

# Political Space Representations with Approval Data Supplementary Online Materials

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## Abstract

This document contains tables with supplementary materials for the article “Political Space Representations with Approval Data”, submitted to *Electoral Studies*.

## 1 Party abbreviations

In this document, party names are abbreviated as indicated in the following table.

Abbreviation	Party name (translated)	Actual German name
APP	Animal Protection Party	Partei Mensch Umwelt Tierschutz
CDU	Christian Democratic Union	Christlich Demokratische Union
FAM	Family Party	Familien-Partei Deutschlands
FDP	Liberal Democratic Party	Freie Demokratische Partei
FRV	Free Voters	Freie Wähler
GRE	Greens	Die Grünen
Left	The Left	Die Linke
ödp	Ecologic Democratic Party	Ökologisch-Demokratische Partei
NPD	National Democratic Party	Nationaldemokratische Partei Deutschlands
PIR	The Pirates	Piratenpartei
REP	Republicans	Die Republikaner
SPD	Social Democratic Party	Sozialdemokratische Partei Deutschlands
VIO	The Violets	Die Violetten

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## 2 Association matrices

Tables 1 and 2 show the association matrices for the party vote in Messel and Konstanz, respectively. Tables 3 and 4 contain the corresponding association matrices for candidates. The numbers on the diagonal are the absolute number of approvals received by the parties or candidates, the numbers off-diagonal are the number of associations between two parties or candidates.

Parties	SPD	CDU	GRE	FDP	Left	APP	FAM	REP	NPD
SPD	517	88	266	91	91	46	54	6	2
CDU	88	429	67	242	12	36	43	21	21
GRE	266	67	347	70	59	40	40	4	1
FDP	91	242	70	313	15	27	30	13	10
Left	91	12	59	15	118	15	12	2	1
APP	46	36	40	27	15	92	22	3	3
FAM	54	43	40	30	12	22	92	6	5
REP	6	21	4	13	2	3	6	32	14
NPD	2	21	1	10	1	3	5	14	27

Table 1: Association matrix for Parties, Messel.

Parties	GRE	SPD	CDU	FDP	PIR	Left	APP	ödp	VIO	REP	NPD
GRE	831	516	208	173	219	198	124	84	40	3	4
SPD	516	677	155	130	137	141	86	52	18	2	2
CDU	208	155	593	364	65	22	50	39	9	10	3
FDP	173	130	364	519	79	27	48	26	5	8	5
PIR	219	137	65	79	298	93	51	30	19	5	6
Left	198	141	22	27	93	263	47	21	16	5	6
APP	124	89	50	48	51	47	175	42	18	2	2
ödp	84	52	39	26	30	21	42	106	14	2	2
VIO	40	18	9	5	19	16	18	14	44	2	3
REP	3	2	10	8	5	5	2	2	2	19	6
NPD	4	2	3	5	6	6	2	2	3	6	15

Table 2: Association matrix for Parties, Konstanz.

Candidates	SPD	CDU	GRE	FDP	Left	FRV	REP	NPD
SPD	557	95	250	92	76	35	10	4
CDU	95	402	42	210	13	26	21	20
GRE	250	42	302	59	47	26	5	2
FDP	92	210	59	291	8	28	14	8
Left	76	13	47	8	100	13	5	3
FRV	35	26	26	28	13	71	8	1
REP	10	21	5	14	5	8	37	14
NPD	4	20	2	8	3	1	14	27

Table 3: Association matrix for Candidates, Messel.

Parties	GRE	SPD	CDU	FDP	Left	NPD
GRE	723	420	177	137	175	4
SPD	420	665	184	126	124	2
CDU	177	184	644	333	21	2
FDP	137	126	333	482	27	6
Left	175	124	21	27	249	5
NPD	4	2	2	6	5	14

Table 4: Association matrix for Candidates, Konstanz.

### 3 Goodness of fit (A Method Comparison Using VAA Data)

Table 5 reports the explanatory power for the spatial representations considered in Section 4 of the article, “A Method Comparison Using VAA Data”. The columns correspond to Spatial Approval Voting (Spatial AV) using both data from the field experiment in Konstanz and Wahl-O-Mat data, and the W-NOMINATE procedure. For the former, we report the inertia explained by relying on different numbers of dimensions. For the later, we report the number of correct classifications, the Aggregate Proportional Reduction Error (APRE), and the Geometric Mean Probability (GMP).

	Spatial AV		W-NOMINATE		
	KN Party Field Exp. Data	Wahlomat Data	Correct Classifications	APRE	GMP
Dim 1	24.23%	55.30%	80.71%	0.336	0.706
Dim 2	45.08%	76.98%	91.85%	0.720	0.816
Dim 3	57.42%	87.35%	95.11%	0.832	0.883
Dim 4	66.78%	92.85%	99.18%	0.972	0.924

Table 5: Goodness of fit measures for various spatial representations using VAA data.

## 4 Wahl-O-Mat questionnaire responses

The following table contains the actual Wahl-O-Mat questionnaire responses for the eleven parties considered in the 2009 federal election spatial representation. Coding: 1 - Agreement; 0 - Disagreement; x - Neutrality.

Q-Item	GRE	SPD	CDU	FDP	PIR	Left	APP	ödp	VIO	REP	NPD
1	0	0	1	1	0	0	0	0	0	1	0
2	1	1	0	0	x	1	1	1	0	1	1
3	0	0	0	0	x	1	1	0	1	1	1
4	0	0	0	0	0	0	0	0	x	1	1
5	x	1	x	1	1	0	0	0	1	0	0
6	1	0	0	1	1	1	1	1	1	1	1
7	1	1	x	0	1	1	1	1	1	1	1
8	1	1	1	1	0	x	1	1	1	1	1
9	1	x	0	0	0	1	1	1	1	1	x
10	1	1	1	1	1	0	x	1	0	1	0
11	x	0	x	x	0	0	1	1	0	0	x
12	1	1	0	0	0	1	1	0	0	0	0
13	0	0	1	1	0	0	0	0	0	1	1
14	1	1	0	1	1	1	1	1	1	1	1
15	0	0	1	0	0	0	0	1	0	1	1
16	x	1	0	0	0	1	1	0	0	1	1
17	0	0	0	1	x	0	0	0	0	0	0
18	1	1	0	0	x	1	0	x	0	0	0
19	1	1	0	0	0	1	1	1	0	0	1
20	1	0	0	1	1	1	0	1	1	1	1
21	0	0	0	0	0	0	0	0	0	1	1
22	1	1	x	0	x	1	1	1	1	0	1
23	0	x	1	0	0	0	0	1	x	1	x
24	1	1	0	0	1	1	1	1	1	1	1
25	0	0	1	0	0	0	0	1	0	x	1
26	0	x	x	1	0	0	0	0	0	0	0
27	1	1	0	1	1	1	x	x	1	0	0
28	x	x	0	0	x	1	1	0	0	0	1
29	0	0	1	1	0	0	1	1	1	0	0
30	1	0	0	x	x	1	x	1	x	0	0
31	1	0	0	1	1	1	1	1	1	1	1
32	1	0	0	x	1	0	x	0	0	0	x
33	x	0	0	0	0	1	1	x	1	0	1
34	0	0	1	1	0	0	x	x	0	1	1
35	1	1	0	1	1	1	1	x	1	0	0
36	1	x	0	0	x	1	1	x	1	0	x
37	0	0	1	0	0	0	0	0	0	1	0
38	1	1	1	1	1	1	0	1	x	x	0

## 5 Cosines of projections for graphical representations

The following tables report the cosines of the projections for the various graphical representations in the article. Those serve as a measure of the quality of the representation. For convenience, values are shown as percentages, i.e. the actual cosine values multiplied by 100.

Cos	1 dim	2 dim	3 dim	4 dim
SPD	68.71	69.33	81.13	97.68
CDU	41.89	77.03	77.66	80.20
GRE	72.39	75.19	79.24	82.84
FDP	21.17	71.05	73.71	84.43
Left	59.94	76.39	82.68	90.86
APP	16.60	30.79	74.24	74.24
FAM	2.51	32.46	55.14	66.34
REP	79.40	86.55	90.76	90.79
NPD	93.53	98.89	99.50	99.50

Messel, Parties

Cos	1 dim	2 dim	3 dim	4 dim
GRE	56.06	62.50	62.68	86.13
SPD	66.81	69.71	73.77	94.01
CDU	30.27	79.73	82.20	82.54
FDP	23.92	78.22	81.32	82.24
PIR	1.29	20.10	42.21	57.15
Left	9.58	55.85	76.16	77.69
APP	17.18	30.85	61.19	61.57
ödp	2.59	19.12	70.59	70.83
VIO	42.62	64.69	76.48	76.51
REP	87.58	94.94	95.67	96.48
NPD	94.51	94.82	96.07	96.10

Konstanz, Parties

Cos	1 dim	2 dim	3 dim	4 dim
SPD	68.54	69.65	85.54	95.69
CDU	48.23	73.32	78.40	79.15
GRE	74.79	75.66	75.84	96.97
FDP	24.15	80.34	82.85	83.97
Left	46.35	85.03	85.17	85.17
FRV	19.41	19.80	88.47	98.05
REP	74.21	90.40	91.88	91.97
NPD	81.56	91.63	96.82	98.95

Messel, Candidates

Cos	1 dim	2 dim	3 dim	4 dim
SPD	40.70	78.47	99.47	100.00
CDU	9.51	90.42	99.84	100.00
GRE	97.51	98.33	98.52	100.00
FDP	81.06	97.74	97.96	100.00
Left	98.99	99.22	99.45	100.00
FRV	40.08	99.90	99.96	100.00

Konstanz, Candidates.