The Eurovision Song Contest as a 'Friendship' Network [1]

Anthony Dekker

Australian Defence Science and Technology Organisation (DSTO)

This paper examines the votes cast in the 2005 Eurovision Song Contest. Adjusting votes for song quality, a friendship network with valued links is obtained. Statistical analysis shows that friendship between countries is largely determined by geographical proximity, with a visible five-bloc structure. However, large immigrant groups often swayed national ties by voting for their home country. Some countries, such as Switzerland, appear to play a significant bridging role, and the Eastern Mediterranean bloc appears to act as a bridge to the new Balkan countries. Analysis thus reveals an emerging Europe very different from previous network studies of this kind. The analysis techniques demonstrated here have more general applicability, and may be useful for analysing other types of friendship network.

INTRODUCTION

The Eurovision Song Contest has been held annually since 1956. Hosted by the European Broadcasting Union, and broadcast live on television across Europe (with delayed telecasts internationally), the Eurovision Song Contest seeks to find Europe's most popular song. Perhaps the most famous winner has been Abba, the Swedish entry in 1974, singing "Waterloo." On 21 May 2005, the 50th Eurovision Song Contest was held in Kiev, Ukraine. The winning entry out of 24 finalists was from Greece, with Malta as the runner-up.

The Eurovision Song Contest involves the live television broadcast of popular songs from various European countries. Each country then casts votes for its ten favourites on a 1…12 scale: 12 points for the favorite, 10 for the second favorite, and 8,7,6…1 points in turn for the third to tenth favorite. These votes are based on telephone polls conducted in each country during the broadcast. Votes cast in the 2005 final are shown in Table 1, in the format found on the Eurovision web site (Euro-

pean Broadcasting Union, 2005). Accusations of political influence on the voting patterns have been common, particularly by BBC commentator Terry Wogan (Wikipedia, 2005). A notable example was the failure of any country to assign points to the UK in 2003, possibly in protest against UK involvement in Iraq. Our analysis will confirm that, interpreted using Social Network Analysis techniques, the Contest results do indeed provide a window into European politics.

A difficulty in analysing data from the Eurovision Song Contest has been the enormous variation in the number of participants. The very identity of "Europe" has changed enormously in the past 50 years, and the rules of the Contest have also altered. We avoid these issues by using techniques that allow conclusions to be drawn from a single year's data, thus presenting a "snapshot" of a changing Europe at one point in time. The techniques we use may also be of more general interest.

[1] Corresponding author: Brian C. Ladd, Department of Mathematics, Computer Science and Statistics, St. Lawrence University, Canton, NY 13617, phone: 315-229-5293, fax: 315-229-7413, blad@it.stlawu.edu

Figure 1 shows the average vote in 2005 from country X to country Y, as a function of the total score obtained by country Y (an indication of the overall popularity of country Y's entry), and on the distance between countries X and Y (measured by the number of borders needing to be crossed in order to travel from country X to country Y, thus eliminating geographical area as a factor). Figure 1 shows that the highest votes generally go to songs whose popularity is shared (i.e. with high total scores), and to songs from nearby countries (i.e. with small distances), presumably because of shared linguistic and cultural factors.
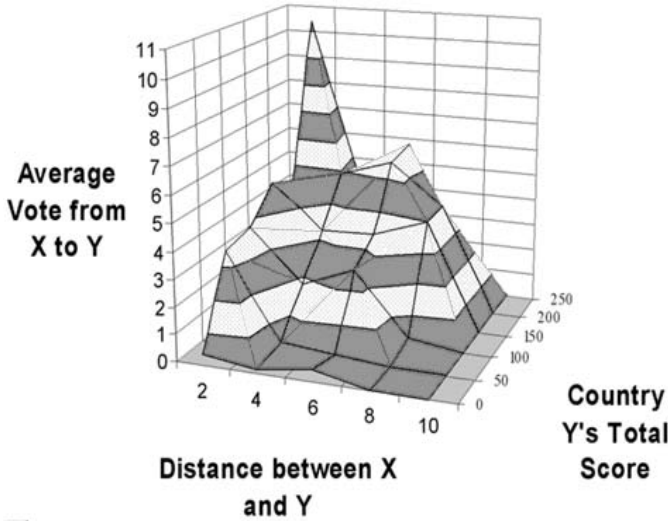

Figure 1. Eurovision Song Contest Votes from Country X to Country Y as a Function of Total Score and Distance Between Countries

Although the Eurovision Song Contest is ostensibly a competition on song quality, we can adjust for song quality to obtain a "friendship" network, similar in structure to friendship networks between people. The resulting social network has valued links: a high vote for an otherwise unpopular song indicates maximum friendship, while a low vote for a popular song indicates least friendship. We analyse the friendship network using techniques previously developed for valued networks (Dekker, 2005), which combine network-analysis methods with statistical methods. Statistical techniques for Social Network Analysis are also discussed by Wasserman and Faust (1994), but the methods they present have limited utility for valued networks.

Our analysis of the Eurovision Song Contest data reveals a set of friendship blocs, and a significant tendency to vote for nearby countries. Some individual countries have more unusual voting behaviour, and we briefly discuss reasons for this. Finally, we compare our results with past studies of the Eurovision Song Contest.

THE FRIENDSHIP NETWORK

We can measure the quality (or at least popularity) of country Y's song performance by using country Y's total score SY. This total provides a measure of how highly that country's song was
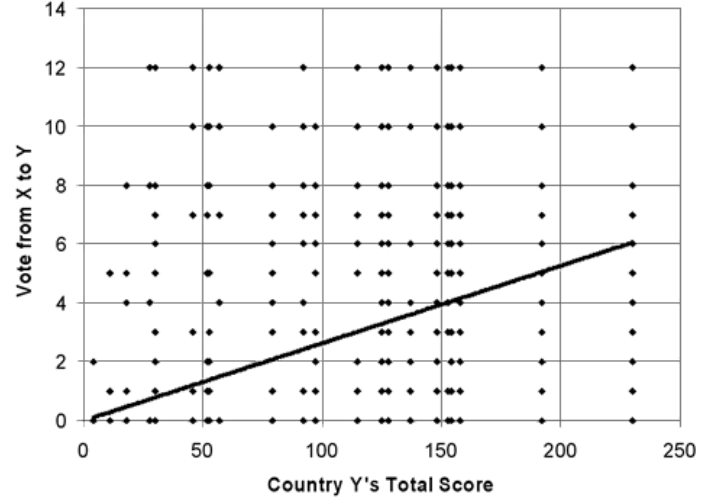

Figure 2. Eurovision Song Contest Votes as a Function of Total Score

rated by a Europe-wide audience. When we plot the vote VXY from country X to country Y against country Y's total score SY, we obtain a weak linear relationship, shown in Figure 2. The line of best fit was:

$$V_{XY} \approx 0.026\, S_Y \qquad (1)$$

The correlation here is a weak 0.44 ($r^2 = 20\%$), but is statistically extremely significant ($p < 10{-}44$), i.e. votes are indeed partially determined by the shared perception of song quality, as we would expect. We can therefore adjust scores for song characteristics by subtracting the predicted vote from the actual vote, giving a friendship score FXY (we also add 6.1 to ensure that the result is positive, in the range 0 to 17.4):

$$FXY = 6.1 + VXY - 0.026\, SY \qquad (2)$$

Having subtracted the shared perception of song "quality" from the votes, the numbers FXY which remain provide an indication of the bias that country X has towards country Y. These numbers form a social network with a structure similar to that obtained by asking a group of people how much they like each other, and we therefore refer to it as a friendship network, in the sense that countries like Norway and Denmark can be informally described as "friends." However, the biases between countries are naturally more complex than friendship between individuals, being influenced by cultural, political, and other factors.

Bruine de Bruin (2005) and Haan et al. (2005) have found that, as well as song quality, the order of performance also determines country Y's total score SY. However, by adjusting for SY, we are also compensating for that factor.

Figure 3 shows the friendship network, laid out using Spring Embedding (Freeman, 2000), a process equivalent to Multidimensional Scaling (Brandes, 2001). For clarity, Figure 3 shows only arrows corresponding to votes with a high friendship score FXY > 12. In this network, friendship tends not to be returned: the correlation between FXY and its inverse FYX is a
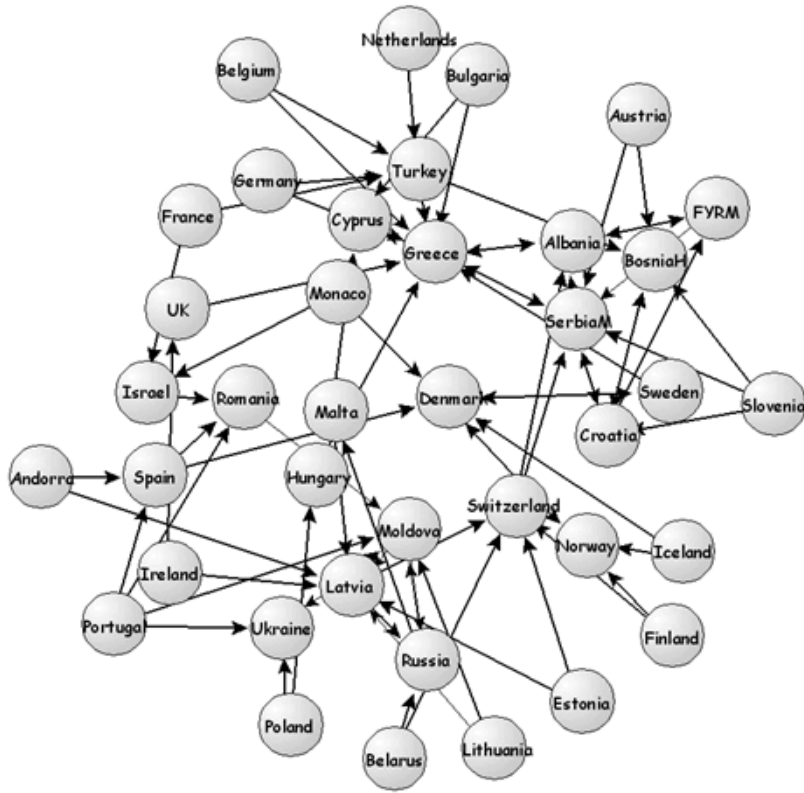
Figure 3. Eurovision Song Contest Friendship Network

weak 0.40 (we will discuss the reasons for this later in the returned: the correlation between FXY and its inverse FYX is a weak 0.40 (we will discuss the reasons for this later in the paper). In our experience, a correlation of 0.6 or more would indicate a symmetric relationship (Dekker, 2005). A consequence of the lack of symmetry in friendship is that the concept of link distance between people which we introduced in previous work (Dekker, 2005) must be used with caution, since it is based on symmetrical relationships. Figure 3 should therefore be interpreted with care, particularly since the correlation between friendship scores FXY and distances in the diagram is a relatively weak –0.38.

Conclusions about individual countries from distances in Figure 3 should be made with care. However, Figure 3 does contain several visually apparent friendship blocs, composed of nearby countries which vote for each other. Figure 4 shows more clearly these friendship blocs, which are:

- **Eastern:** former USSR, Romania, Hungary, Poland.
- **Nordic:** Norway, Sweden, Denmark, Finland, Iceland.
- **Balkan:** former Yugoslavia, Albania.
- **Eastern Mediterranean:** Greece, Cyprus, Malta, Bulgaria, Turkey.
- **Western:** other countries.

We also grouped countries computationally, by considering only votes with a high friendship score FXY > 12, and applying the Strongly Connected Components algo-

rithm (Gibbons, 1985). This algorithm has the advantage of being fully deterministic, and finds three clusters in this case. They are subsets of the Eastern bloc (Russia, Latvia, Moldova, Ukraine), Nordic bloc (Norway, Sweden, Denmark), and Balkan and Eastern Mediterranean blocs together (Greece, Cyprus, Albania, and former Yugoslavia). The Strongly Connected Components algorithm groups Malta with the Eastern bloc because its second-highest vote was for Latvia, while Malta received Russia's highest vote. However, it seems more appropriate to define the Eastern bloc as the former Warsaw Pact countries (with the exception of Bulgaria, which gave its highest votes to Greece and Cyprus, and is therefore grouped with them). It also seems appropriate to separate the Balkan and Eastern Mediterranean blocs, which are visibly distinct in Figure 3.

Grouping countries using a Simulated Annealing algorithm (Hecht-Nielsen, 1990) gives different results each time the algorithm is run, but consistently separates the Balkan and Eastern Mediterranean blocs, while giving inconsistent groupings for the other countries. This supports our separation of the Balkan and Eastern Mediterranean blocs.

Another common way of grouping countries is the use of taxonomic trees, as in Fenn at al. (2005). However, taxonomic trees are known to be sensitive to random noise in the data. We applied a taxonomic algorithm which randomly alters all friendship scores by between 0 and 0.1%, calculates taxonomic trees using neighbour-joining (Pachter and Sturmfels,
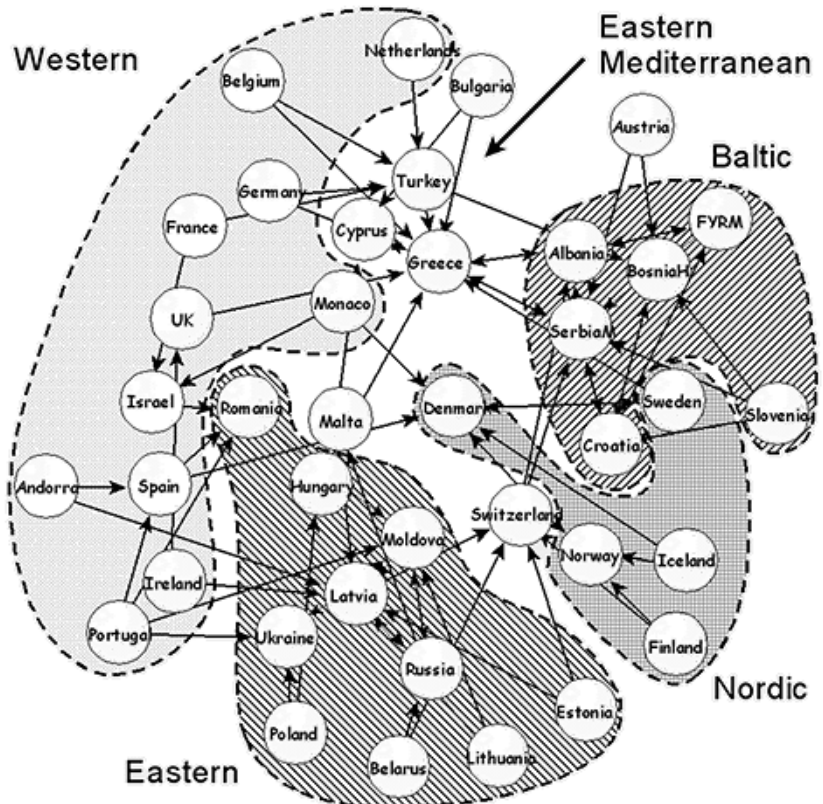

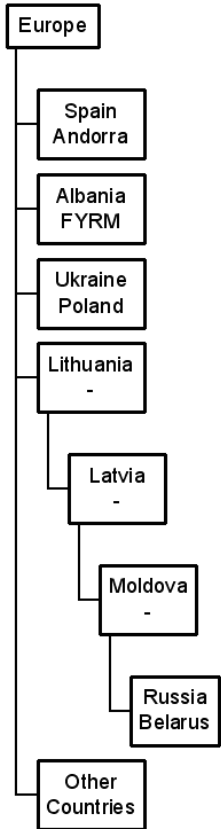**Figure 4**. Friendship Blocs in the Eurovision Song Contest

Figure 5. Common Relationships in Taxonomic Trees for Countries

2005), repeats this 100 times, and then takes only the relationships common to all 100 trees. There were very few of such common relationships, underscoring the brittleness of taxonomic-tree formation. Tree relationships which were not common, i.e. which altered in the face of only a 0.1% alteration in the data, are clearly due to chance, and therefore meaningless. Figure 5 shows the common relationships. The only cluster recognisable in this diagram is the Eastern bloc, not including Hungary and Romania (which are closer to the Western bloc) or Estonia (which is closer to the Nordic bloc).

As would be expected, friendship scores within a bloc were higher than between blocs (on average, 8.1 versus 5.6, significant at $p < 10^{-20}$). Table 2 shows the average friendship scores between and within blocs. Interestingly, the Western bloc was the least cohesive: within-bloc scores were lowest for the Western bloc.
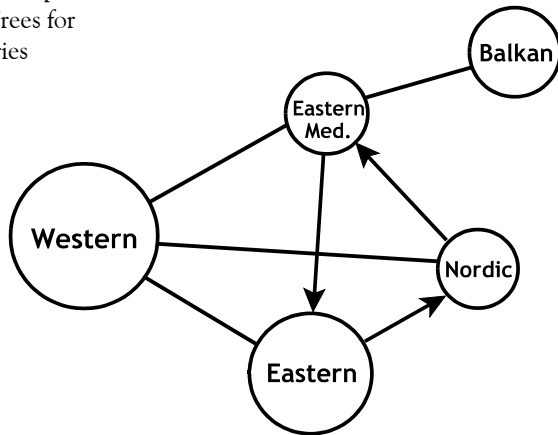
Table 2. Average Friendship Scores Within and Between Blocs

		To				
		Eastern	Nordic	Balkan	EastMed	Western
From	Eastern	**7.9**	6.1	5.0	4.4	6.5
	Nordic	5.3	**11.3**	4.8	5.9	6.0
	Balkan	4.9	4.5	**11.0**	5.8	5.0
	EastMed	6.2	4.7	6.0	**8.7**	5.8
	Western	5.7	5.8	5.5	6.8	**6.6**

Austria and Switzerland are somewhat exceptional countries. Both gave strong votes to Balkan countries, presumably because of large numbers of Balkan immigrants (Switzerland also received strong votes from Finland and the Eastern bloc). Similarly, Romanian immigrants in Spain seem to have given strong votes to their home country, as did Turkish immigrants in the five countries with the most Turkish immigrants: Belgium, France, Germany, Austria, and the Netherlands (Manço, 2004). This kind of voting was in general not returned. Table 3 lists the fifteen greatest asymmetries in friendship scores, where the score F_{XY} was 7 or more points greater than the reverse score F_{YX}. Of these, six can be tentatively attributed to immigrants (Niessen et al., 2005). However, this attribution cannot, of course, be confirmed without surveying Eurovision voters on the reasons for their vote.

Figure 6. Links Between Friendship Blocs in the Eurovision Song Contest

Figure 6 shows the above-average between-bloc scores. The pairs Balkan/Eastern Mediterranean, Western/Eastern, Western/Nordic, and Western/Eastern Mediterranean had above-average scores in both directions, and there was also a triangle of unidirectional above-average scores. Figure 6 highlights the position of the Balkan countries as "new arrivals" in Europe, and a possible "bridging" role played by the Eastern Mediterranean countries. Individual Western countries such as Austria and Switzerland may also play a "bridging" role. The links between the Western bloc and the other blocs reflects the past dominance of Europe (and the Eurovision Song Contest) by the Western bloc.

Table 3. Fifteen Greatest Asymmetries in Friendship Scores Between Countries

Country Pair		Friendship Score	Reverse Score	Possible Reason
Latvia	Switzerland	14.7	2.1	?
Switzerland	Albania	14.7	2.7	?
Switzerland	Serbia/ Montenegro	14.5	2.7	Immigrants
Malta	Cyprus	16.9	7	?
France	Turkey	15.7	5.8	Immigrants
Denmark	Turkey	11.7	2.8	Immigrants
Spain	Romania	13.9	5.4	Immigrants
Russia	Malta	13	4.6	?
Turkey	Greece	12	3.7	?
Moldova	Sweden	10.3	2.2	?
Germany	Turkey	13.7	6	Immigrants
Latvia	Russia	14.6	7.1	Former USSR
Spain	Denmark	12.8	5.4	?
Albania	Cyprus	11.9	4.7	?
Switzerland	Turkey	9.7	2.7	Immigrants

THE EFFECT OF DISTANCE

Although we are not able to use the concept of link distance (Dekker, 2005) for analysis, we can use related statistical techniques to examine the factors that determine friendship scores. A good predictor of the friendship score F_{XY} was the

distance D_{XY} between countries which we discussed above (measured by the number of borders needing to be crossed in order to travel from country X to country Y). This is presumably because of cultural and linguistic factors shared between nearby countries. Economic factors (as measured by differences between country's GDPs) did not seem to have an effect, nor did population size. Linguistic difference alone (as measured by distance in a four-level language family tree) had a small effect ($r^2 = 2\%$), but this effect vanished when D_{XY} was included, since D_{XY} already incorporates cultural and linguistic factors. The line of best fit was:

$$F_{XY} \approx 7.8 - 0.46\, D_{XY} \qquad (3)$$

The correlation here was a very weak –0.24 ($r2 = 6\%$), but was statistically extremely significant ($p < 10–12$), thus providing additional justification for defining blocs of countries which are geographically close to each other. Figure 7 shows the relationship graphically. An alternative way of describing the result is that the original vote VXY from country X to country Y (see Figure 1) can be explained (by analysis of variance) as 20% due to country Y's total score SY, 4% due to the distance DXY between countries, and 76% due to other factors. We would expect some of the 76% to be explained by the numbers of immigrants from country Y living in country X, but accurate statistics on this are difficult to obtain.
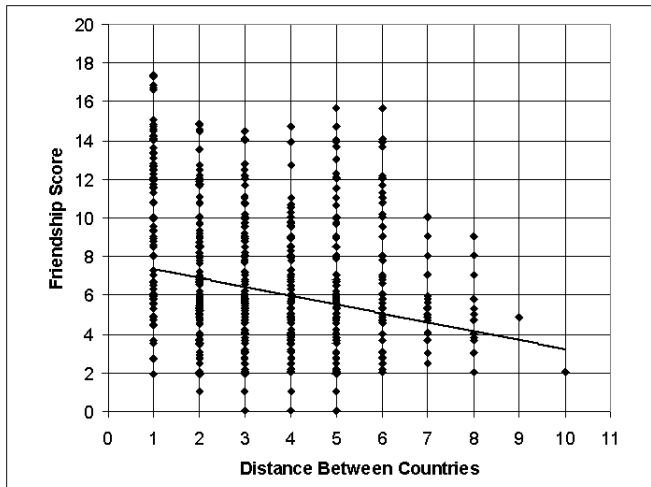

Figure 7. Friendship Scores as a Function of Distance between Countries

CENTRALITY

Various forms of centrality concept have shown great utility in Social Network Analysis (Wasserman and Faust, 1994). We therefore calculated valued centrality (Dekker, 2005) scores for each of the countries in Figure 3. This centrality measure takes "closeness" to be the inverse of distances dij along network paths, and obtains valued centrality Ci by averaging closeness values:

$$C_i = \frac{1}{n-1} \sum_{j \neq i} d_{ij} \qquad (4)$$

This is the most suitable definition of centrality for valued networks (Dekker, 2005). However, since measuring distance along network paths is not really appropriate with non-symmetric friendship relationships, the valued centrality scores should be interpreted with some caution. There was a strong correlation of 0.84 between valued centrality scores and total Contest scores ($r2 = 70\%$, significant at $p < 10–6$), as shown in Figure 8.
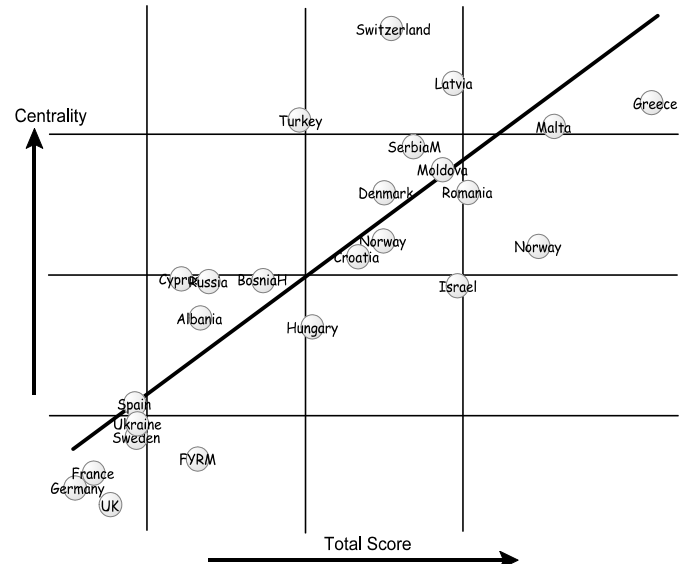
Figure 8. Valued Centrality Scores as a Function of Total Contest Score

Of particular interest are the countries whose valued centrality is higher than their total score would indicate, in particular Turkey and Switzerland. This seems to reflect the high votes which Turkey obtained from Turkish immigrants in Western countries, and "neutral" Switzerland acting as a "bridge" between blocs by giving votes to the Balkans while receiving them from the Eastern bloc.

DISCUSSION

By adjusting Eurovision Song Contest votes to compensate for song quality, we have obtained a friendship network which can indeed "reveal by homology the structure of political Europe" (le Guern, 2002). The structure that our analysis has revealed is very different from that reported by Yair (1995), who partially compensated for song quality by averaging votes over several years. Yair's study revealed the Western bloc as dominant. In contrast, today's Europe is very different, with Western countries being least central and least cohesive, and Central Europe being more important.

In general, we found that friendship scores were highest for nearby countries, resulting in five friendship blocs: Western, Eastern, Nordic, Balkan, and Eastern Mediterranean. The new countries of the Balkans were most isolated, with the Eastern Mediterranean countries, Austria, and Switzerland acting as "bridges." The past dominance of the Western bloc is reflected in its close ties to the other blocs (excluding the Balkans).

Recent work by Fenn et al. (2005) examines Eurovision Song Contest data from the period 1992–2003, using the framework of complex dynamical networks, and also averaging votes over several years. For the smaller set of countries competing in that period, they also found regional clustering, particularly the pair Greece/Cyprus, the Nordic bloc (including Estonia), and the Western bloc, which (unlike Yair) they did not find to be cohesive. However, this analysis was based on taxonomic trees, which may be deceptive. Fenn et al. also found UK voting to be consistently the most in tune with the rest of Europe—and indeed, in 2005, the UK was the only country which gave its top two votes to the ultimate winner (Greece) and runner-up (Malta). This may be a result of the UK's reduced involvement in regional ties and/or conflicts.

DISCUSSION

By adjusting Eurovision Song Contest votes to compensate for song quality, we have obtained a friendship network which can indeed "reveal by homology the structure of political Europe" (le Guern, 2002). The structure that our analysis has revealed is very different from that reported by Yair (1995), who partially compensated for song quality by averaging votes over several years. Yair's study revealed the Western bloc as dominant. In contrast, today's Europe is very different, with Western countries being least central and least cohesive, and Central Europe being more important.

In general, we found that friendship scores were highest for nearby countries, resulting in five friendship blocs: Western, Eastern, Nordic, Balkan, and Eastern Mediterranean. The new countries of the Balkans were most isolated, with the Eastern Mediterranean countries, Austria, and Switzerland acting as "bridges." The past dominance of the Western bloc is reflected in its close ties to the other blocs (excluding the Balkans).

Recent work by Fenn et al. (2005) examines Eurovision Song Contest data from the period 1992–2003, using the framework of complex dynamical networks, and also averaging votes over several years. For the smaller set of countries competing in that period, they also found regional clustering, particularly the pair Greece/Cyprus, the Nordic bloc (including Estonia), and the Western bloc, which (unlike Yair) they did not find to be cohesive. However, this analysis was based on taxonomic trees, which may be deceptive. Fenn et al. also found UK voting to be consistently the most in tune with the rest of Europe—and indeed, in 2005, the UK was the only country which gave its top two votes to the ultimate winner (Greece) and runner-up (Malta). This may be a result of the UK's reduced involvement in regional ties and/or conflicts.

Gatherer (2006) examines data in five-year windows over several years (1975–2005), comparing them against simulation results, which allows him to perform tests of statistical significance on links. He finds two large clusters in the period from 2001 to 2005: a "Balkan Bloc," which includes our Eastern Mediterranean cluster, and a "Viking Empire," of the Nordic

countries with Latvia, Lithuania, and Estonia. However, his analysis does not allow relationships outside these clusters, or relationships between clusters, to be inferred. In addition, this and other previous studies do not adequately eliminate song quality as a factor, and therefore potentially obscure the true bias or friendship relationships between countries.

The high valued centrality score for Turkey in our study emphasises the importance of immigrants from one country living in another. Van der Veen (2002) points out that such expatriate workers are also of importance in the formation of a pan-European social identity. The high valued centrality score for Switzerland suggests that it plays a "bridging" role within the new Europe, although the reasons for this are not completely clear.

Just as the mathematical techniques we have presented have illuminated the structure of Europe, they can also be used to generate friendship networks from other competitions where the participants (or their representatives) double as the voting jury. For example, in the judging of the Olympic Games, the difference between individual judge's scores and the average for a particular performance can be used as a friendship vote from the judge's country to the athlete's. Unlike previous techniques for studying the Eurovision Song Contest, the method we describe does not require many years of historical data, and hence can be used for studying social structures which are in a state of flux. The analysis techniques presented in this paper can also be used for analysing other friendship networks, as well as trust networks, which have a similar structure.

Table 1. Votes Cast for Eurovision Song Contest Final in 2005

		Votes To																						
		Greece	Malta	Romania	Israel	Latvia	Moldova	SerbiaMont	Switzerland	Norway	Denmark	Croatia	Hungary	Turkey	BosniaHerz	Russia	Albania	FYRM	Cyprus	Sweden	Ukraine	Spain	UK	France	Germany
	Total Score	230	192	158	154	153	148	137	128	125	125	115	97	92	79	57	53	52	46	30	30	28	18	11	4
	Andorra	4	0	7	8	10	0	0	1	2	3	0	6	0	0	0	0	0	0	0	0	12	0	5	0
	Albania	12	4	5	3	0	0	6	0	0	0	2	0	8	0	0	—	10	7	0	0	0	0	1	0
	Austria	4	5	6	1	0	2	12	0	0	0	8	0	7	10	0	3	0	0	0	0	0	0	0	0
	Belarus	0	5	1	8	6	7	3	10	4	0	0	2	0	0	12	0	0	0	0	0	0	0	0	0
	Belgium	12	8	7	6	5	1	0	0	3	4	0	2	10	0	0	0	0	0	0	0	0	0	0	0
	BosniaHerz	6	0	2	0	0	4	10	0	3	0	12	1	8	—	0	5	7	0	0	0	0	0	0	0
	Bulgaria	12	0	8	0	0	6	4	0	1	0	2	5	3	0	0	0	7	10	0	0	0	0	0	0
	Croatia	5	4	0	0	7	1	12	3	0	0	—	6	0	10	0	2	8	0	0	0	0	0	0	0
	Cyprus	12	6	8	0	1	2	10	4	3	0	0	7	0	0	0	0	0	—	0	0	0	5	0	0
	Denmark	2	10	3	5	6	0	0	1	12	—	0	0	8	4	0	0	0	0	7	0	0	0	0	0
	Estonia	0	4	0	1	10	6	0	12	8	5	2	3	0	0	7	0	0	0	0	0	0	0	0	0
	Finland	3	8	0	5	4	0	0	10	12	2	1	0	0	0	7	0	0	0	6	0	0	0	0	0
	France	8	7	5	10	0	2	6	0	0	0	0	3	12	0	0	1	0	0	0	0	0	4	—	0
	FYRM	7	0	2	0	0	5	10	0	0	0	8	1	4	3	0	12	—	0	6	0	0	0	0	0
	Germany	12	8	0	5	7	1	3	4	0	6	2	0	10	0	0	0	0	0	0	0	0	0	0	—
	Greece	—	8	5	0	1	7	6	3	4	0	0	2	0	0	0	10	0	12	0	0	0	0	0	0
	Hungary	12	5	10	8	1	4	2	3	0	6	7	—	0	0	0	0	0	0	0	0	0	0	0	0
	Iceland	2	4	5	0	3	8	0	7	12	10	1	6	0	0	0	0	0	0	0	0	0	0	0	0
	Ireland	2	10	5	6	12	0	0	3	4	7	0	0	0	1	0	0	0	0	0	0	0	0	8	0
	Israel	7	10	12	—	6	4	0	2	1	3	0	8	0	0	0	0	0	0	0	0	0	0	5	0
	Latvia	0	5	0	2	—	8	1	12	6	4	7	3	0	0	10	0	0	0	0	0	0	0	0	0
	Lithuania	1	2	0	3	12	10	0	8	5	4	6	0	0	0	7	0	0	0	0	0	0	0	0	0
	Malta	6	—	7	8	10	2	0	1	5	3	0	0	0	0	0	0	0	12	0	0	0	4	0	0
	Moldova	4	0	7	6	12	—	1	0	3	0	0	0	0	0	10	0	0	0	5	8	0	0	0	2
	Monaco	0	5	4	12	0	0	6	8	0	10	7	0	0	0	0	0	1	0	3	0	0	0	0	2
	Netherlands	10	5	3	7	0	0	4	0	1	8	2	0	12	6	0	0	0	0	0	0	0	0	0	0
	Norway	4	10	6	5	8	0	0	3	—	12	2	0	0	7	0	0	0	0	1	0	0	0	0	0
	Poland	1	0	7	0	4	3	0	6	8	5	2	10	0	0	0	0	0	0	0	12	0	0	0	0
	Portugal	3	0	12	5	6	10	0	4	0	1	0	2	0	0	0	0	0	0	0	7	8	0	0	0
	Romania	10	2	—	7	0	12	6	0	0	4	5	8	3	0	0	0	0	1	0	0	0	0	0	0
	Russia	4	12	0	8	5	10	6	7	0	0	1	3	0	0	—	0	0	0	0	2	0	0	0	0
	SerbiaMont	12	0	3	0	0	5	—	0	2	0	10	6	0	4	0	8	7	1	0	0	0	0	0	0
	Slovenia	2	1	0	0	7	3	10	6	4	0	12	0	0	8	0	0	5	0	0	0	0	0	0	0
	Spain	8	7	12	6	0	4	0	0	3	10	0	5	0	0	0	0	0	0	2	1	—	0	0	0
	Sweden	12	6	2	1	3	0	4	5	8	10	0	0	0	7	0	0	0	0	—	0	0	0	0	0
	Switzerland	7	3	0	1	0	0	12	—	0	0	8	0	6	5	0	10	2	0	0	0	4	0	0	4
	Turkey	12	8	4	3	0	7	0	0	0	0	0	6	—	10	0	2	5	0	0	0	0	0	1	0
	Ukraine	0	10	0	7	1	12	3	5	6	0	8	2	0	0	4	0	0	0	0	—	0	0	0	0
	UK	12	10	0	7	6	2	0	0	5	8	0	0	1	4	0	0	0	3	0	0	0	—	0	0

Votes From (row-side label, rotated along the left margin)

REFERENCES

Brandes, U. (2001). Drawing on Physical Analogies. In *Drawing Graphs: Methods and Models* (Michael Kaufmann and Dorothea Wagner, eds), *Springer-Verlag Lecture Notes in Computer Science* **2025:** 71–86.

Bruine de Bruin, W. (2005). Save the last dance for me: unwanted serial position effects in jury evaluations. *Acta Psychologica* **118**: 245–260.

Dekker, A.H. (2005). Conceptual Distance in Social Network Analysis. *Journal of Social Structure*, **6** (3): www.cmu.edu/joss/content/articles/volume6/dekker/

European Broadcasting Union, (2005). Eurovision Song Contest web site, accessed 10 June 2005: www.eurovision.tv

Fenn, D., Suleman, O., Efstathiou, J., and Johnson, N.F. (2005). How does Europe Make Its Mind Up? Connections, cliques, and compatibility between countries in the Eurovision Song Contest. Oxford: Oxford University: arxiv.org/abs/physics/0505071

Freeman, L.C. (2000). Visualizing Social Networks. *Journal of Social Structure*, **1** (1): www.cmu.edu/joss/content/articles/volume1/Freeman.html

Gatherer, D. (2006). Comparison of Eurovision Song Contest Simulation with Actual Results Reveals Shifting Patterns of Collusive Voting Alliances. *Journal of Artificial Societies and Social Simulation*, **9** (2): jasss.soc.surrey.ac.uk/9/2/1.html

Gibbons, A. (1985). *Algorithmic Graph Theory*. Cambridge: Cambridge University Press.

Haan, M., Dijkstra, S., and Dijkstra, P. (2005). Expert Judgment Versus Public Opinion – Evidence from the Eurovision Song Contest. *Journal of Cultural Economics* **29**: 59–78.

Hecht-Nielsen, R. (1990). *Neurocomputing*. Reading, Massachusetts: Addison Wesley.

Niessen, J., Schibel, Y., and Thompson, C. (eds.), (2005). Current Immigration Debates in Europe. Brussels: Migration Policy Group: www.migpolgroup.com/documents/3055.html

le Guern, P. (2002). From National Pride to Global Kitsch: the Eurovision Song Contest. Lille: University of Lille: wjfms.ncl.ac.uk/leguWJ.htm

Manço, U. (2004). Turks in Western Europe. Brussels: Centre d'Etudes Sociologiques, Facultes Universitaires Saint-Louis: www.flwi.ugent.be/cie/umanco/umanco3.htm

Pachter, L. and Sturmfels, B. (2005). *Algebraic Statistics for Computational Biology*. Cambridge: Cambridge University Press.

van der Veen, A.M. (2002). Determinants and Implications of European Identity: An Investigation Using Eurobarometer Data. Philadelphia, PA: University of Pennsylvania: www.ssc.upenn.edu/~maurits/papers/EUsupport.doc

Wasserman, S. and Faust, K. (1994). *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Wikipedia, (2005). Eurovision Song Contest, accessed 10 June 2005: en.wikipedia.org/wiki/Eurovision_Song_Contest

Yair, G. (1995). 'Unite Unite Europe' The political and cultural structures of Europe as reflected in the Eurovision Song Contest. *Social Networks*, **17** (2): 147–161.