110	0.319	0.277
35	Q30a More breath tests by police	0.088	0.056	-0.027
36	Q30b Harsher penalties over limit	0.022	0.052	0.067
37	Q30d Host let guests drink less	-0.185	-0.023	0.026
38	Q38a Minimum age 17 for driving	-0.035	0.349	-0.170
39	Q38b Tougher standard driving test	-0.144	0.099	-0.047
40	Q38c A penalty points system	0.099	0.074	-0.012
41	Q38d Common limit 30 Mph in towns	0.198	-0.176	-0.073
42	Q38e Common limit 70 Mph motorways	0.177	0.164	0.005
43	Q38f Manufacturers restrict speed	-0.043	0.004	-0.121
44	Q38g A uniform low alcohol limit	0.128	-0.019	-0.129
45	Q38h Regular check-ups for safety	0.046	-0.002	-0.007
46	Q38i Regular check-ups environment	-0.016	-0.050	-0.040
47	Q38j Obligate day-time run light	0.473	0.085	0.015
48	Q38k Install third braking light	0.094	-0.039	-0.104
49	Q38l Obligate use belts front/rear	0.210	-0.020	-0.077

Table 4.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Variables Q13a/13b		Q13c		Q13d		Q62	
Categories							
Old	New	Old	New	Old	New	Old	New
1	1	1-4	1	1-6	1	1-2	1
2	2	5	2	7	2	3-4	2
3	3	6	3	8	3	5-6	3
4	4	7	4	9	4	7-9	4
5	5	8	5	10	5	10	5
6	6	9	6	11	6	11-14	6
7-16	7	10	7	12	7	15-16	7
17	8	11	8	13	8	17-20	8
		12-16	9	14	9	21-35	9
		17	10	15	10	36-990	10
				16	11		
				17	12		

Table 4.3. The reduction of categories for variables Q13a, Q13b, Q13c, Q13d, Q62. (1-4 means categories 1,2,3,4).

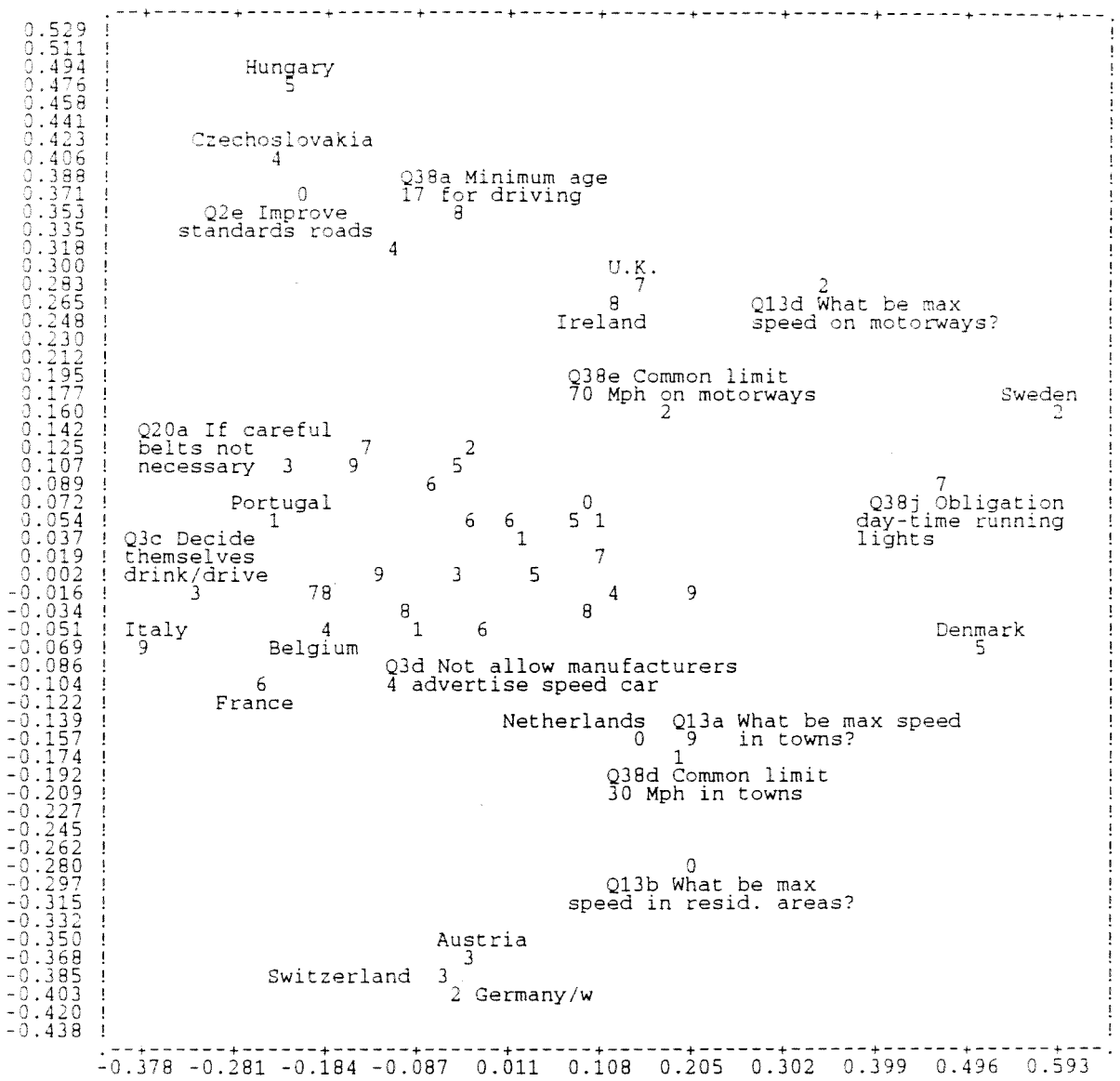

Figure 4.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

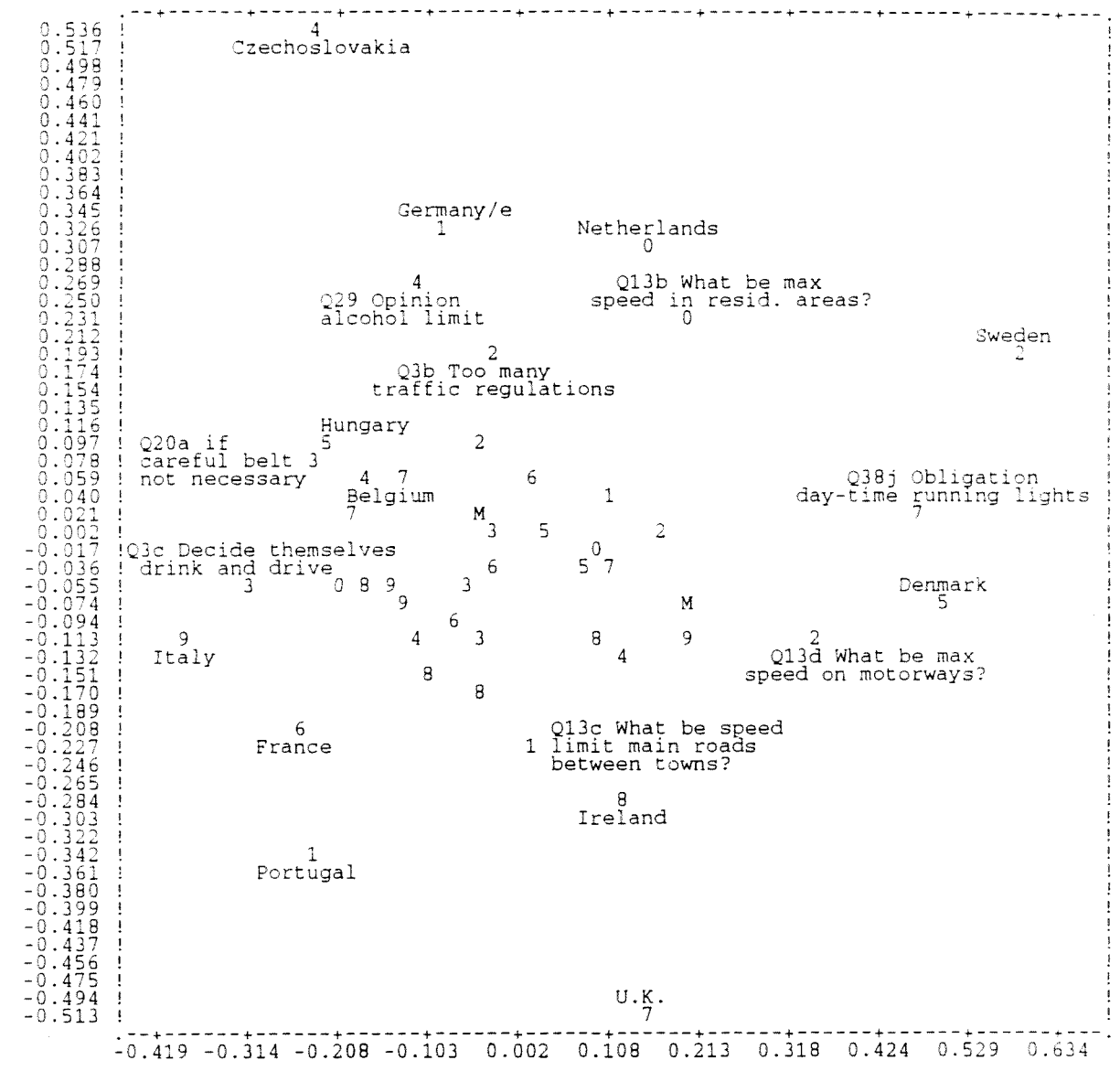

Figure 4.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

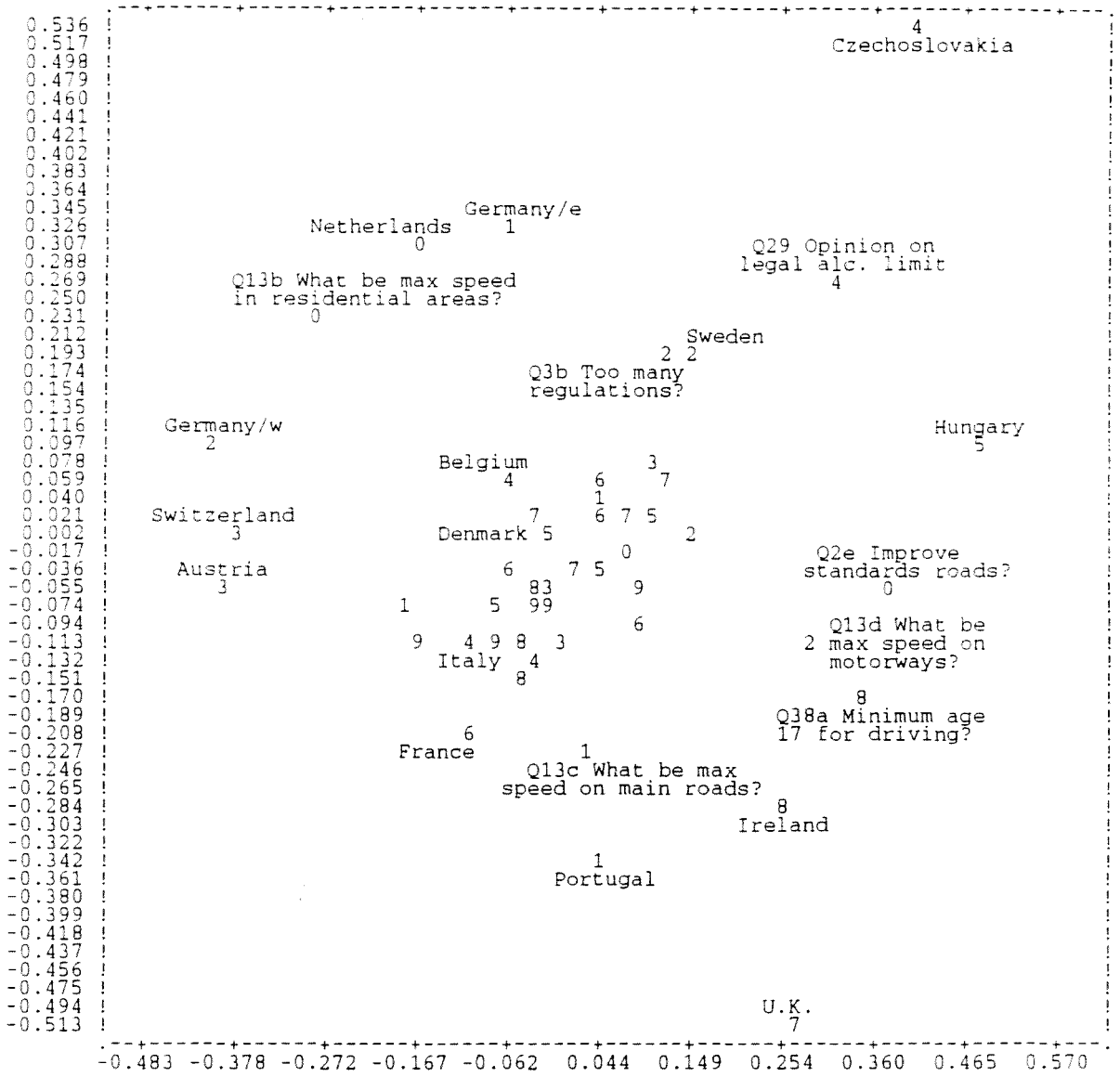

Figure 4.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Var.	Cat.	Freq.	Category quantifications
Q2a	1	5432	-0.569
	2	6224	-0.561
	3	3192	0.911
	4	870	2.556
	5	209	3.173
	6	296	2.646
Q2b	1	5428	-1.142
	2	6232	0.019
	3	2790	1.051
	4	1289	1.814
	5	354	2.263
	6	130	0.060
Q2c	1	4497	-1.399
	2	6672	0.106
	3	3447	0.907
	4	1109	1.136
	5	250	1.795
	6	248	3.026
Q2d	1	5007	-1.066
	2	6138	0.238
	3	3164	1.462
	4	1294	0.429
	5	411	-2.696
	6	209	-0.954
Q2e	1	8380	-0.877
	2	4939	0.490
	3	2072	1.536
	4	560	2.177
	5	174	2.138
	6	98	1.606
Q3a	1	4403	0.740
	2	5612	-0.651
	3	3054	-0.762
	4	2105	-0.008
	5	795	3.485
	6	254	-0.123
Q3b	1	1324	-2.591
	2	3650	-0.813
	3	3954	0.168
	4	5271	0.661
	5	1532	1.142
	6	492	1.015
Q3c	1	930	-2.173
	2	979	-2.131
	3	664	-1.442
	4	3010	-0.611
	5	10492	0.672
	6	148	-0.983
Q3d	1	2666	-1.898
	2	3244	-0.481
	3	4007	0.175
	4	3558	1.084
	5	2295	0.720
	6	453	0.905
Q3e	1	8138	-0.630
	2	6082	0.059
	3	1202	1.902
	4	489	3.303
	5	192	4.110
	6	120	0.640

Var.	Cat.	Freq.	Category quantifications
Q11a	1	7582	-0.978
	2	6892	1.135
	3	1749	-0.232
Q11b	1	6385	-0.348
	2	7827	-0.399
	3	2011	2.658
Q11c	1	5978	-1.130
	2	8269	0.970
	3	1976	-0.639
Q13a	1	108	-2.506
	2	855	-1.932
	3	1600	-0.713
	4	8595	-0.398
	5	4189	1.283
	6	560	1.283
	7	190	1.283
	8	48	1.283
Q13b	1	636	-1.424
	2	4141	-1.182
	3	3485	-0.424
	4	5010	0.608
	5	2274	1.442
	6	355	1.442
	7	203	1.442
	8	34	1.442
Q13c	1	229	-3.809
	2	639	-3.809
	3	742	-0.435
	4	3633	-0.206
	5	4158	0.386
	6	4932	0.386
	7	944	0.386
	8	636	0.431
	9	164	0.431
	10	69	0.431
Q13d	1	29	-2.199
	2	85	-2.199
	3	153	-2.199
	4	1177	-1.577
	5	2182	-1.577
	6	4405	-0.035
	7	3399	0.261
	8	1786	0.862
	9	963	1.154
	10	419	1.154
	11	275	1.154
	12	1216	1.395
Q20a	1	2739	-1.199
	2	12641	0.482
	3	843	-3.330
Q29	1	7317	-0.794
	2	2727	1.085
	3	4584	0.999
	4	884	-2.069
	5	116	-0.343
	6	595	0.232

Var.	Cat.	Freq.	Category quantifications
Q30a	1	12508	-0.543
	2	2541	1.708
	3	1174	2.089
Q30b	1	12714	-0.443
	2	2511	2.334
	3	998	-0.231
Q30d	1	10036	-0.400
	2	4432	1.526
	3	1755	-1.564
Q38a	1	7328	-1.097
	2	8109	0.943
	3	786	0.502
Q38b	1	9058	-0.889
	2	5795	1.124
	3	1370	1.124
Q38c	1	10502	-0.713
	2	4328	1.557
	3	1393	0.534
Q38d	1	12504	-0.539
	2	3325	1.922
	3	394	0.889
Q38e	1	8882	-0.898
	2	6890	1.146
	3	451	0.170
Q38f	1	6843	-1.157
	2	7774	0.936
	3	1606	0.400
Q38g	1	12496	-0.515
	2	2802	2.127
	3	925	0.509
Q38h	1	14423	-0.345
	2	1194	3.219
	3	606	1.874
Q38i	1	13892	-0.406
	2	1539	2.167
	3	792	2.911
Q38j	1	5775	-1.341
	2	8795	0.785
	3	1653	0.507
Q38k	1	6134	-0.467
	2	7713	-0.371
	3	2376	2.412
Q38l	1	12124	-0.539
	2	3033	1.149
	3	1066	2.857

Appendix 5. Results second analysis on measures questions (all countries included).

The canonical loadings in Tables 5.1 and 5.2 are plotted in Figures 5.1, 5.2 and 5.3 in this Appendix. The location of each variable in the plot in indicated by the last digit of the variable number. For instance, Question 38e has variable number 42 (see Table 5.2) and thus is indicated by a '2' in the plot. A letter 'M' in one of the plots refers to two or more variables lying so close together that separate digits could not be printed.

Table 5.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

Table 5.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Figure 5.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

Figure 5.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

Figure 5.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Number of observations: 17430
Canonical correlations for each dimension 0.708 0.676 0.582

		(1)	(2)	(3)
1	Germany/east	-0.106	-0.058	-0.112
2	Germany/west	-0.079	0.339	-0.064
3	Austria	-0.047	0.367	-0.052
4	Belgium	-0.168	0.033	0.111
5	Denmark	0.501	0.202	0.239
6	Spain	-0.172	-0.088	-0.298
7	France	-0.240	0.093	-0.206
8	United Kingdom	0.250	-0.211	-0.333
9	Ireland	0.171	-0.225	-0.459
10	Italy	-0.343	0.053	0.083
11	Netherlands	0.126	0.142	0.291
12	Portugal	-0.222	-0.028	-0.248
13	Sweden	0.598	-0.104	0.026
14	Switzerland	-0.096	0.432	0.262
15	Czechoslovakia	-0.179	-0.501	0.370
16	Hungary	-0.113	-0.431	0.406

Table 5.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

		(1)	(2)	(3)
17	Q2a Improving driver training	-0.142	-0.052	-0.122
18	Q2b More enforcement	-0.095	-0.160	-0.022
19	Q2c More safety publ.campaigns	-0.111	0.026	-0.189
20	Q2d More vehicle tests	-0.114	-0.001	-0.118
21	Q2e Improve standards of roads	-0.166	-0.412	-0.224
22	Q3a Penalties be more severe	0.132	-0.055	0.065
23	Q3b Too many traffic. regulations	-0.002	-0.150	0.167
24	Q3c Decide themselves drink/drive	-0.305	-0.027	-0.003
25	Q3d No stress speed advertisements	-0.105	0.067	-0.174
26	Q3e More care pedestrians/cyclists	-0.030	-0.110	-0.040
27	Q11a Put speed device on or off?	0.093	-0.026	-0.076
28	Q11b Exceed limit for short time?	-0.059	-0.072	-0.064
29	Q11c Unable to exceed limit?	-0.175	-0.014	-0.143
30	Q13a What speed limit in towns?	0.172	0.176	-0.191
31	Q13c What limit on main roads?	0.117	0.029	0.089
32	Q13d What limit on motorways?	0.383	-0.218	-0.132
33	Q20a If careful belts not necess.	-0.204	-0.133	0.122
34	Q29 Opinion legal limit of alcohol	-0.068	-0.352	0.174
35	Q30a More breath test by police	0.084	-0.055	-0.099
36	Q30b Harsher penalties over limit	0.044	-0.055	0.057
37	Q30d Hosts let guests drink less	-0.143	0.005	-0.114
38	Q38a Minimum age 17 for driving	0.020	-0.324	-0.151
39	Q38b Tougher standard driving test	-0.111	-0.109	0.033
40	Q38c A penalty points system	0.106	-0.067	-0.093
41	Q38d Common limit 30 Mph in towns	0.171	0.181	-0.146
42	Q38e Common limut 70 Mph motorways	0.188	-0.133	-0.002
43	Q38f Manufacturers restrict speed	-0.040	-0.012	-0.169
44	Q38g A uniform low alcohol limit	0.116	0.027	-0.201
45	Q38h Regular check-ups for safety	0.072	0.014	-0.081
46	Q38i Regular check-ups environment	-0.017	0.042	-0.085
47	Q38j Obligate day-time run lights	0.477	-0.010	0.064
48	Q38k Install third braking light	0.027	0.086	-0.095
49	Q38l Obligate use belts front/rear	0.204	0.026	-0.188

Table 5.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

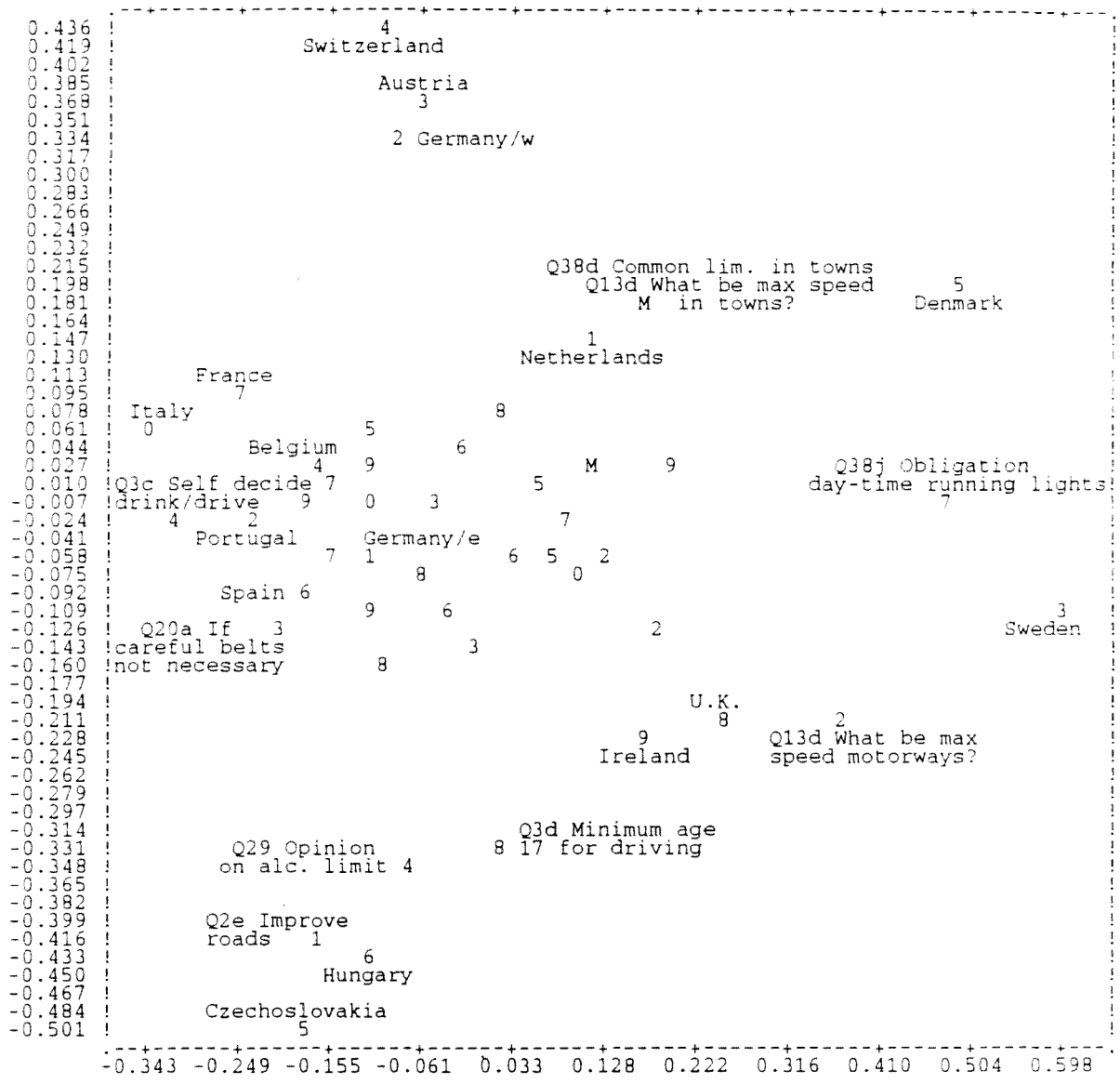

Figure 5.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

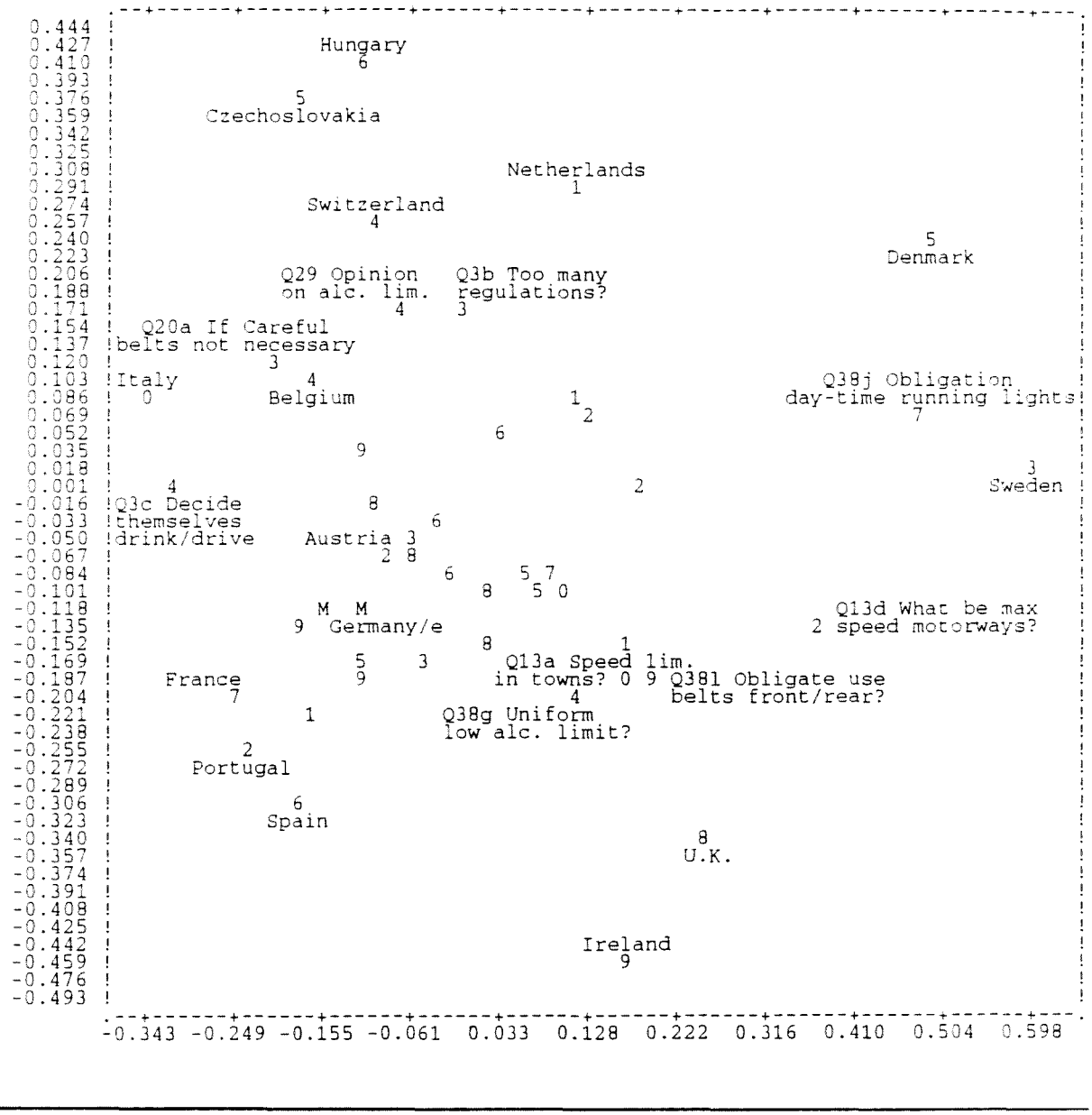

Figure 5.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

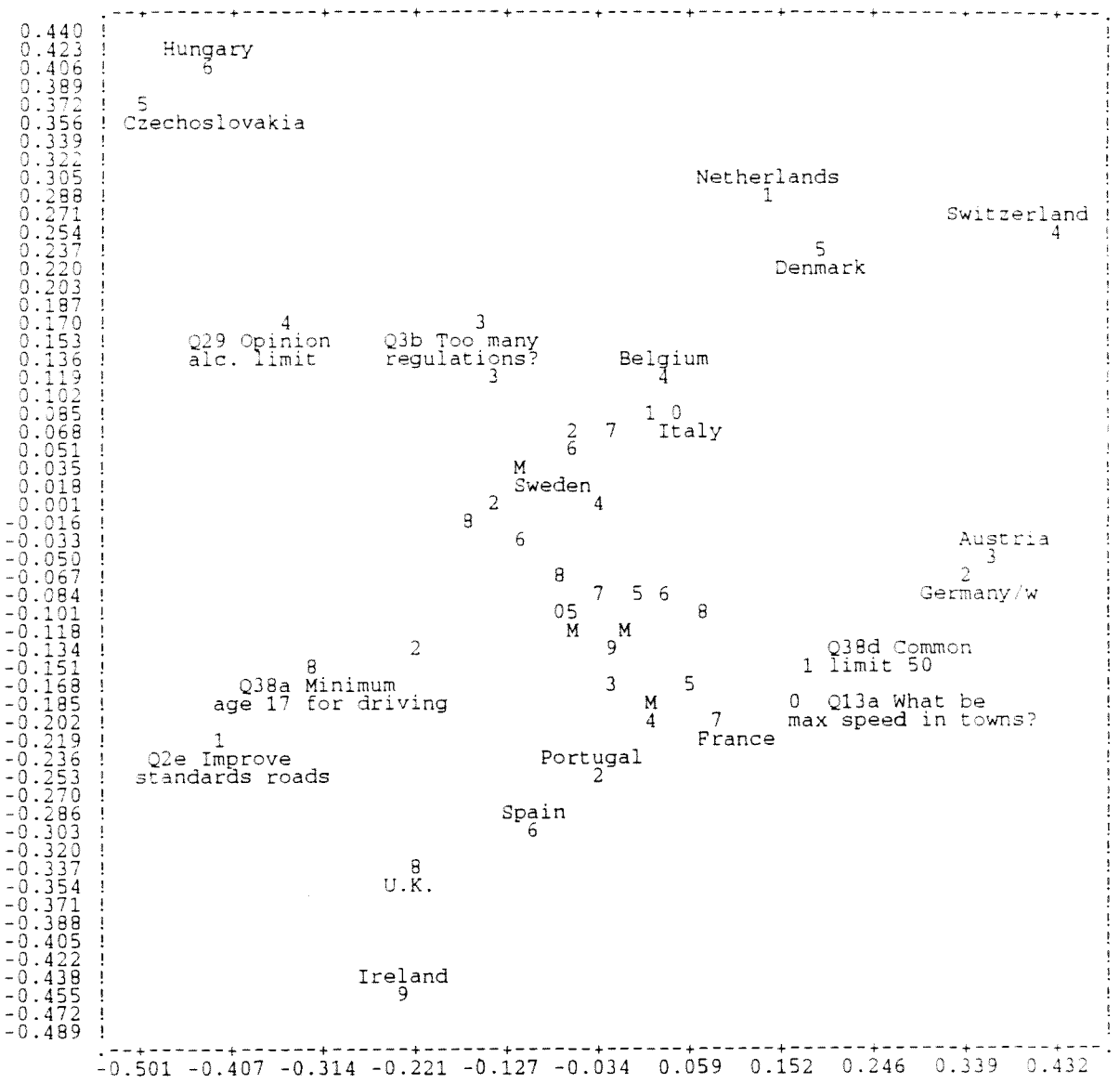

Figure 5.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Appendix 6. Results third analysis on measures questions (Spain and Czechoslovakia excluded)

The canonical loadings in Tables 6.1 and 6.2 are plotted in Figures 6,1, 6.2 and 6.3 in this Appendix. The location of each variable in the plot is indicated by the last digit of the variable number. For instance, Question 38e has variable number 42 (see Table 6.2) and thus is indicated by a '2' in the plot. A letter 'M' in one of the plots refers to two or more variables lying so close together that separate digits could not be printed.

Table 6.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

Table 6.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Figure 6.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

Figure 6.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

Figure 6.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Number of observations: 15152
Canonical correlations for each dimension 0.736 0.692 0.592

	(1)	(2)	(3)
1 Germany/east	0.075	0.058	0.253
2 Germany/west	0.116	0.371	0.192
3 Austria	0.113	0.346	0.129
4 Belgium	0.207	0.001	-0.112
5 Denmark	-0.459	0.158	-0.398
6 France	0.286	-0.025	0.110
7 U.K.	-0.223	-0.322	0.397
8 Ireland	-0.157	-0.299	0.458
9 Italy	0.382	-0.079	-0.148
10 Netherlands	-0.126	0.248	-0.154
11 Portugal	0.255	-0.200	0.100
12 Sweden	-0.615	-0.014	-0.048
13 Switzerland	0.149	0.358	-0.233
14 Hungary	0.124	-0.599	-0.544

Table 6.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

	(1)	(2)	(3)
15 Q2a Improving driver training	0.134	-0.003	0.108
16 Q2b More enforcement	0.082	-0.118	0.062
17 Q2c More safety publ.campaigns	0.124	0.010	0.159
18 Q2d More vehicle tests	0.107	-0.028	0.192
19 Q2e Improve standards of roads	0.105	-0.395	0.206
20 Q3a Penalties be more severe	-0.129	-0.061	-0.016
21 Q3b Too many traffic. regulations	-0.121	-0.021	-0.074
22 Q3c Decide themselves drink/drive	0.320	-0.078	-0.059
23 Q3d No stress speed advertisements	0.121	0.021	0.185
24 Q3e More care pedestrians/cyclists	-0.005	-0.092	0.051
25 Q11a Put speed device on or off?	-0.072	-0.029	0.112
26 Q11b Exceed limit for short time?	-0.113	0.001	0.025
27 Q11c Unable to exceed limit?	0.179	-0.030	0.159
28 Q13a What speed limit in towns?	-0.105	0.116	0.233
29 Q13b What limit in res. areas?	-0.202	0.407	0.241
30 Q13c What limit on main roads?	-0.100	-0.014	-0.049
31 Q13d What limit on motorways?	-0.413	-0.211	0.165
32 Q20a If careful belts not necess.	0.192	-0.094	-0.129
33 Q29 Opinion legal limit of alcohol	0.035	-0.233	-0.057
34 Q30a More breath test by police	-0.098	-0.053	0.081
35 Q30b Harsher penalties over limit	-0.047	-0.029	-0.011
36 Q30c Lower limit inexper. drivers	0.199	0.031	0.216
37 Q30d Hosts let guests drink less	0.145	0.024	0.204
38 Q38a Minimum age 17 for driving	-0.047	-0.375	0.159
39 Q38b Tougher standard driving test	0.114	-0.121	0.021
40 Q38c A penalty points system	-0.136	-0.033	0.126
41 Q38d Common limit 30 Mph in towns	-0.144	0.175	0.186
42 Q38e Common limut 70 Mph motorways	-0.221	-0.113	-0.009
43 Q38f Manufacturers restrict speed	0.055	-0.047	0.163
44 Q38g A uniform low alcohol limit	-0.144	0.029	0.183
45 Q38h Regular check-ups for safety	-0.080	0.005	0.110
46 Q38i Regular check-ups environment	0.032	0.021	0.099
47 Q38j Obligate day-time run lights	-0.486	0.008	-0.096
48 Q38k Install third braking light	-0.149	-0.086	-0.009
49 Q38l Obligate use belts front/rear	-0.208	0.011	0.205

Table 6.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

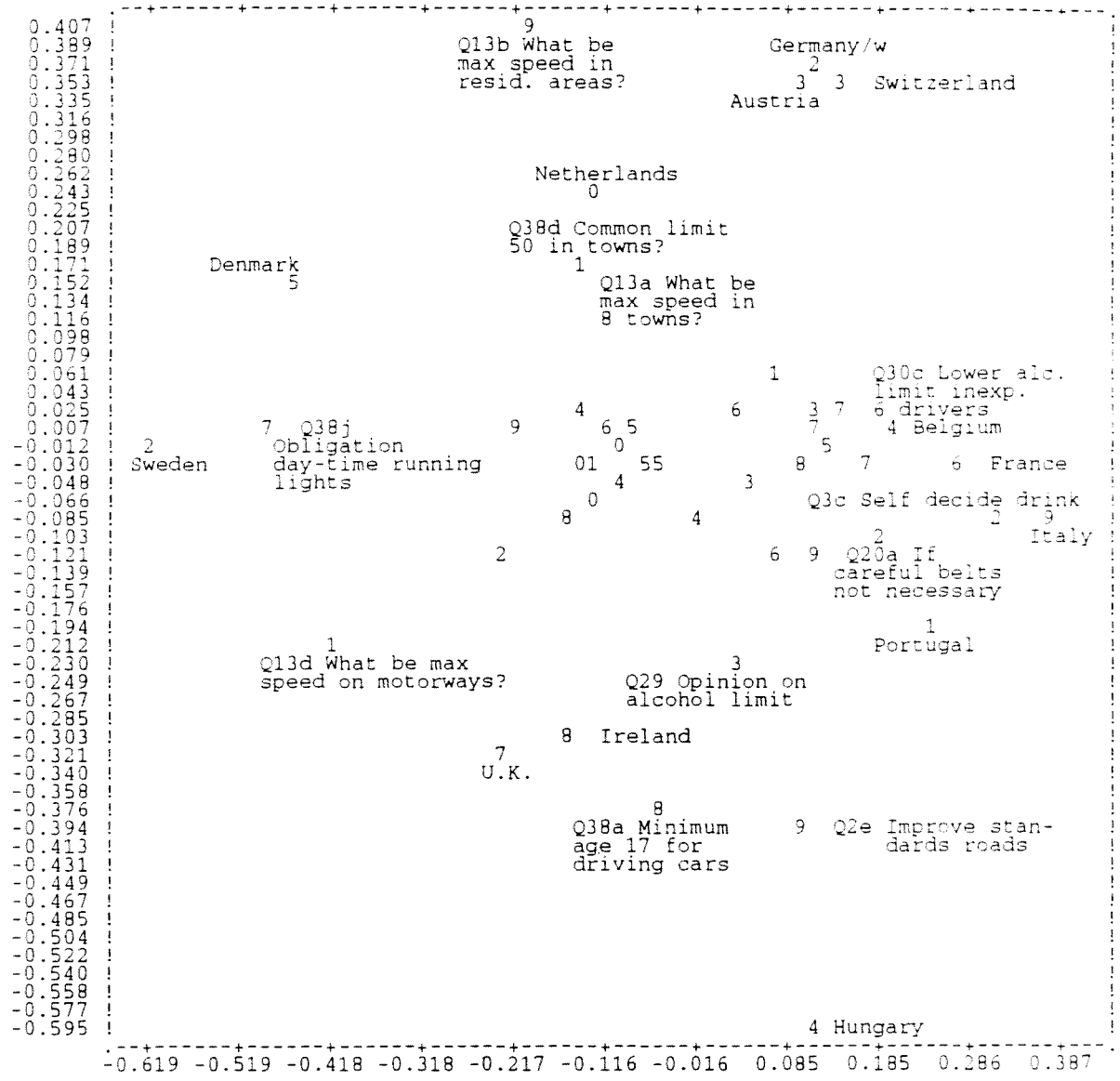

Figure 6.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

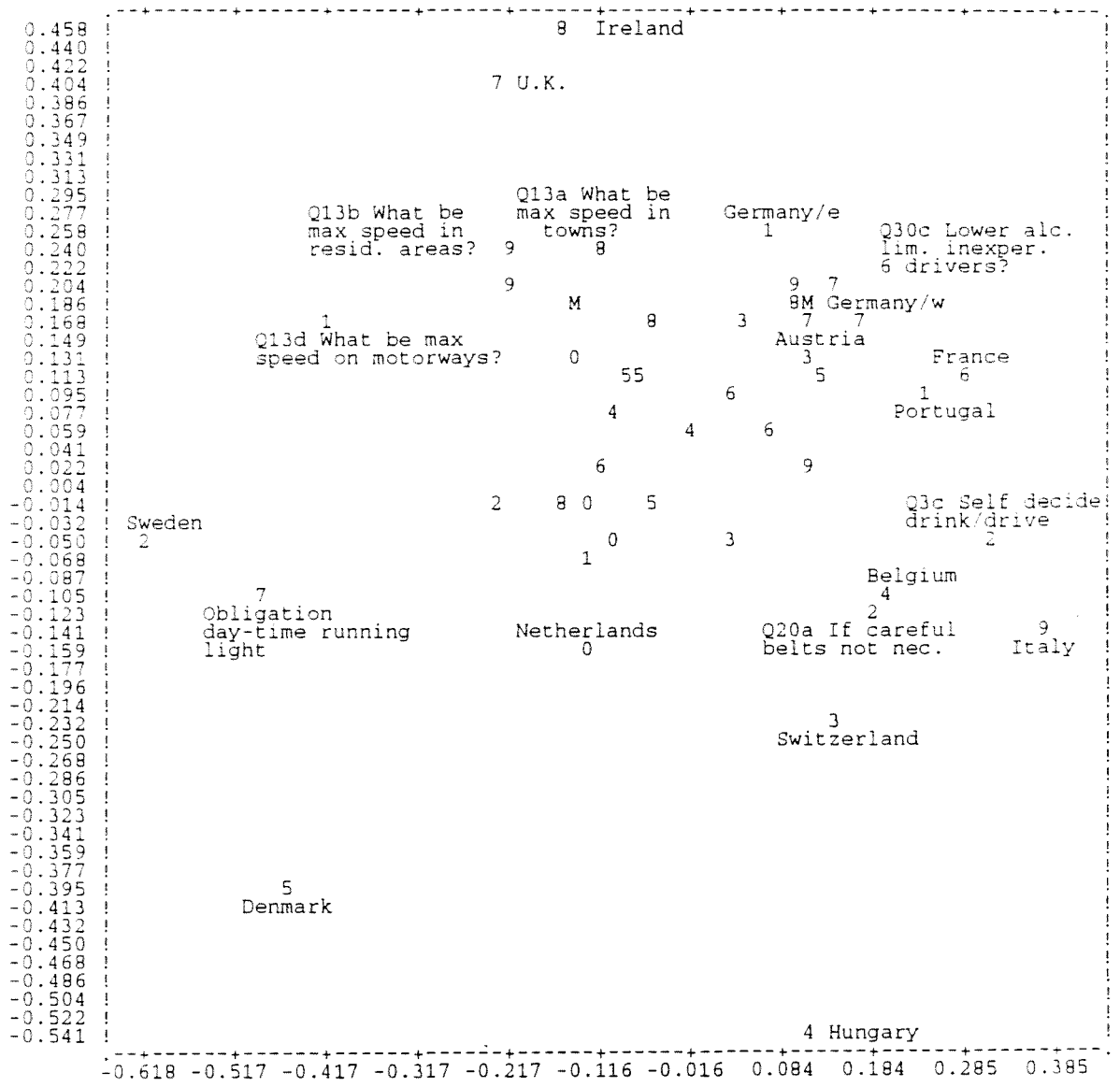

Figure 6.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

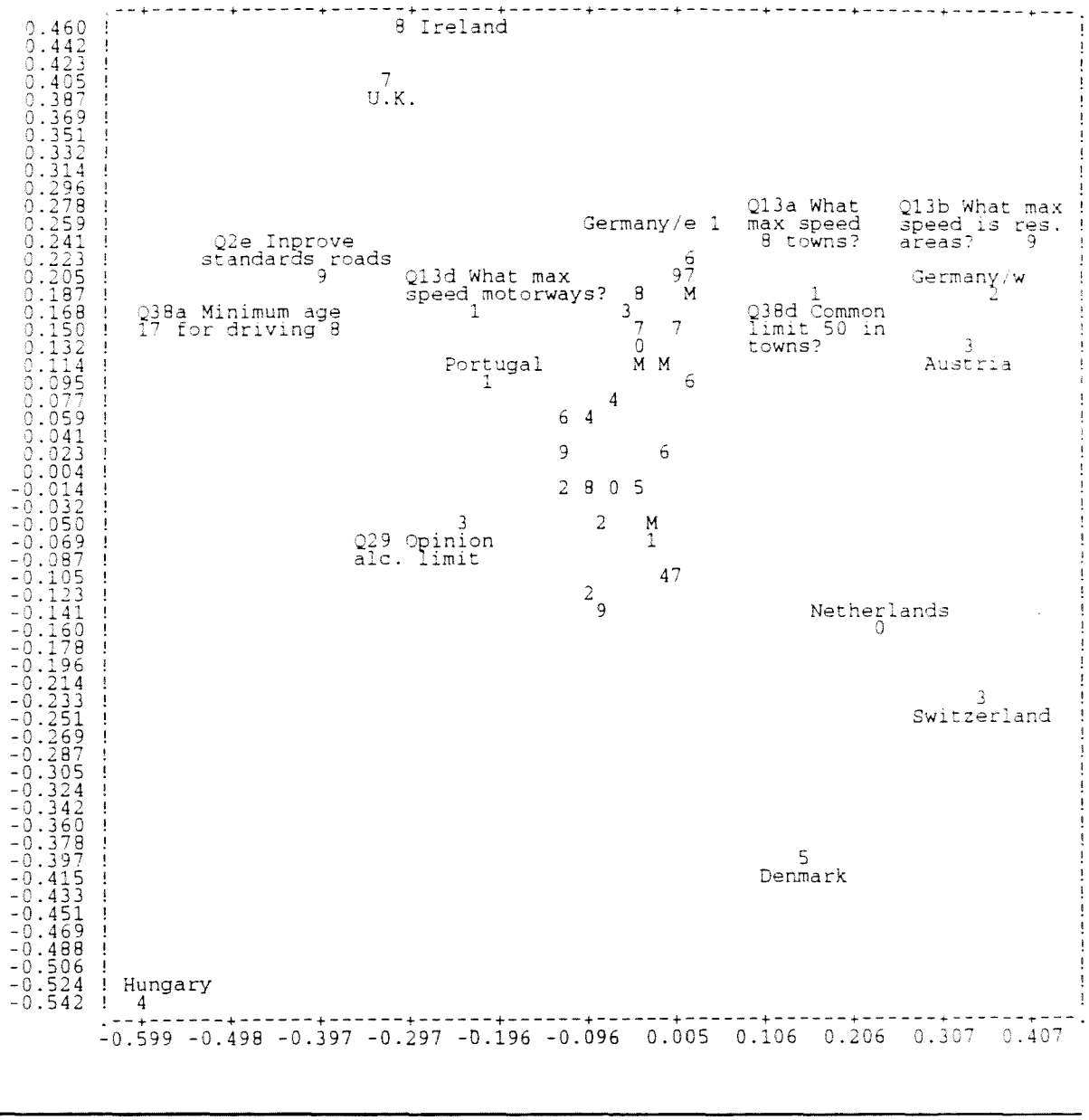

Figure 6.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Appendix 7. Results first analysis on speed questions (Spain excluded)

The canonical loadings in Tables 7.1 and 7.2 are plotted in Figures 7.1, 7.2 and 7.3 in this Appendix. The location of each variable in the plot is indicated by the last digit of the variable number. For instance, Question 41f has variable number 42 (see Table 7.2) and thus is indicated by a '2' in the plot. A letter 'M' in one of the plots refers to two or more variables lying so close together that separate digits could not be printed.

Table 7.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

Table 7.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Figure 7.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

Figure 7.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

Figure 7.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

		(1)	(2)	(3)
1	Germany/east	-0.131	0.396	-0.062
2	Germany/west	-0.424	0.440	-0.059
3	Austria	-0.280	0.248	-0.017
4	Belgium	-0.079	-0.098	0.118
5	Denmark	0.412	-0.087	-0.199
6	France	-0.155	-0.186	0.064
7	United Kingdom	0.281	-0.052	0.608
8	Ireland	0.229	-0.081	0.305
9	Italy	-0.308	-0.151	0.223
10	Netherlands	0.243	0.292	-0.009
11	Portugal	-0.187	-0.285	0.171
12	Sweden	0.492	0.168	-0.211
13	Switzerland	-0.086	0.087	-0.086
14	Czechoslovakia	0.048	-0.111	-0.574
15	Hungary	-0.166	-0.598	-0.301

Table 7.1. Correlations between the optimally scaled variables of the *first* set and the canonical variates of the first set for each dimension.

16 Not allow manufacturers advertise speed	-0.052	0.030	0.191
17 Q4d Following too closely cause accident?	-0.127	-0.133	-0.082
18 Q4e Driving too fast cause accident?	0.069	-0.113	-0.191
19 Q4f Driving too slow cause accident?	0.002	0.059	-0.164
20 Q6e Verhicle too fast cause accident?	0.178	0.046	-0.244
21 Q9 How often do others break speed limit?	-0.226	0.042	-0.060
22 Q10 Compared with other drivers do you generally drive ..	0.167	-0.071	0.102
23 Q11a Put speed device on or off?	0.076	0.038	0.015
24 Q11b Be able exceed limit short time?	0.058	-0.013	0.005
25 Q11c Unable to exceed certain limit?	-0.156	0.015	0.127
26 Q12a Drive faster than limit on motorways?	-0.077	0.048	-0.065
27 Q12b Violate limit on roads between towns?	-0.087	0.082	0.050
28 Q12c Drive faster than limit country roads?	-0.028	0.057	0.107
29 Q12d Violate limit main roads in towns?	0.027	0.015	0.004
30 Q12e Violate limit in residential areas	0.091	0.089	-0.058
31 Q13a What should speed limit be in towns?	0.114	0.300	0.224
32 Q13b What speed limit be in resid. areas?	0.100	0.518	-0.004
33 Q13c What speed limit main roads betw. towns?	0.075	-0.010	0.282
34 Q13d What speed limit be on motorways?	0.471	-0.054	0.107
35 Q14 Ever been stopped exceed speed limit?	-0.053	0.129	-0.094
36 Q17i Do you warn others speed trap police	0.245	0.092	0.049
37 Q38d A common limit 30 Mph in towns?	0.093	0.262	0.164
38 Q38e A common limit 70 Mph motorways?	0.254	-0.041	0.015
39 Q38f Require manufacturers restrict speed?	0.033	0.004	0.181
40 Q40d How important performance car?	-0.079	0.012	0.082
41 Q41b I enjoy driving fast	0.000	0.056	-0.069
42 Q41f I sometimes get into races with others	-0.025	-0.028	-0.111
43 Q58b Engine size of car you drive	-0.182	-0.054	0.172
44 Q62 How many 1000 miles driven last 12 months?	0.002	-0.113	-0.131

Table 7.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

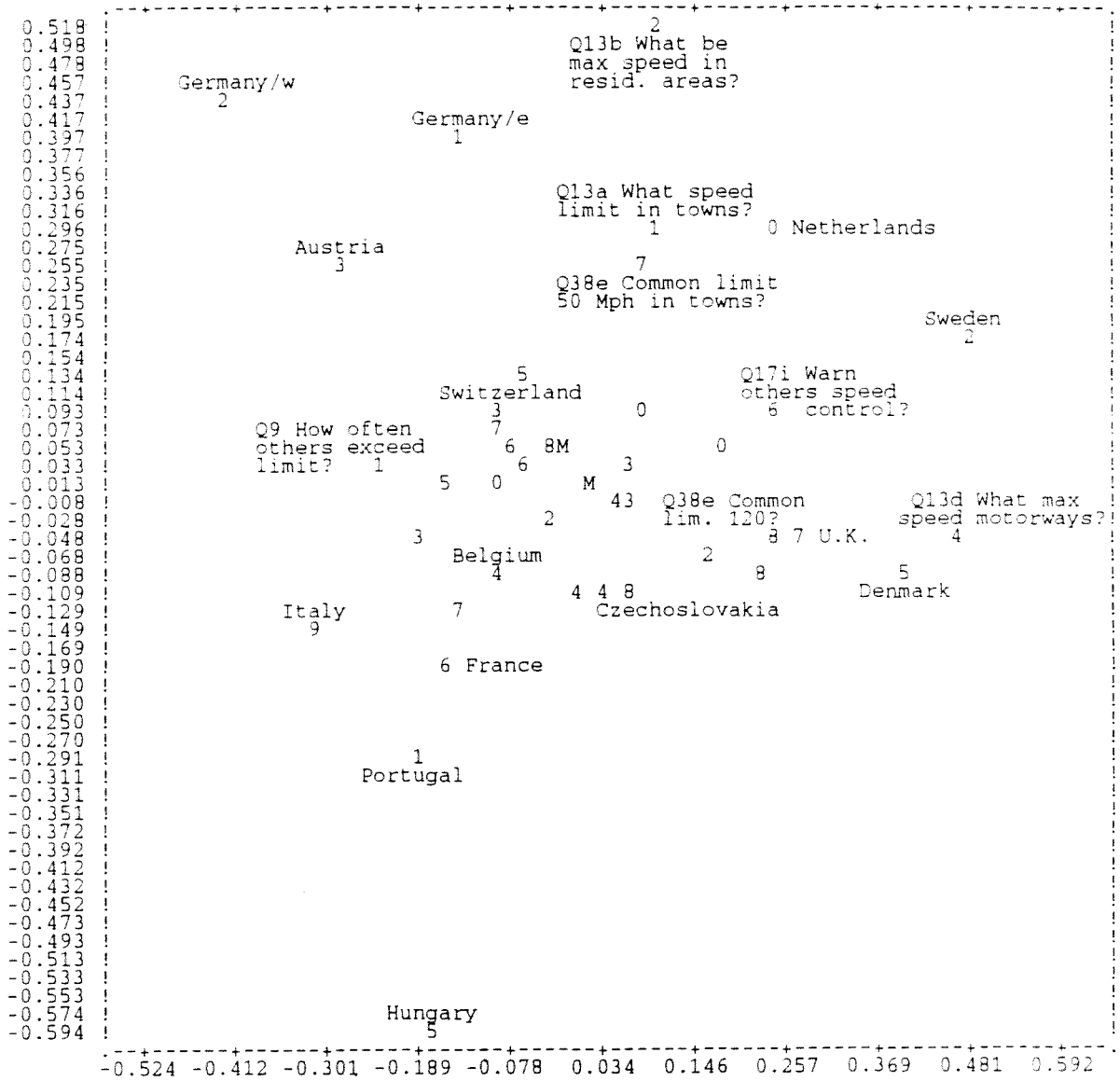

Figure 7.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

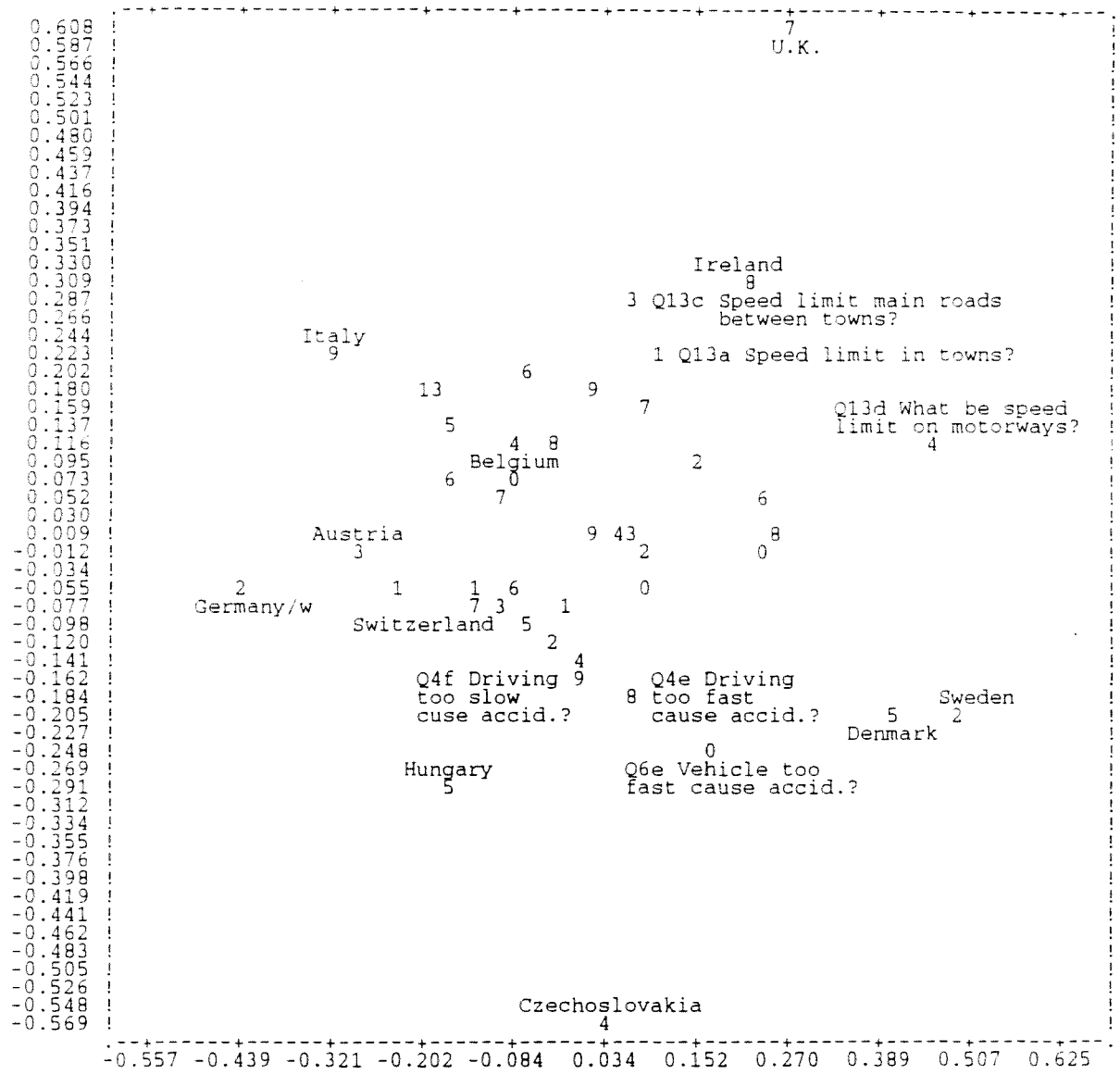

Figure 7.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

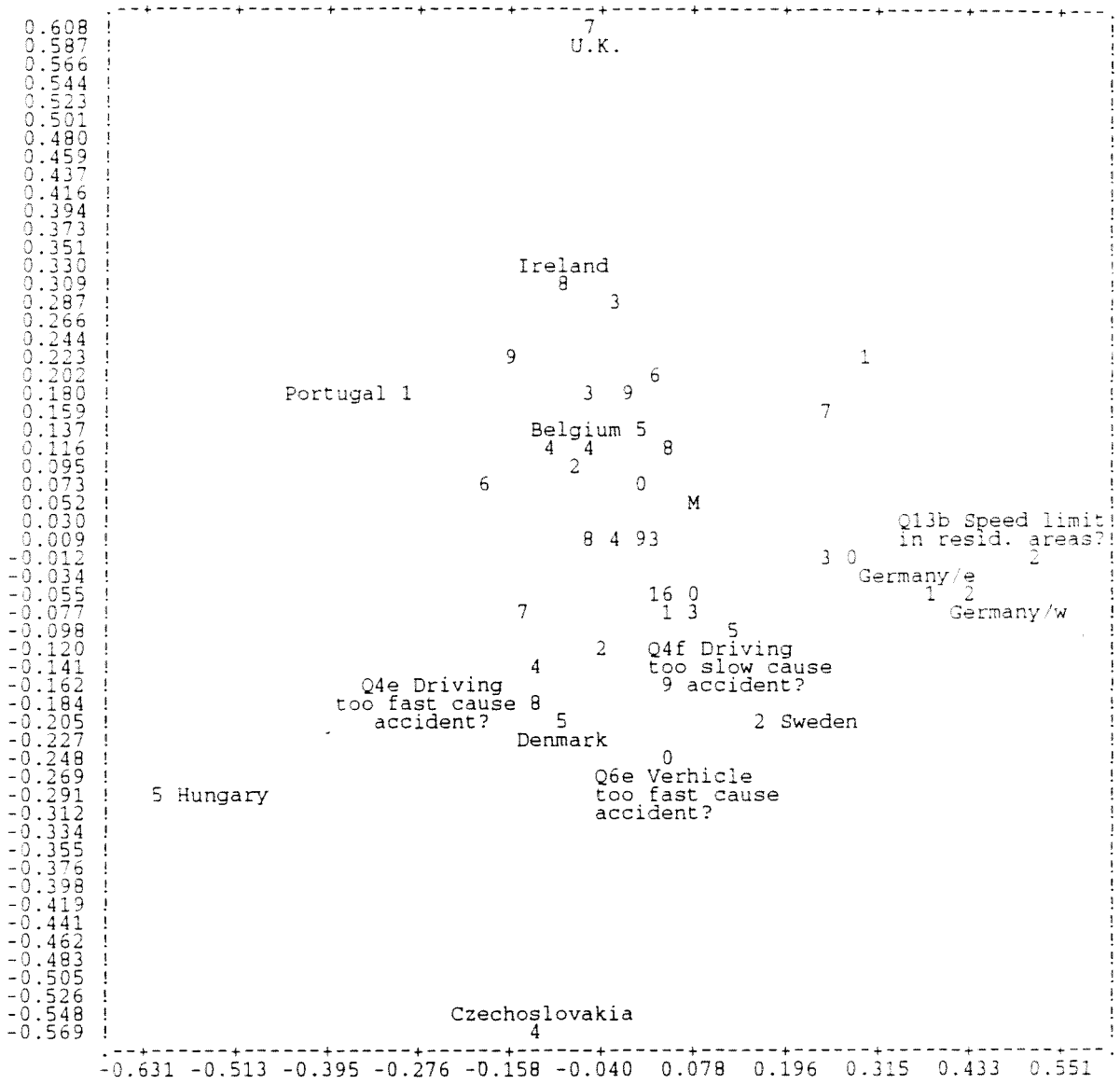

Figure 7.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Var.	Cat.	Freq.	Category quantifications
Q3d	1	2666	-1.248
	2	3244	-1.064
	3	4007	-0.093
	4	3558	0.979
	5	2295	1.275
	6	453	1.642
Q4d	1	210	-2.481
	2	622	-1.597
	3	3467	-1.379
	4	5889	0.143
	5	5006	1.117
	6	902	0.083
	7	127	-1.723
Q4e	1	193	2.296
	2	705	-1.206
	3	2815	-1.411
	4	4874	-0.492
	5	6183	0.686
	6	1364	1.801
	7	89	0.897
Q4f	1	575	-1.286
	2	4370	-1.016
	3	6456	-0.073
	4	2921	0.946
	5	1362	1.884
	6	332	2.485
	7	207	-2.428
Q6e	1	465	-1.655
	2	2185	-1.626
	3	4041	-0.493
	4	4557	0.330
	5	3831	1.020
	6	825	1.793
	7	319	-1.822
Q9	1	55	-3.099
	2	258	-2.925
	3	2235	-1.493
	4	6144	-0.307
	5	6515	0.827
	6	842	1.517
	7	174	-2.969
Q10	1	302	-1.309
	2	2927	-1.036
	3	8447	-0.404
	4	3771	1.322
	5	557	2.672
	6	219	1.673
Q11a	1	7582	-0.936
	2	6892	0.490
	3	1749	2.129
Q11b	1	6385	-1.123
	2	7827	0.451
	3	2011	1.809
Q11c	1	5978	-1.156
	2	8269	0.963
	3	1976	-0.532
Q12a	1	3405	-0.248
	2	3595	-1.211
	3	4572	-0.198
	4	2473	0.993
	5	1224	1.639
	6	734	2.517
	7	220	-0.935
Q12b	1	3210	-0.973
	2	4407	-0.717
	3	5060	0.187
	4	2357	1.611
	5	776	1.434
	6	318	2.401
	7	95	-3.545
Q12c	1	5221	-1.203
	2	5375	0.025
	3	3698	0.932
	4	1237	1.489
	5	378	1.705
	6	178	2.580
	7	136	-1.768
Q12d	1	6536	-1.108
	2	5246	0.369
	3	2995	0.984
	4	962	1.545
	5	231	1.967
	6	155	2.985
	7	98	-0.425
Q12e	1	8943	-0.775
	2	4826	0.494
	3	1649	1.710
	4	453	2.525
	5	134	3.142
	6	104	2.369
	7	114	-0.692
Q13a	1	108	-2.233
	2	855	-2.029
	3	1600	-0.442
	4	8595	-0.442
	5	4189	1.296
	6	560	1.296
	7	190	1.296
	8	48	1.296
Q13b	1	636	-1.214
	2	4141	-1.212
	3	3485	-0.288
	4	5010	0.405
	5	2274	1.636
	6	355	1.636
	7	203	1.636
	8	34	1.636
Q13c	1	229	-3.962
	2	639	-3.962
	3	742	-0.234
	4	3633	-0.143
	5	4158	0.374
	6	4932	0.374
	7	944	0.374
	8	636	0.374
	9	164	0.374
	10	69	0.650

Var.	Cat.	Freq.	Category quantifications
Q13d	1	29	-1.982
	2	85	-1.982
	3	153	-1.982
	4	1177	-1.466
	5	2182	-1.466
	6	4405	-0.212
	7	3399	0.273
	8	1786	0.765
	9	963	1.189
	10	419	1.272
	11	275	1.356
	12	1216	1.717
Q14	1	4799	-1.498
	2	11391	0.622
Q17i	1	7368	-1.026
	2	2413	0.301
	3	3143	0.812
	4	1210	1.448
	5	628	1.473
	6	1182	1.386
	7	279	-0.123
Q38d	1	12504	-0.539
	2	3325	1.924
	3	394	0.860
Q38e	1	8882	-0.908
	2	6890	1.116
	3	451	0.836
Q38f	1	6843	-1.126
	2	7774	0.658
	3	1606	1.614
Q40d	1	5527	-1.262
	2	6482	0.261
	3	3397	1.122
	4	737	1.879
	5	80	1.083
Q41b	1	6031	-1.276
	2	9753	0.806
	3	439	-0.374
Q41f	1	1295	-3.277
	2	14768	0.313
	3	160	-2.332
Q58b	1	2366	-1.163
	2	10664	-0.079
	3	1952	0.945
	4	624	1.752
	5	176	6.970
	6	441	-1.302
Q62	1	1701	-1.176
	2	1268	-0.927
	3	1712	-0.927
	4	1474	-0.260
	5	1835	-0.260
	6	1310	0.562
	7	1666	0.629
	8	1655	0.629
	9	1879	0.717
	10	1357	0.717

Appendix 8. Results second analysis on speed questions (all countries included)

The canonical loadings in Tables 8.1 and 8.2 are plotted in Figures 8.1, 8.2 and 8.3 in this Appendix. The location of each variable in the plot is indicated by the last digit of the variable number. For instance Question 41f has variable number 42 (see Table 8.2) and thus is indicated by a '2' in the plot. A letter 'M' in one of the plots refers to two or more variables lying so close together that separate digits could not be printed.

Table 8.1. Correlations between the optimally scaled variables of *the first* set and the canonical variates of the first set for each dimension.

Table 8.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

Figure 8.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

Figure 8.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

Figure 8.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.

Number of observations: 17430
Canonical correlations for each dimension 0.669 0.562 0.516

	(1)	(2)	(3)
1 Germany/east	0.105	-0.311	0.132
2 Germany/west	0.383	-0.364	0.206
3 Austria	0.244	-0.285	0.158
4 Belgium	0.068	0.093	-0.201
5 Denmark	-0.418	0.078	0.172
6 Spain	0.206	0.479	-0.315
7 France	0.142	0.138	-0.141
8 United Kingdom	-0.289	-0.311	-0.279
9 Ireland	-0.233	-0.005	-0.446
10 Italy	0.326	-0.034	-0.251
11 Netherlands	-0.248	-0.220	0.052
12 Portugal	0.179	0.131	-0.221
13 Sweden	-0.497	0.021	0.090
14 Switzerland	0.067	-0.174	0.230
15 Czechoslovakia	-0.065	0.433	0.462
16 Hungary	0.131	0.336	0.353

Table 8.1. Correlations between the optimally scaled variables of *the first* set and the canonical variates of the first set for each dimension.

17 Q3d Not allow manufacturers advertise speed	0.062	-0.069	-0.177
18 Q4d Following too closely cause accident?	0.137	0.151	0.004
19 Q4e Driving too fast cause accident?	-0.036	0.184	0.088
20 Q4f Driving too slow cause accident?	-0.034	-0.031	0.189
21 Q6e Verhicle too fast cause accident?	-0.171	0.083	0.207
22 Q9 How often do others break speed limit?	0.236	0.080	-0.073
23 Q10 Compared with other drivers do you generally drive ..	-0.165	0.018	-0.107
24 Q11a Put speed device on or off?	-0.061	-0.013	-0.003
25 Q11b Be able exceed limit for short time?	-0.023	0.053	-0.022
26 Q11c Unable to exceed certain limit?	0.167	-0.021	-0.134
27 Q12a Drive faster than limit on motorwys?	0.047	-0.049	0.094
28 Q12b Violate limit on roads between towns?	0.091	-0.037	-0.058
29 Q12c Drive faster than limit country roads?	0.048	-0.008	-0.152
30 Q12d Violate limit main roads in towns?	-0.018	0.054	-0.063
31 Q12e Violate limit in residential areas?	-0.075	0.005	0.014
32 Q13a What should speed limit be in towns?	-0.131	-0.348	-0.099
33 Q13c What speed limit main roads betw. towns?	-0.122	-0.205	0.018
34 Q13d What speed limit be on motorways?	-0.452	0.028	-0.147
35 Q14 Ever been stopped exceed speed limit?	0.029	-0.116	0.189
36 Q17i Do you warn others speed trap police?	-0.240	-0.070	-0.043
37 Q38d A common speed limit 30 Mph in towns?	-0.100	-0.266	-0.095
38 Q38e A common speed limit 70 Mph motorways?	-0.237	0.056	-0.055
39 Q38f Require manufacturers restrict speed?	-0.018	-0.026	-0.195
40 Q40d How important performance car?	0.093	-0.010	-0.074
41 Q41b I enjoy driving fast	-0.002	-0.048	0.103
42 Q41f I sometimes get into races with others	0.015	0.045	0.116
43 58b Engine size of car you drive	0.167	-0.086	-0.145
44 Q62 How many 1000 miles driven last 12 mnths?	0.012	0.225	-0.015

Table 8.2. Correlations between the optimally scaled variables of the *second* set and the canonical variates of the first set for each dimension.

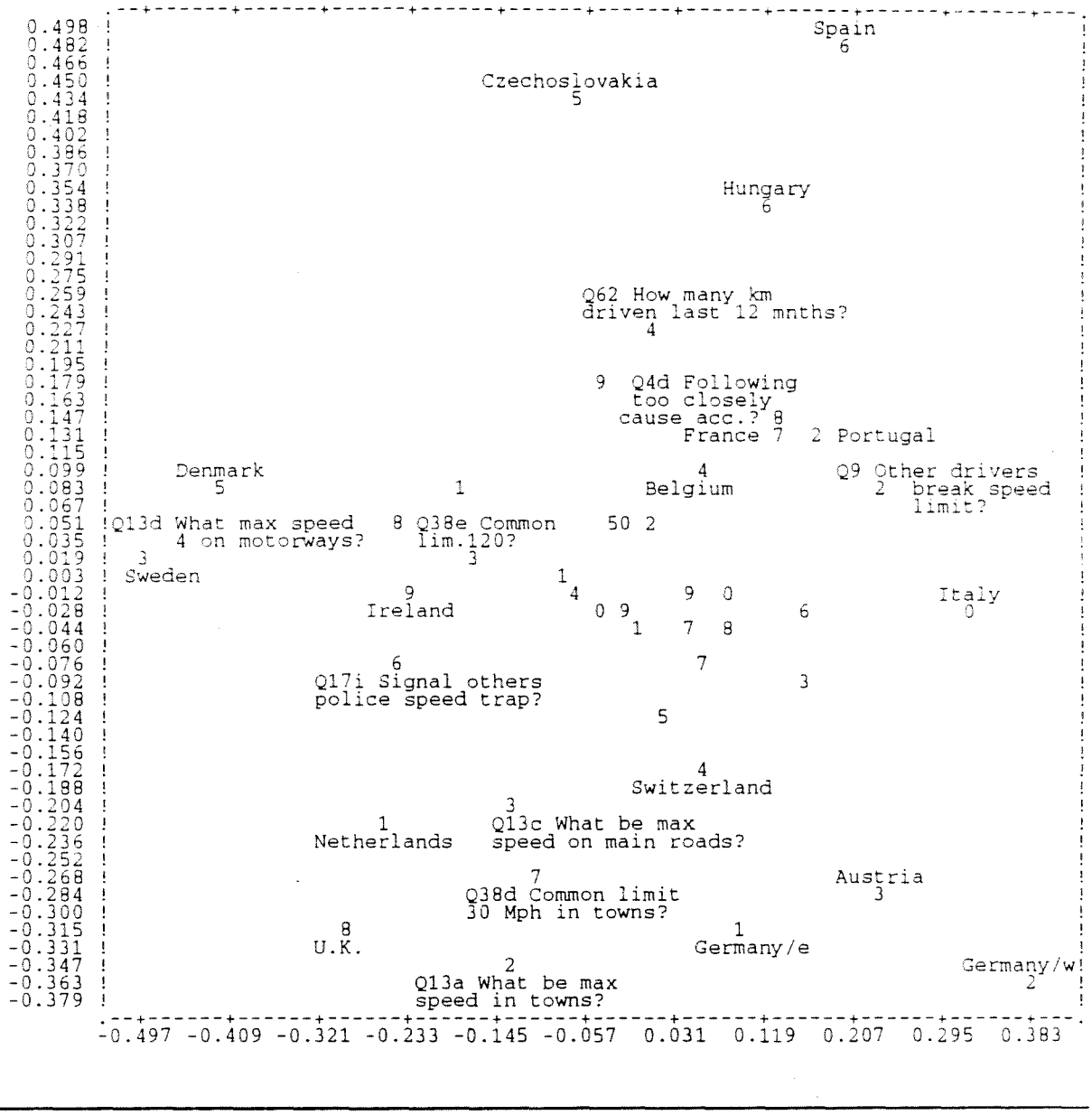

Figure 8.1. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 2) of the first set.

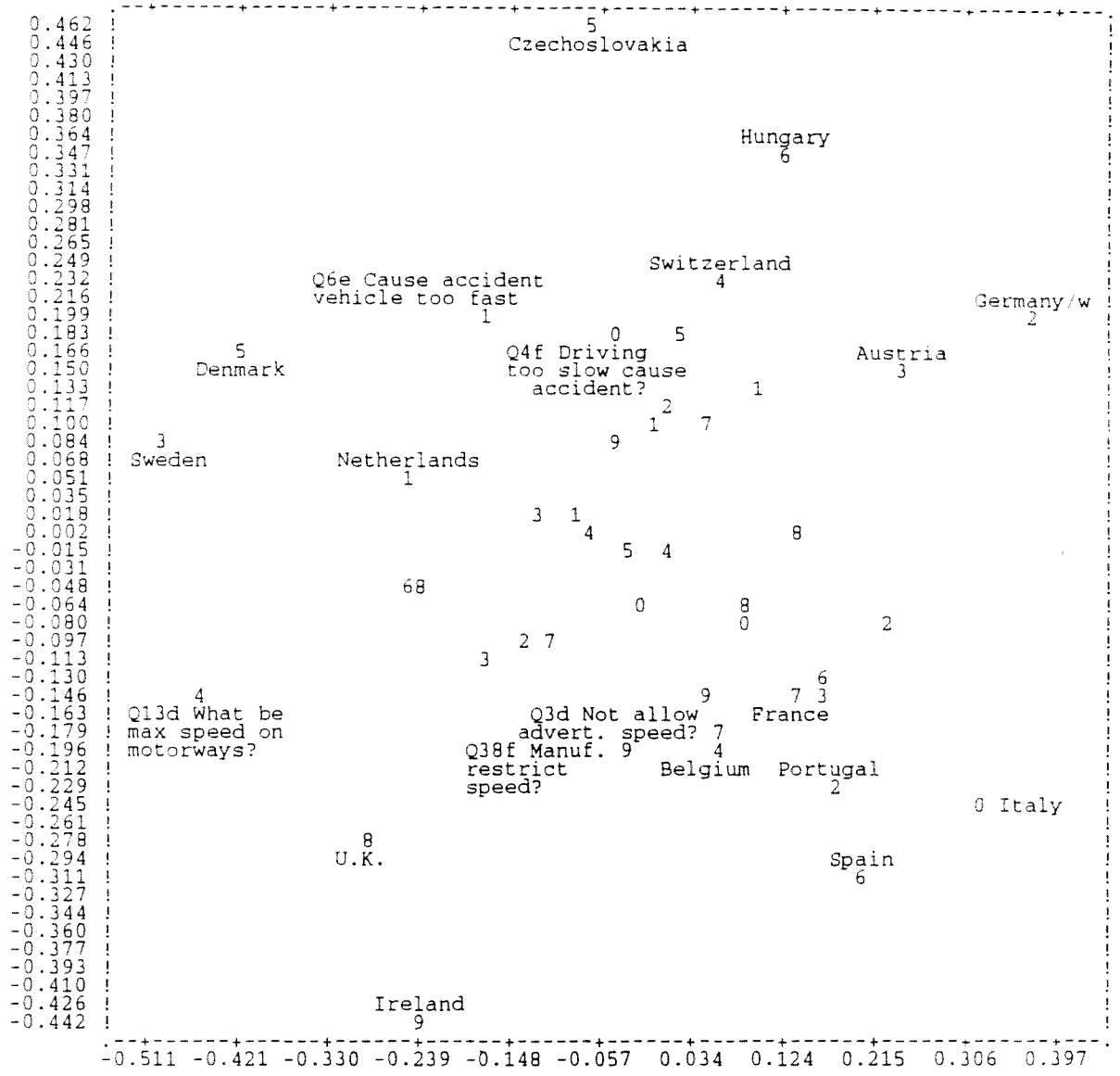

Figure 8.2. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 1 and vertical 3) of the first set.

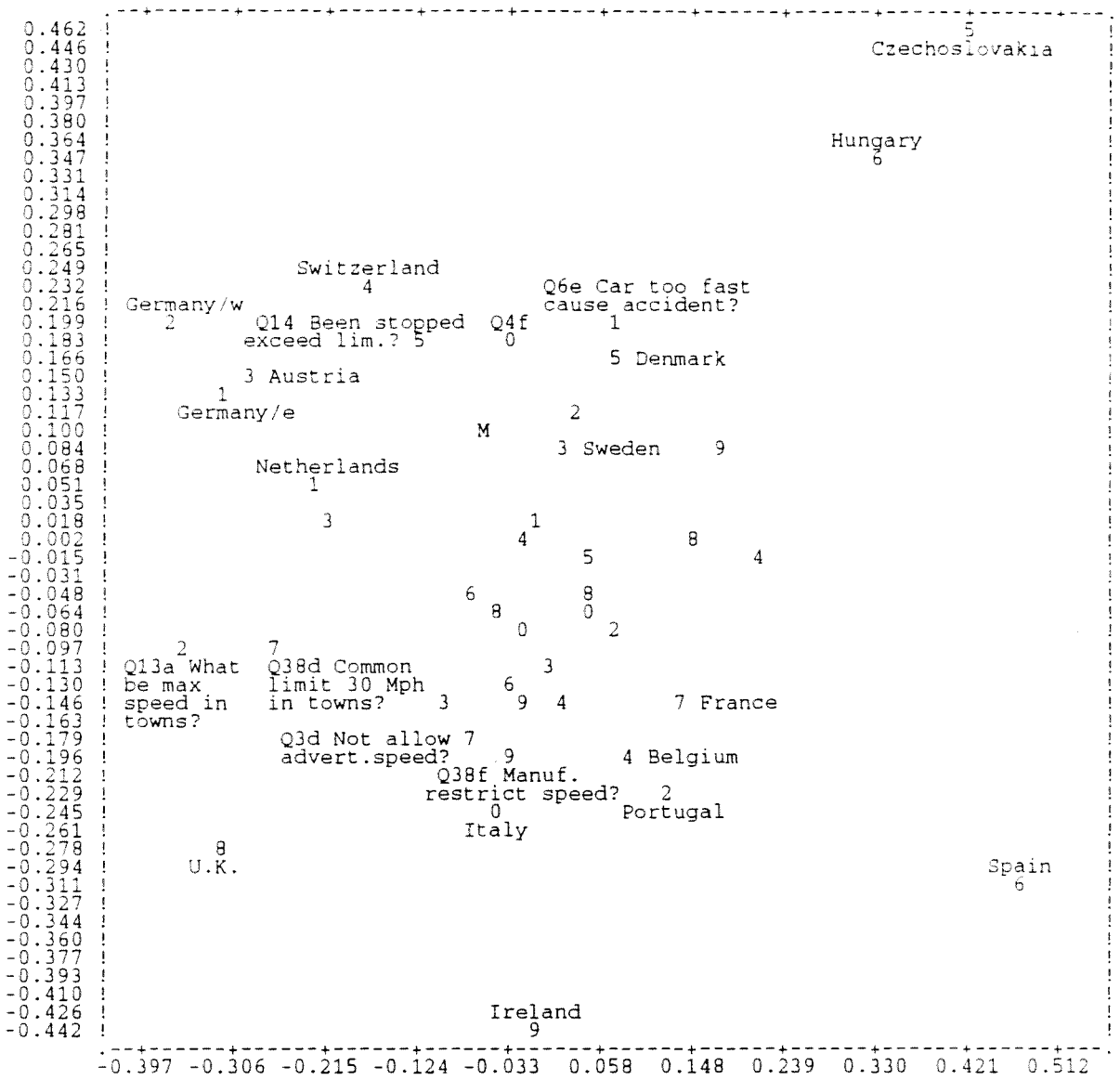

Figure 8.3. A plot of the correlations between optimally scaled variables and canonical variates (horizontal 2 and vertical 3) of the first set.