1992 Presidential Search Committee at Wheaton

- **Goal:** Select three faculty, one from each academic division to serve on the search committee for Wheaton's president
- Initial ballot used approval voting to reduce the field of possible candidates to six
- Final ballot: Vote for one candidate in each division

Arts & Humanities	____ C1	____ C2
Natural Sciences	____ C3	____ C4
Social Sciences	____ C5	____ C6

- Majority vote used to select committee members.

Outcome

- Selected three men

- **Why did this happen?**
  - Voters' preferences of overall composition decomposed into choices on individual candidates
  - Selected candidates were individually preferred by a majority, but the overall composition was nearly unanimously unacceptable
  - Breaks down complete transitive rankings of candidates into comparisons on pairs and reassembles to gain an overall ranking
  - Vital information about voters' preferences is lost

Approach to Presidential Search in 2003

- Similar initial ballot to reduce to six candidates

Division	Candidates
Arts & Humanities	1 and 2
Natural Sciences	3 and 4
Social Sciences	5 and 6

- Voters rank eight possibilities

$$A = \{1, 3, 5\} \qquad E = \{2, 3, 5\}$$
$$B = \{1, 3, 6\} \qquad F = \{2, 3, 6\}$$
$$C = \{1, 4, 5\} \qquad G = \{2, 4, 5\}$$
$$D = \{1, 4, 6\} \qquad H = \{2, 4, 6\}$$

- Borda count used to determine winner

	Ranking (1st to 8th)							
1	A	B	E	F	C	D	G	H
2	A	E	G	B	C	F	D	H
3	B	A	D	C	F	E	H	G
4	B	C	D	E	G	F	H	A
5	B	D	A	C	F	H	E	G
6	B	D	H	A	C	F	E	G
7	B	F	A	E	D	H	G	C
8	B	F	D	H	A	E	C	G
9	B	F	D	H	E	G	A	C
10	C	A	B	D	G	E	F	H
11	C	D	A	B	G	H	E	F
12	C	D	G	B	A	E	H	F
13	C	D	G	A	B	E	H	F
14	C	E	D	A	B	F	G	H
15	C	G	D	H	E	A	B	F
16	D	B	C	A	H	F	G	E
17	D	B	C	A	H	G	F	E

	Ranking (1st to 8th)							
18	D	B	C	A	H	G	F	E
19	D	B	F	C	H	G	E	A
20	D	B	F	E	G	C	H	A
21	D	C	B	A	H	G	F	E
22	D	C	G	H	B	A	F	E
23	D	C	G	H	B	E	A	F
24	D	C	G	H	B	E	A	F
25	D	C	H	B	G	F	A	E
26	D	G	H	C	B	E	F	A
27	D	H	B	F	C	G	A	E
28	D	H	B	F	C	G	E	A
29	D	H	B	F	G	E	C	A
30	D	H	B	F	G	E	C	A
31	D	H	B	F	G	C	E	A
32	D	H	C	G	B	F	E	A
33	D	H	G	C	A	B	E	F

	Ranking (1st to 8th)							
34	E	F	B	D	H	G	C	A
35	E	F	G	H	A	B	C	D
36	E	F	H	G	B	D	C	A
37	E	G	A	C	F	H	D	B
38	E	G	B	C	D	F	H	A
39	E	G	C	H	F	D	B	A
40	E	G	D	B	F	H	C	A
41	F	B	D	H	A	E	G	C
42	F	B	H	D	E	G	A	C
43	F	H	B	D	G	E	C	A
44	F	H	E	B	A	C	G	D
45	F	H	G	E	D	C	B	A
46	F	H	G	E	C	B	D	A
47	G	C	D	H	A	E	B	F
48	G	C	D	H	A	E	B	F
49	G	D	H	C	B	A	F	E
50	G	E	C	A	H	F	D	B
51	G	E	C	D	A	B	H	F

	Ranking (1st to 8th)							
52	G	E	H	F	C	D	A	B
53	G	E	H	F	C	D	B	A
54	G	H	E	F	C	A	B	D
55	H	D	B	F	A	C	G	E
56	H	D	B	F	G	C	A	E
57	H	D	F	B	C	G	E	A
58	H	D	F	B	G	C	E	A
59	H	D	F	B	G	E	C	A
60	H	D	F	G	E	C	B	A
61	H	D	G	C	F	B	E	A
62	H	D	G	F	B	C	E	A
63	H	D	G	F	B	E	C	A
64	H	F	B	D	G	E	C	A
65	H	F	G	E	B	D	C	A
66	H	G	D	C	F	B	E	A
67	H	G	D	C	F	E	B	A
68	H	G	D	E	C	F	A	B

Outcome

- *D* selected by the Borda Count

Candidate	*D*	*H*	*G*	*B*	*C*	*F*	*E*	*A*
BC Total	330	292	258	255	232	223	189	125

D also Condorcet winner and plurality winner

- Faculty very happy with process overall
  - Only 3 invalid ballots out of 71 cast
  - Some expressed difficulty in ranking 8 possibilities
  - Anecdotal evidence:
    Easily identify top and bottom
    Middle somewhat arbitrary

Diversity of preferences

If consider the groups $A, B, C, \ldots, H$ as eight different alternatives, then very little overlap in preferences.

- 64 distinct rankings from 68 ballots
  Not surprising since $8! = 40,320$ possibilities
- If restrict to top three in ranking,
  45 distinct rankings, largest duplicate has five voters
- If consider top and bottom rankings,
  23 out of 56 possibilities present
- One explanation:
  No extremely polarizing individual among six faculty

Complexity of preferences

Look inside the eight groups for insight about the voters' preferences on the individual candidates $1, 2, 3, \ldots, 6$.

- For 35 out of 68 voters, first and last place not disjoint

$$A = \{1,3,5\} \qquad C = \{1,4,5\} \qquad E = \{2,3,5\} \qquad G = \{2,4,5\}$$
$$B = \{1,3,6\} \qquad D = \{1,4,6\} \qquad F = \{2,3,6\} \qquad H = \{2,4,6\}$$

Voter 7: *B F A E D H G C*

- For seven voters (4, 34, 36, 38, 39, 40, and 49), first and last place committees differed by a single candidate.

e.g. Voter 4: *B C D E G F H A*

Conclusion

In circumstances where voters have opinions on how members of committee will interact:

- Strong evidence that voters' preferences are not separable into preferences on individual candidates
- Rankings of candidates cannot detect voters' preferences for interactions among candidates
- Ballot that asks for single set of candidates cannot detect preference