

Voter Paradox in the 2009 Burlington IRV Mayoral Race

	1st	2nd	3 rd	4th	5th	totals	%	vote dif	winner
Montroll over Wright	2063	1788	644	100	2	4597	56%	929	Montroll
Wright over Montroll	2954	570	126	17	1	3668	44%		
Kiss over Montroll	2586	657	207	28	0	3478	46%	589	
Montroll over Kiss	2063	1316	568	118	2	4067	54%		Montroll
Kiss over Wright	2586	1123	521	77	7	4314	51%	250	Kiss
Wright over Kiss	2954	760	308	42	0	4064	49%		

This table provides compares the top 3 candidates in the 2009 Burlington mayoral race on the basis of voter preference of one over another. The figures are the number and percent of ballots on which one candidate was preferred over the other. The columns listed as "1st", "2nd", "3rd", "4th" and "5th" contain the number of ballots in which the candidate was ranked above their opponent. The column "1st" includes each candidate's 1st place votes. The column "2nd" contains each candidate's 2nd place votes minus their 2nd place votes that they received from voters who ranked their opponent 1st. The column "3rd" contains each candidate's 3rd place votes minus 3rd place votes received from voters who ranked their opponent 1st or 2nd. Etc. The totals are the sum of all of the ballots that ranked the candidate over their opponent regardless whether it was in the 1st and 2nd ranking or the 3rd and 4th ranking or whatever combination. The raw numbers used for this calculation are attached below in the form of crosstabs.

The table demonstrates that **a majority of voters ranked Andy Montroll above Kurt Wright (56% to 44%) and Bob Kiss (54% to 46%)**. That is more voters preferred Montroll to Wright and Montroll to Kiss. Despite this, Bob Kiss won the election after the ballots for all the candidates but Kurt Wright were reallocated in the final round of the IRV process. In other words, the IRV election resulted in a Thwarted-Majorities Paradox in which a candidate that can beat every other candidate in direct-comparison lost the election.¹

Source: Burlington City Clerk, <http://www.ci.burlington.vt.us/ct/elections/>, accessed 9 March 2009.

¹ See Peter Fishburn and Steven Brams, "Paradoxes of Preferential Voting: What Can Go Wrong with Sophisticated Voting Systems Designed to Remedy Problems of Simpler Systems," *Mathematics Magazine* vol. 56. no. 4, September 1983: pp. 207-214.

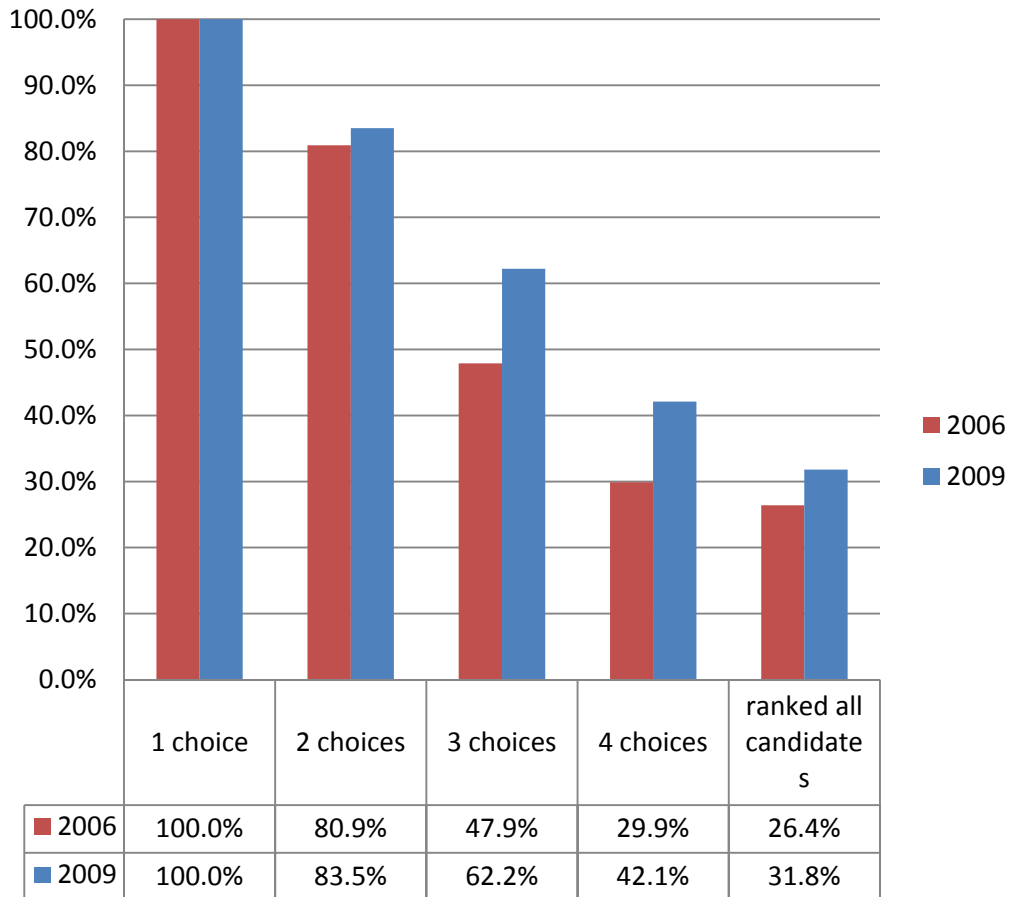


Figure: Percent of voters who made a 1st choice, 2nd choice, etc., 2006 and 2009 Burlington mayoral election.

Source: Burlington City Clerk, <http://www.ci.burlington.vt.us/ct/elections/>, accessed 9 March 2009.

The following tables are crosstabs matching up voters' rankings (CH1 = voters' first choice, CH2 = voters second choice, CH3 = voters third choice, etc.). So, the first table matches up voters' 1st choice with their 2nd choice, the second table matches up voters' 1st choice with their 3rd choice, etc. An example of interpretation of the numbers (1st table): 1321 voters for whom Kiss was their first choice picked Montroll for their second choice (data row 1, column 2), 119 voters for whom Kiss was their first choice picked Simpson for their second choice (row 1, column 3), etc.

CH1 * CH2 Crosstabulation

Count		2 nd Choice						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
1 st Choice	KISS	0	1321	119	571	234	15	2260
	MONTROLL	747	0	62	642	424	10	1885
	SIMPSON	14	4	0	9	4	1	32
	SMITH	356	450	48	0	327	1	1182
	WRIGHT	281	849	78	883	0	23	2114
	WRITE-IN	6	13	0	2	5	0	26
Total		1404	2637	307	2107	994	50	7499

CH1 * CH3 Crosstabulation

Count		CH3						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH1	KISS	0	484	287	681	229	10	1691
	MONTROLL	406	0	126	579	324	8	1443
	SIMPSON	6	9	0	5	5	0	25
	SMITH	281	398	91	0	162	9	941
	WRIGHT	266	505	152	533	0	15	1471
	WRITE-IN	3	1	3	8	1	0	16
Total		962	1397	659	1806	721	42	5587

CH2 * CH3 Crosstabulation

Count		CH3						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH2	KISS	0	345	92	439	184	7	1067
	MONTROLL	349	0	289	1013	271	11	1933
	SIMPSON	38	95	0	93	19	8	253
	SMITH	397	695	224	0	243	12	1571
	WRIGHT	175	248	51	257	0	4	735
	WRITE-IN	3	14	3	4	4	0	28
Total		962	1397	659	1806	721	42	5587

CH1 * CH4 Crosstabulation

Count

		CH4						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH1	KISS	0	150	326	339	302	15	1132
	MONTROLL	225	0	249	218	256	12	960
	SIMPSON	2	8	0	4	5	0	19
	SMITH	164	114	181	0	152	14	625
	WRIGHT	348	225	276	183	0	3	1035
	WRITE-IN	2	2	4	3	2	0	13
Total		741	499	1036	747	717	44	3784

CH2 * CH4 Crosstabulation

Count

		CH4						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH2	KISS	0	103	224	182	185	11	705
	MONTROLL	248	0	369	352	287	10	1266
	SIMPSON	45	48	0	55	30	7	185
	SMITH	275	244	333	0	215	15	1082
	WRIGHT	169	100	109	146	0	1	525
	WRITE-IN	4	4	1	12	0	0	21
Total		741	499	1036	747	717	44	3784

CH3 * CH4 Crosstabulation

Count

		CH4						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH3	KISS	0	128	150	177	188	5	648
	MONTROLL	240	0	352	165	157	18	932
	SIMPSON	77	166	0	229	55	3	530
	SMITH	277	122	441	0	314	8	1162
	WRIGHT	147	74	91	174	0	10	496
	WRITE-IN	0	9	2	2	3	0	16
Total		741	499	1036	747	717	44	3784

CH1 * CH5 Crosstabulation

Count

		CH5						
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	Total
CH1	KISS	0	28	349	58	366	32	833
	MONTROLL	101	0	365	22	186	16	690
	SIMPSON	3	1	0	3	6	3	16
	SMITH	73	20	212	0	146	13	464
	WRIGHT	309	58	424	45	0	7	843
	WRITE-IN	5	3	3	0	0	0	11
Total		491	110	1353	128	704	71	2857

CH2 * CH5 Crosstabulation

Count

		CH5						
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	Total
CH2	KISS	0	25	275	41	164	17	522
	MONTROLL	158	0	447	43	282	20	950
	SIMPSON	33	19	0	20	69	7	148
	SMITH	205	45	364	0	189	24	827
	WRIGHT	93	21	255	21	0	3	393
	WRITE-IN	2	0	12	3	0	0	17
Total		491	110	1353	128	704	71	2857

CH3 * CH5 Crosstabulation

Count

		CH5						
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	Total
CH3	KISS	0	27	322	14	111	8	482
	MONTROLL	128	0	344	49	176	19	716
	SIMPSON	149	32	0	32	213	16	442
	SMITH	165	34	431	0	203	24	857
	WRIGHT	45	17	248	33	0	4	347
	WRITE-IN	4	0	8	0	1	0	13
Total		491	110	1353	128	704	71	2857

CH4 * CH5 Crosstabulation

Count

		CH5						Total
		KISS	MONTROLL	SIMPSON	SMITH	WRIGHT	WRITE-IN	
CH4	KISS	0	28	401	15	63	7	514
	MONTROLL	104	0	196	13	59	15	387
	SIMPSON	300	57	0	71	410	33	871
	SMITH	45	11	344	0	164	6	570
	WRIGHT	37	12	396	26	0	10	481
	WRITE-IN	5	2	16	3	8	0	34
Total		491	110	1353	128	704	71	2857