

The Third Vote Experiment

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WSI 

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Fakten für eine faire Arbeitswelt.

&

 **KIT**

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Introduction

Voting Advice Application (StuPa-O-Mat) asks the user questions on policy issues (A Baden-Württemberg-wide off-peak ticket with the semester fee? Y/N, etc.); the computer program, drawing on all the parties' answers, finds for the user the best-, the second-best-matching party, etc.

New election method: the voters are asked about their preferences on the policy issues to define the balance of public opinion on each issue. These referenda measure the degree to which the parties' policies match the public preferences. The parliament seats are then distributed among the parties in proportion to their indices of popularity (the average percentage of the population represented on all the issues) and universality (frequency in representing a majority).

Experiment: during the election to the Student Parliament of the Karlsruhe Institute of Technology, July 4--8, 2016

Electoral ballot

EXPERIMENT -“The Third Vote”

What did you vote for on the actual ballot?

- Liberale Hochschulgruppe (LHG)
- RCDS - Ring christlich-demokratischer Studenten
- Liste für basisdemokratische Initiative, Studium, Tierzucht und Elitenbeförderung (LISTE)
- FiPS - Fachschaftserfahrung im Parlament der Studierenden
- Die Linke.SDS
- Rosa Liste
- Juso - studentisch. demokratisch. solidarisch

Did you use the StuPa-O-Mat in order to find your decision?

- yes
- no

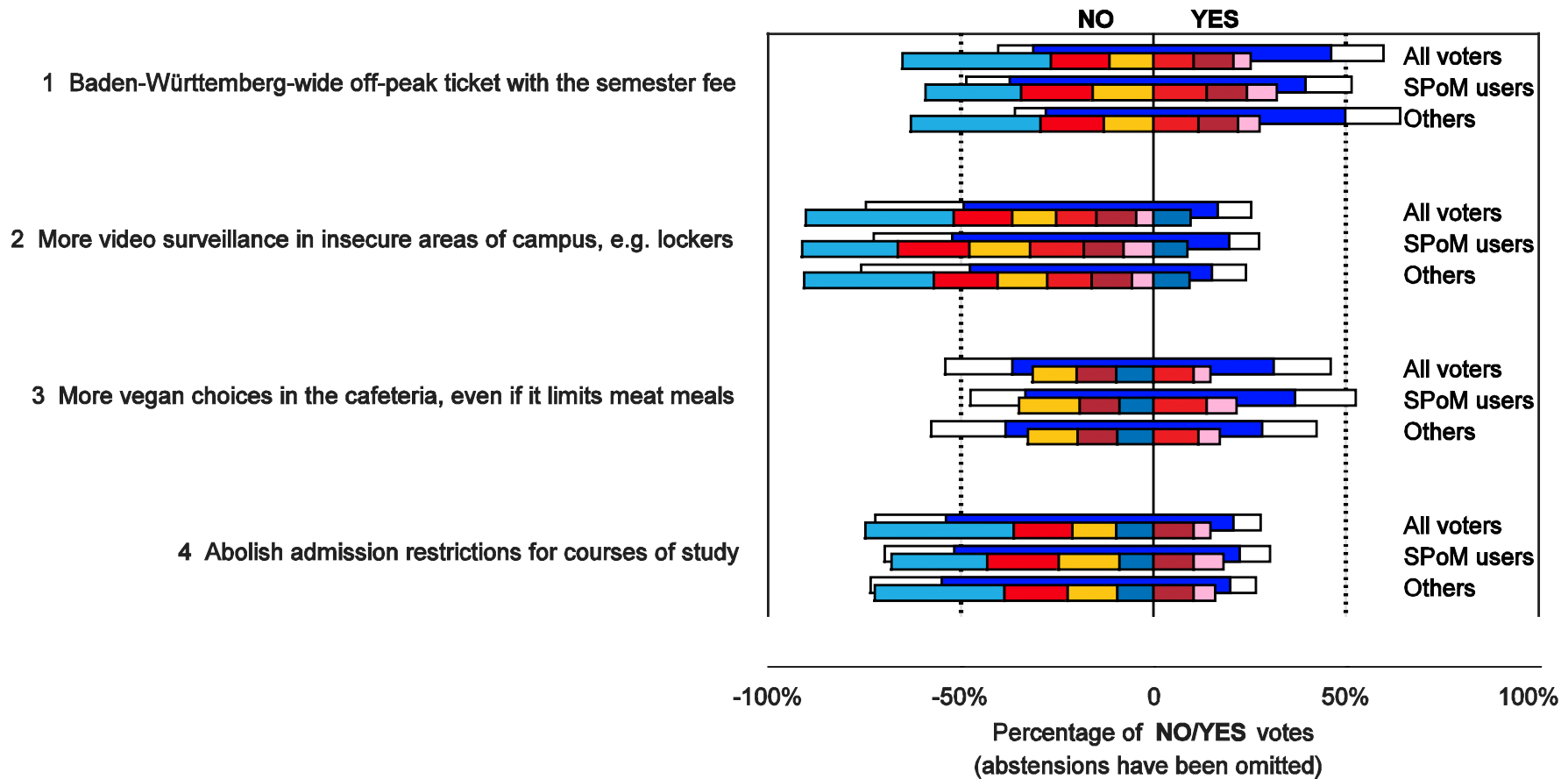
Please answer these selected StuPa-O-Mat questions to help us define your policy profile:	+	o	-	#
A Baden-Württemberg-wide off-peak ticket with the semester fee				1
More video surveillance in insecure areas of campus, e.g. lockers				2
More vegan choices in the cafeteria, even if it limits meat meals				3
Abolish admission restrictions for courses of study				4
Sexism is a current problem at the KIT				5
Abolish the maximum duration of study				6
Promote gender-neutral restroom facilities on campus				7
Heavily restrict commercial advertising on campus				8
Special deals on tickets to cultural events with the semester fee				9
Replace low-attendance lectures with recordings and exercise classes				10

Experimental data

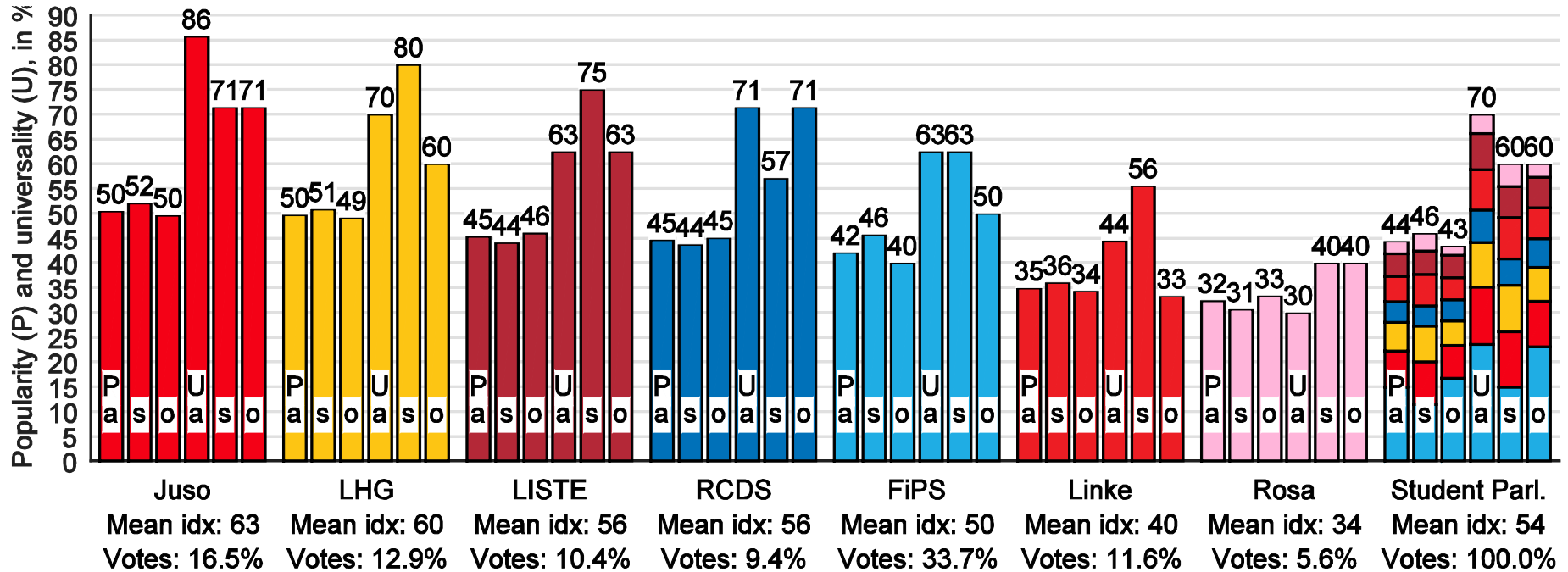
Questions	FiPS Juso LHG RCDS Linke LISTE Rosa	All voters who participated in the experiment			StuPa-O-Mat users who participated in the experiment			Others who participated in the experiment (non-users of StuPa-O-Mat)		
		Pros	Cons	Majority	Pros	Cons	Majority	Pros	Cons	Majority
		%	%	1/0	%	%	1/0	%	%	1/0
1 Baden-Württemberg-wide off-peak ticket with the semester fee	0 0 0 ? 1 1 1	46	31	1	39	37	1	50	28	1
2 More video surveillance in insecure areas of campus, e.g. lockers	0 0 0 1 0 0 0	17	49	0	20	52	0	15	48	0
3 More vegan choices in the cafeteria, even if it limits meat meals	? ? 0 0 1 0 1	31	37	0	37	33	1	28	38	0
4 Abolish admission restrictions for courses of study	0 0 0 0 ? 1 1	21	54	0	22	52	0	20	55	0
5 Sexism is a current problem at the KIT	1 ? 0 ? 1 ? 1	12	44	0	15	43	0	11	45	0
6 Abolish the maximum duration of study	0 0 1 0 1 1 1	37	39	0	39	38	1	35	39	0
7 Promote gender-neutral restroom facilities on campus	? 0 0 0 1 0 1	15	48	0	19	45	0	13	49	0
8 Heavily restrict commercial advertising on campus	0 0 0 0 1 0 1	22	41	0	21	43	0	23	39	0
9 Special deals on tickets to cultural events with the semester fee	0 ? 0 0 1 0 1	34	32	1	31	39	0	36	28	1
10 Replace low-attendance lectures with recordings and exercise classes	0 0 0 ? 0 ? 1	31	35	0	21	46	0	36	30	1

Balance of opinions and party positions on the issues

FIPS Juso LHG Linke LISTE RCDS Rosa Balance of opinions



Party indices of popularity and universality



Correlation between indices

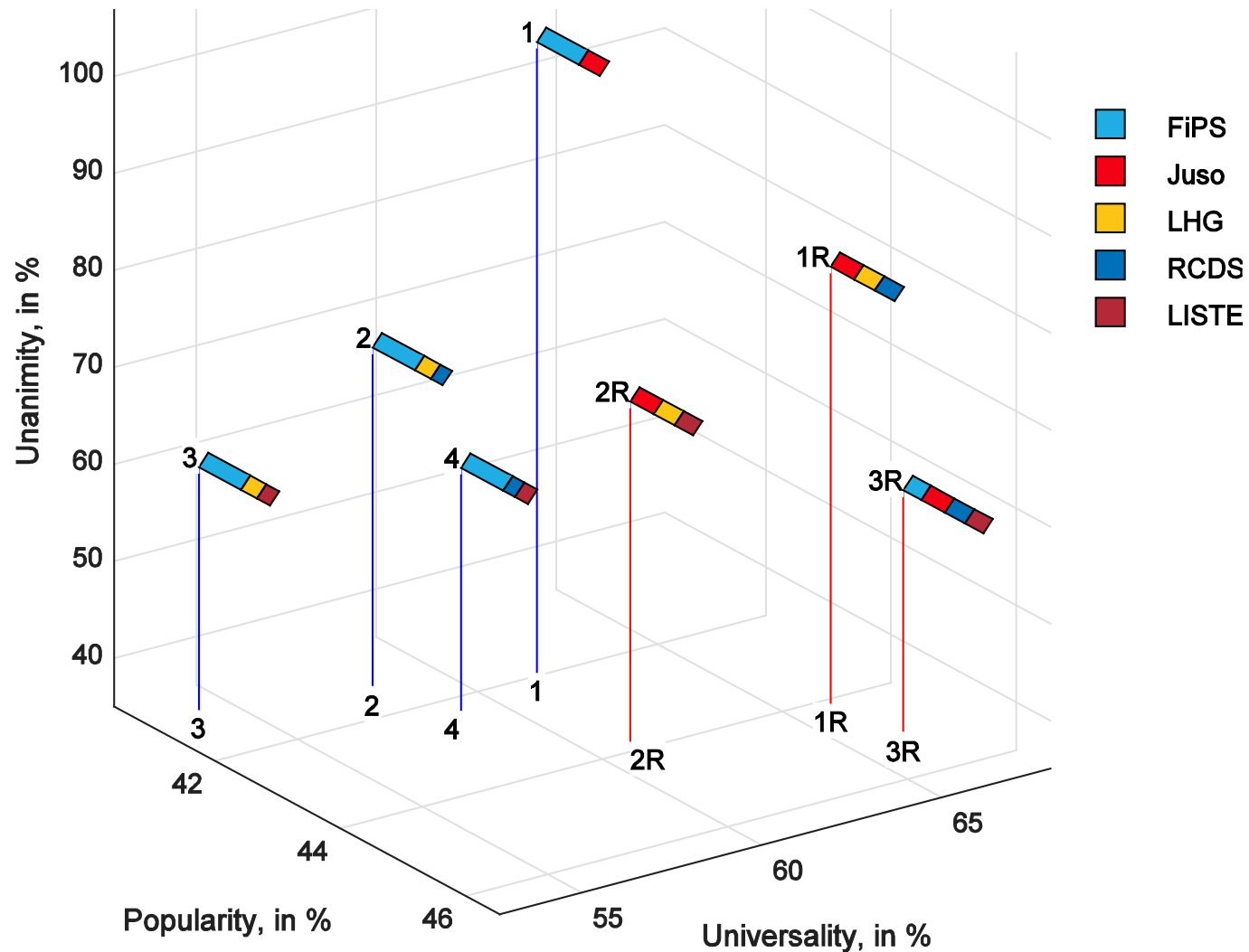
	Second votes				Indices								
	Official votes	Exp. votes	Exp. SPoM	Exp. others	All experim. ballots			SPoM user ballots			Other exper. ballots		
					P	U	Mean	P	U	Mean	P	U	Mean
1	2	3	4	5	6	7	8	9	10	11	12	13	
Official votes	1.00	0.96***	0.95***	0.94***	0.44	0.53	0.51	0.62	0.39	0.49	0.31	0.21	0.25
Exp. votes	0.96***	1.00	0.93***	0.99***	0.22	0.32	0.30	0.43	0.25	0.32	0.09	0.01	0.04
Exp. SPoM	0.95***	0.93***	1.00	0.89***	0.35	0.42	0.41	0.56	0.39	0.47	0.20	0.03	0.08
Exp. others	0.94***	0.99***	0.89***	1.00	0.18	0.28	0.26	0.38	0.20	0.27	0.05	0.01	0.02
P exp. all	0.44	0.22	0.35	0.18	1.00	0.95***	0.97***	0.97***	0.88***	0.94***	0.99***	0.87**	0.93***
U exp. all	0.53	0.32	0.42	0.28	0.95***	1.00	1.00***	0.95***	0.76**	0.85**	0.92***	0.88***	0.91***
Mean all	0.51	0.30	0.41	0.26	0.97***	1.00***	1.00	0.97***	0.80**	0.89***	0.95***	0.88***	0.92***
P exp. SPoM	0.62	0.43	0.56	0.38	0.97***	0.95***	0.97***	1.00	0.88***	0.95***	0.92***	0.77**	0.83**
U exp. SPoM	0.39	0.25	0.39	0.20	0.88***	0.76**	0.80**	0.88***	1.00	0.98***	0.86**	0.59	0.69*
Mean SPoM	0.49	0.32	0.47	0.27	0.94***	0.85**	0.89***	0.95***	0.98***	1.00	0.91***	0.68*	0.76**
P exp. others	0.31	0.09	0.20	0.05	0.99***	0.92***	0.95***	0.92***	0.86**	0.91***	1.00	0.91***	0.96***
U exp. others	0.21	0.01	0.03	0.01	0.87**	0.88***	0.88***	0.77**	0.59	0.68*	0.91***	1.00	0.99***
Mean others	0.25	0.04	0.08	0.02	0.93***	0.91***	0.92***	0.83**	0.69*	0.76**	0.96***	0.99***	1.00

*** PVAL \leq 0.01

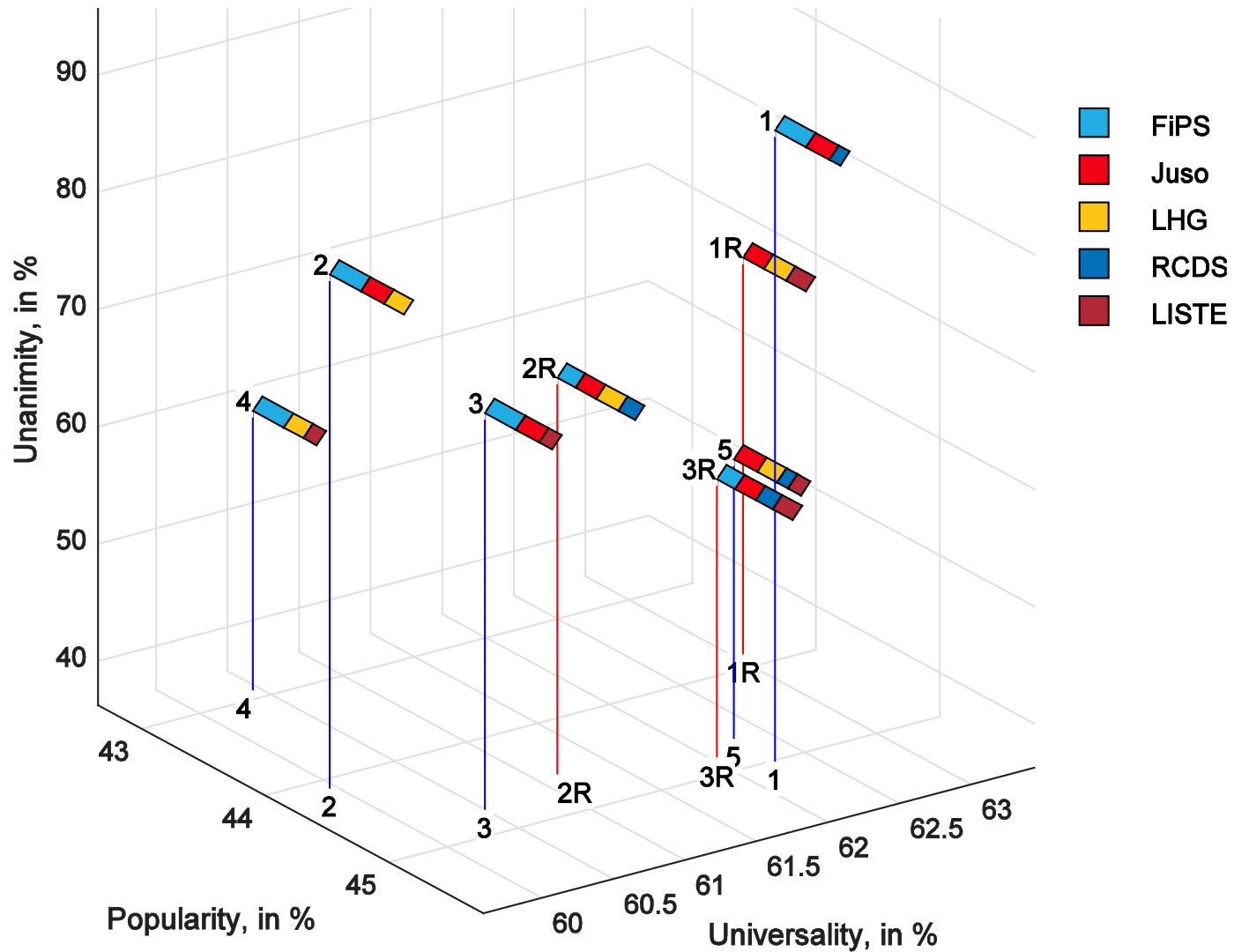
** 0.01 < PVAL \leq 0.05

* 0.05 < PVAL \leq 0.10

Indices of minimal eligible coalitions before and after adjustments /ALL

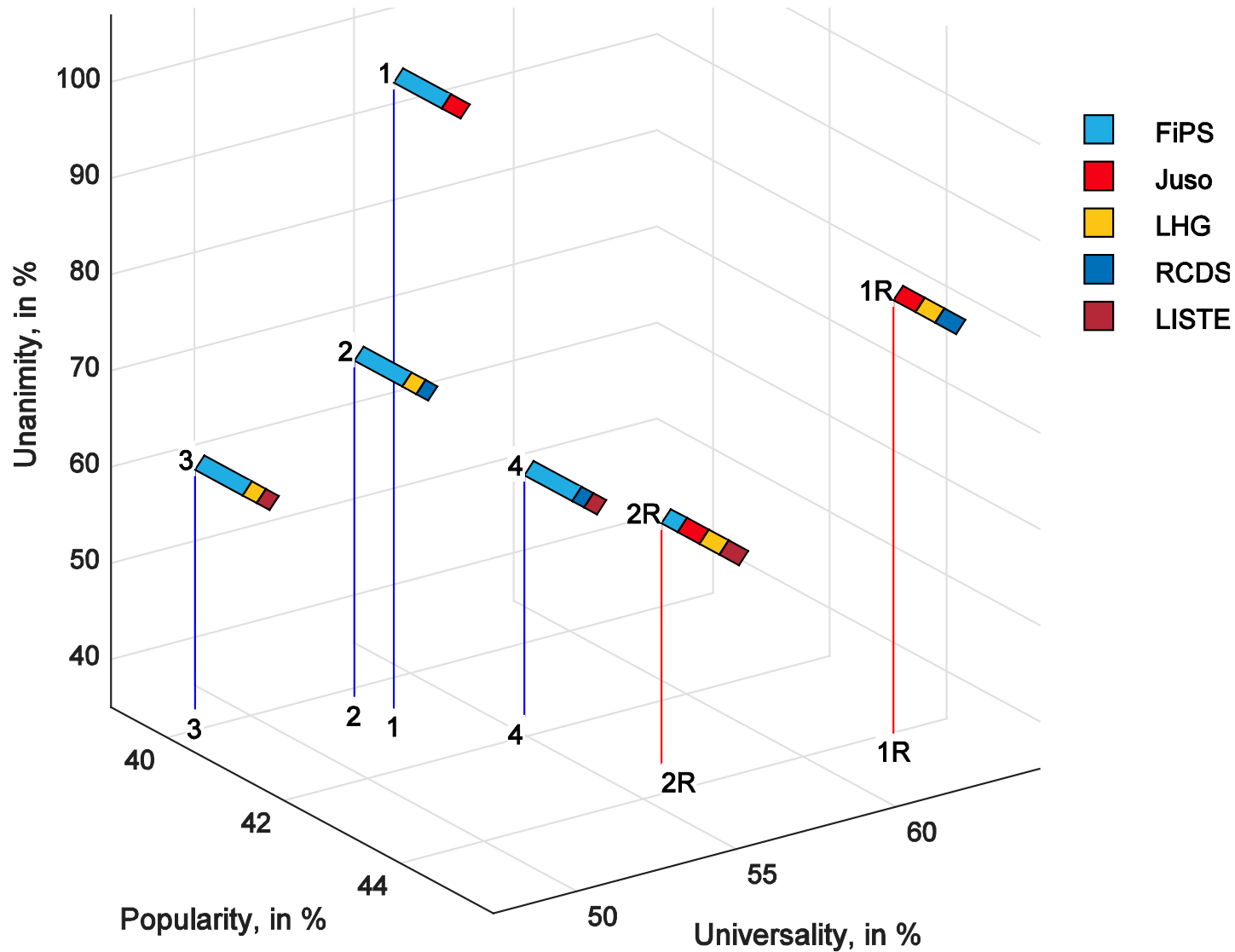


Indices of minimal eligible coalitions StuPa-O-Mat USERS



Indices of minimal eligible coalitions

StuPa-O-Mat NON-USERS



Two Election Architectures

Acceptance/rejection of a paper by 3 reviewers

Criteria	Reviewer				Collective opinion
	1	2	3		
New findings	+	+	-	→	+
Awareness of literature	+	-	+	→	+
Presentation and style	+	-	-	→	-
	↓	↓	↓		↓
Individual votes	+	-	-	→ -	+

↓ → **Individual determination** (usual voting, VAAs): Reject

→ ↓ **Public determination** (voting by criteria, 3rd vote): Accept

Bottlenecks of the method

The selection and wording of questions are of prime importance. Their formulation is on the responsibility of a supposedly neutral official commission, but this task can be hardly performed impartially. To avoid manipulation of electoral outcomes by posing questions favorable for one candidates and unfavorable for others, the questions are suggested to be drawn up by the parties themselves with negotiations on their formulation in order to prevent misinterpretations.

However, the questions can be too numerous to be included in the electoral ballots and can be interdependent, insufficiently discriminating between the party policy profiles. Hence, the party indices of representativeness become close, the VAA produces an impression of almost equally representative parties, and the third vote equalizes the parliament factions, resulting in a malfunction of both.

In the Third Vote Experiment: the direct vote discriminates between the most and the least successful parties by a factor of 6 (FiPS with 33.7% and Rosa with 5.6% of the votes), whereas the mean indices of the most and the least representative parties differ by a factor of 2 (Juso with a mean index of 63% and Rosa with 34%).

Maximizing the discrimination between parties

$$\text{Total Euclidian distance} = \sum_{i < j} d[\mathbf{B}(:, i) - \mathbf{B}(:, j)] = \sum_{i < j} \sqrt{\sum_q [\mathbf{B}(q, i) - \mathbf{B}(q, j)]^2}$$

i, j indices of columns of matrix \mathbf{B}

$:$ denotes the full range of the matrix rows $1, 2, \dots, 27$

$\mathbf{B}(:, i)$ is the i th column and $\mathbf{B}(:, j)$ is the j th column of matrix \mathbf{B}

q are indices of rows of matrix \mathbf{B} , associated with questions

TASK: Find a subset Q of 10 questions $1, \dots, 27$ such that

$$Q: \max_{Q \subset 1:27, |Q|=10} \sum_{i < j} \sqrt{\sum_q [\mathbf{B}(q, i) - \mathbf{B}(q, j)]^2}$$

Four discrimination measures for subset Q of m questions

$$\text{Total Euclidian distance} = \sum_{i < j} \sqrt{\sum_{q \in Q} \frac{[\mathbf{B}(q, i) - \mathbf{B}(q, j)]^2}{m}}$$

$$\text{Total Manhattan distance (sum of absolute differences)} = \sum_{i < j} \sum_{q \in Q} \frac{|\mathbf{B}(q, i) - \mathbf{B}(q, j)|}{m}$$

$$\text{Total Hamming distance (number of mismatches)} = \sum_{i < j} \sum_{q \in Q} \frac{\text{sign} |\mathbf{B}(q, i) - \mathbf{B}(q, j)|}{m}$$

$$\text{Total correlation} = \sum_{i < j} \rho[\mathbf{B}(Q, i) - \mathbf{B}(Q, j)]$$

Selection of questions by exhaustive search

Questions	Party positions (matrix B)							Questions selection criterion				
	LHG	RCDS	LISTE	FIPS	Linke	Rosa	Juso	Selection by organizers	Euclidian distance	Manhattan distance	Hamming distance	correlation
1 Financing the student body. The student body should be financed exclusively by voluntary contributions	1	0	-1	-1	-1	-1	-1					X
2 Room for children and infants. There should be a room at the KIT for child and infant care that students can use	0	1	1	1	1	1	1				X	
3 State wide transport ticket. A Baden-Württemberg-wide transport ticket for evenings and weekends, funded through the mandatory semester fee, should be introduced	-1	0	1	-1	1	1	-1	X	X	X		
4 Military research. Military research should be heavily restricted at the KIT. Possible answers: 'Military research should be completely prohibited'; 'Research for purely military objectives should be prohibited'; 'Military research should be allowed with no restrictions'	-1	-1	0	0	1	1	0					
5 Dealing with the KIT past. The student body should take up a debate accounting for the past of the KIT and its predecessors	0	1	0	1	1	1	0					
6 Video surveillance. There should be more video surveillance in security-sensitive areas (eg. lockers) on campus	-1	1	-1	-1	-1	-1	-1	X			X	
7 Vegan meals in the canteen. The canteen should offer more vegan and sustainable options, even if this means limiting the offer of meals containing meat	-1	-1	-1	0	1	1	0	X		X		
8 Career launch. Courses of study at KIT should be designed to promote quick entry into a career	-1	1	-1	-1	-1	-1	-1				X	
9 University competition. Competition between universities should be reduced	-1	-1	-1	0	1	1	0		X	X		
10 Child care places for students. There should be more places in daycare facilities near the KIT for the children of students	0	0	0	1	1	1	0					
11 Religion room. The KIT should provide a room that is always open for the exercise of religion	-1	0	1	-1	0	1	-1		X	X		X
12 BAFöG. The BAFöG (student financial aid in Germany) should be independent of parental income	1	1	1	1	1	1	-1				X	
13 Admission restrictions. Admission restrictions for courses of study should be abolished	-1	-1	1	-1	0	1	-1	X	X	X		X
14 Sexism. Sexism is a current problem at the KIT	-1	0	0	1	1	1	0	X				
15 Maximum studies duration. The maximum duration of study should be abolished	1	-1	1	-1	1	1	-1	X	X	X		
16 Committees of the student body. The Student Parliament and the Conference of Faculties should be merged together	-1	-1	-1	-1	-1	-1	-1				X	

Questions	Party positions (matrix B)							Questions selection criterion				
	LHG	RCDS	LISTE	FIPS	Linke	Rosa	Juso	Selection by organizers	Euclidian distance	Manhattan distance	Hamming distance	correlation
17 Sponsoring. The student body should make use of sponsors at events like the University festival and other cultural events	1	1	1	1	0	1	1				X	
18 Gender-neutral restrooms. The student body should campaign for gender-neutral restroom facilities on campus	-1	-1	-1	0	1	1	-1	X	X	X		X
19 Payments for AStA speakers. Students who get involved at AStA should do so on a strictly unpaid basis	1	-1	0	-1	-1	-1	-1					X
20 Dormitory construction. The expansion of dormitory facilities should be paid for by student grants	-1	0	-1	-1	1	-1	-1				X	X
21 Subtitles in lecture videos. All recorded courses should be uploaded with subtitles (for inclusion of hearing-impaired students)	1	0	0	1	1	1	-1		X			
22 fzs. The student body should become a member of the fzs (Freier Zusammenschluss von Studenten). Explanation: the fzs is a nationwide and politically neutral alliance of student bodies. It represents students at the federal level and is a member of European Student Union (ESU). Currently the member fee is 40 ct. per student per semester	-1	-1	-1	-1	1	1	0		X	X		X
23 Advertisements on campus. Promotion and advertisements from companies should be heavily restricted on campus	-1	-1	-1	-1	1	1	-1	X	X	X	X	X
24 Cultural events. The student body should advocate special deals on entrance fees and cultural events by introducing a mandatory semester fee	-1	-1	-1	-1	1	1	0	X	X	X		X
25 Accessibility. All areas of the KIT should be accessible without restrictions	1	1	1	0	1	1	1				X	
26 Poor attended lectures. Lectures with low attendance rates should be replaced by recordings and exercise classes	-1	0	0	-1	-1	1	-1	X				X
27 Political mandate. The student body should participate in the general political debate. Explanation: the coalition agreement of the latest green-black (Green-CDU/CSU) state government intends to limit the political mandate of student bodies, restricting them to issues of university policy only	1	-1	1	1	1	1	1				X	
Total Euclidian distance between party 10-profiles								26.19	26.75	26.74	18.32	25.29
Total Manhattan distance between party 10-profiles								20.40	21.80	22.20	10.20	19.60
Total Hamming distance between party 10-profiles								8.00	7.10	6.90	14.70	8.10
Total correlation between party 10-profiles								0.71	0.16	-1.30	11.82	-2.46

Stepwise removal of questions

Number of retained questions	Suboptimal selection of questions by their stepwise removal		Optimal selection of questions by exhaustive search of all combinations				
	Question removed at the given step	Total Euclidian distance normalized	Total Euclidian distance normalized	Questions in optimal selection but not in suboptimal selection	Questions in suboptimal selection but not in optimal selection	Number of combinations of questions	Processing time in seconds
27	None	22.96	22.96	None	None	1	0
26	16	23.39	23.39	None	None	27	0
25	2	23.75	23.75	None	None	351	0
24	17	24.13	24.13	None	None	2925	0
23	25	24.52	24.52	None	None	17550	0
22	10	24.85	24.85	None	None	80730	2
21	5	25.19	25.19	None	None	296010	7
20	14	25.32	25.32	None	None	888030	23
19	6	25.47	25.47	None	None	2220075	56
18	4	25.61	25.61	None	None	4686825	117
17	8	25.75	25.75	None	None	8436285	211
16	12	25.87	25.87	None	None	13037895	324
15	26	26.00	26.00	None	None	17383860	430
14	19	26.16	26.16	None	None	20058300	497
13	27	26.31	26.31	None	None	20058300	496
12	1	26.45	26.45	None	None	17383860	430
11	20	26.60	26.60	None	None	13037895	322
10	7	26.75	26.75	None	None	8436285	207
9	21	26.93	26.93	None	None	4686825	115
8	9	27.14	27.14	None	None	2220075	54
7	23	27.34	27.34	None	None	888030	22
6	11	27.52	27.52	None	None	296010	7
5	22	27.74	27.74	None	None	80730	2
4	24	27.81	27.81	None	None	17550	0
3	13	28.02	28.02	None	None	2925	0
2	3	27.05	27.05	None	None	351	0
1	18	24.00	24.00	None	None	27	0

Ten questions retained (selected by organizers are in boxes): 3 9 11 13 15 18 21 22 23 24

Conclusions

1. Potential of the third vote.
2. Selection of questions by the parties themselves
3. Enhancing difference between parties by optimally reducing the list of questions
4. Combination with the existing voting method

Sources

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<http://www.coe.int/en/web/world-forum-democracy/2016-lab-7-reloading-elections>
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