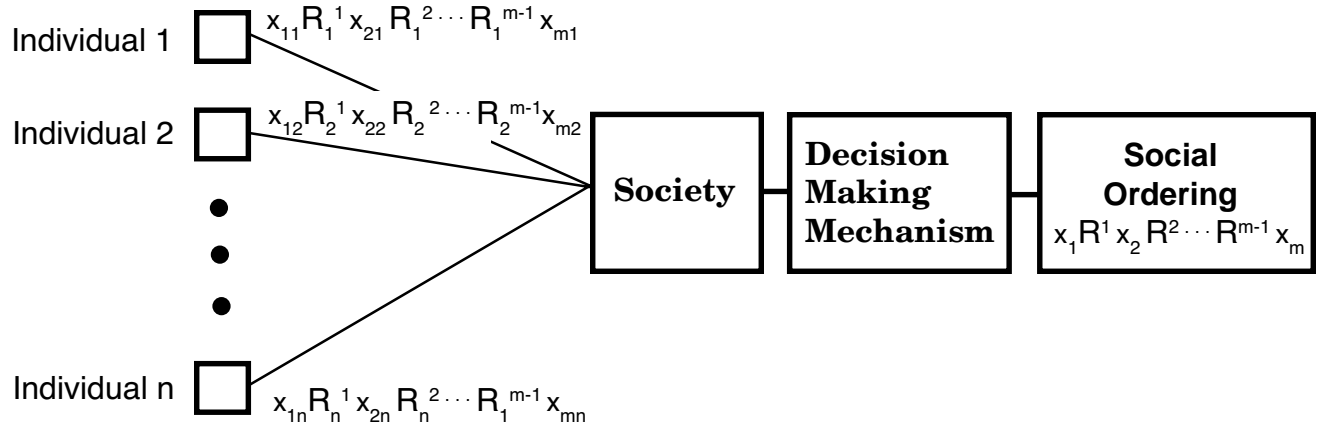
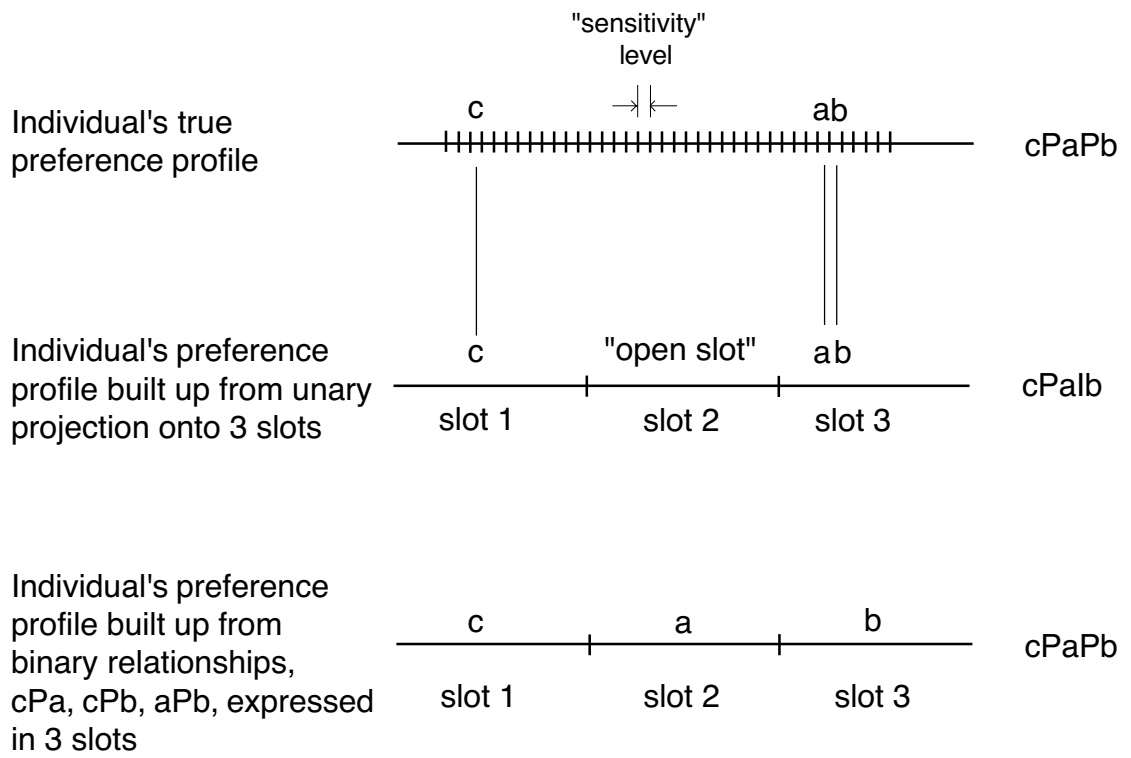




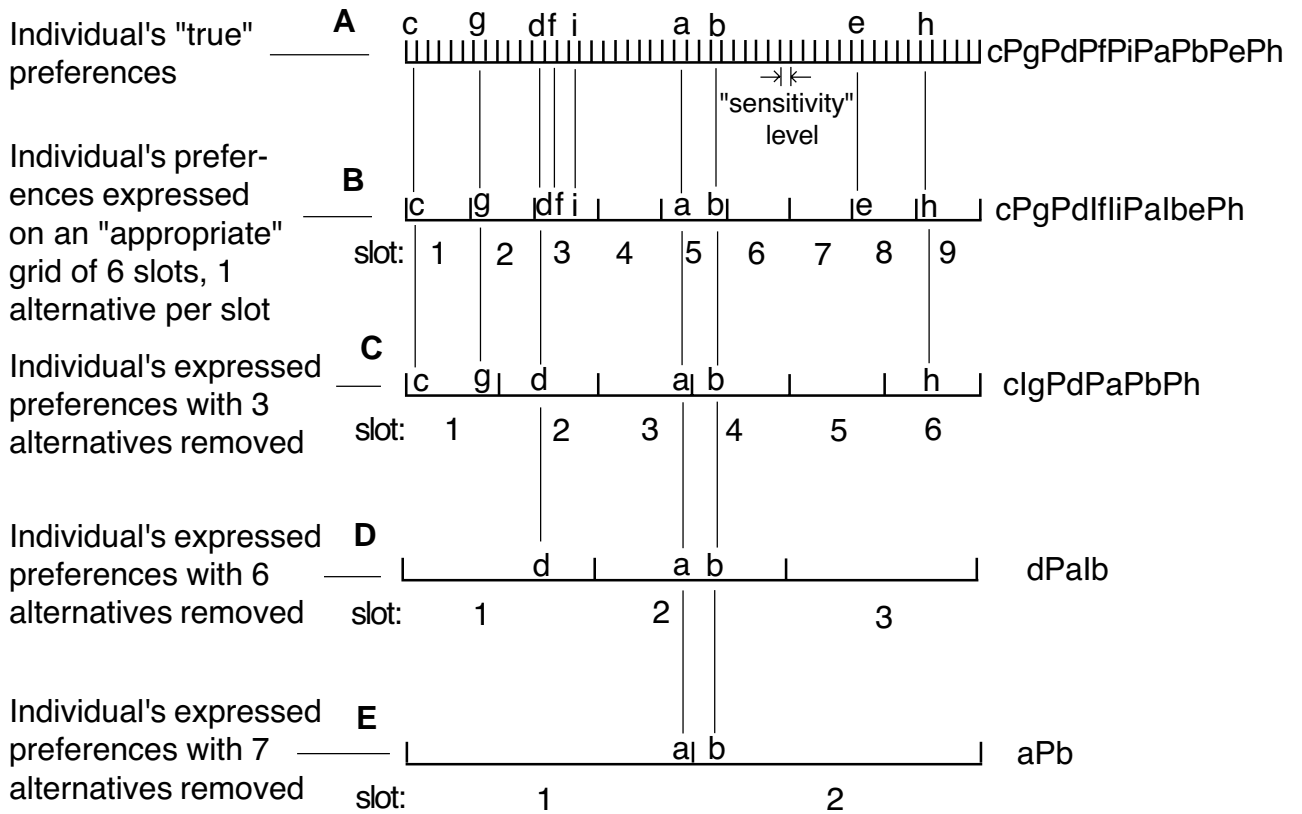
**Fig. 1**



**Fig. 2**



**Fig. 3**



**Fig. 4**

Individual  
True  
Preferences



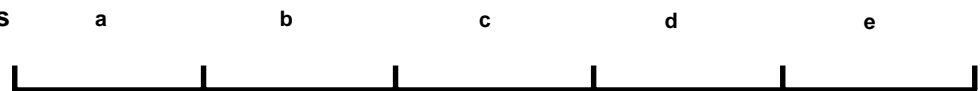
aPbPcPdPe

Individual  
Projected  
Preferences



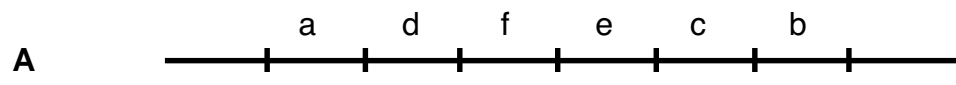
albldle

Individual  
Preferences  
from  
Binary  
Comparisons



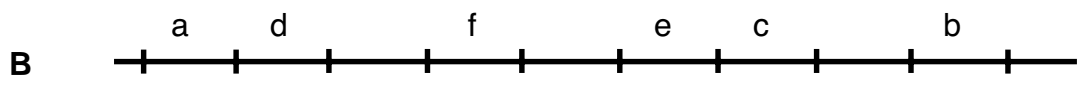
aPbPcPdPe

**Fig. 5**



**m=6**

**aPdPfPePcPb**



**Fig. 6**

2 voters have  $xP_i yP_i zP_i w$

x	y	z	w
---	---	---	---

Possible profiles with  
y removed



x	z	w
---	---	---

x		z w
---	--	-----

1 voter has  $zP_i wP_i xP_i y$

z	w	x	y
---	---	---	---

Possible profiles with  
y removed



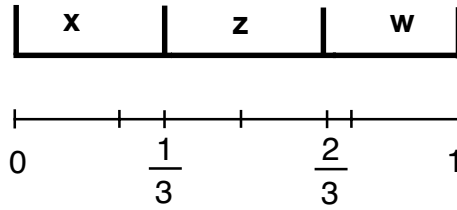
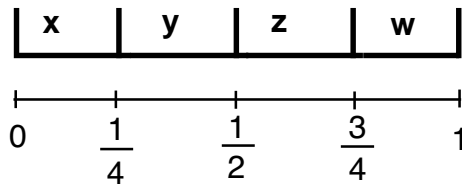
z	w x	
---	-----	--

z	w	x
---	---	---

z w		x
-----	--	---

z w	x	
-----	---	--

**Fig. 7**



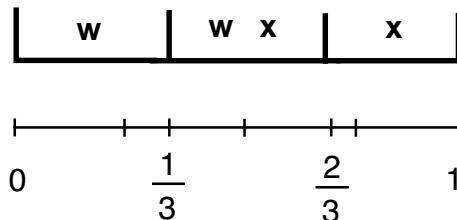
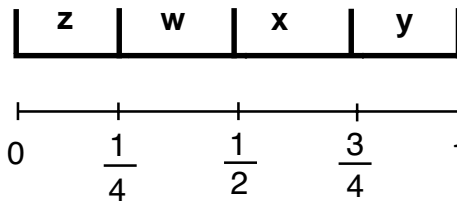
$$P(z \text{ in center slot for } m=3) = \frac{\frac{2}{3} - \frac{1}{2}}{\frac{1}{4}} = \frac{2}{3}$$

$$P(xP_i z P_i w) = \frac{2}{3}$$

$$P(z \text{ in bottom slot for } m=3) = \frac{\frac{3}{4} - \frac{1}{2}}{\frac{1}{4}} = \frac{1}{3}$$

$$P(xP_b P_z l w) = \frac{1}{3}$$

**Note: b = blank**



$$P(w \text{ in middle slot}) = P(x \text{ in middle slot}) = \frac{2}{3}$$

$$P(w \text{ in top slot}) = P(x \text{ in bottom slot}) = \frac{1}{3}$$

$$P(zP_w l x P_b) = \frac{4}{9}$$

$$P(zP_w P_x) = \frac{2}{9}$$

$$P(z l w P_b P_x) = \frac{1}{9}$$

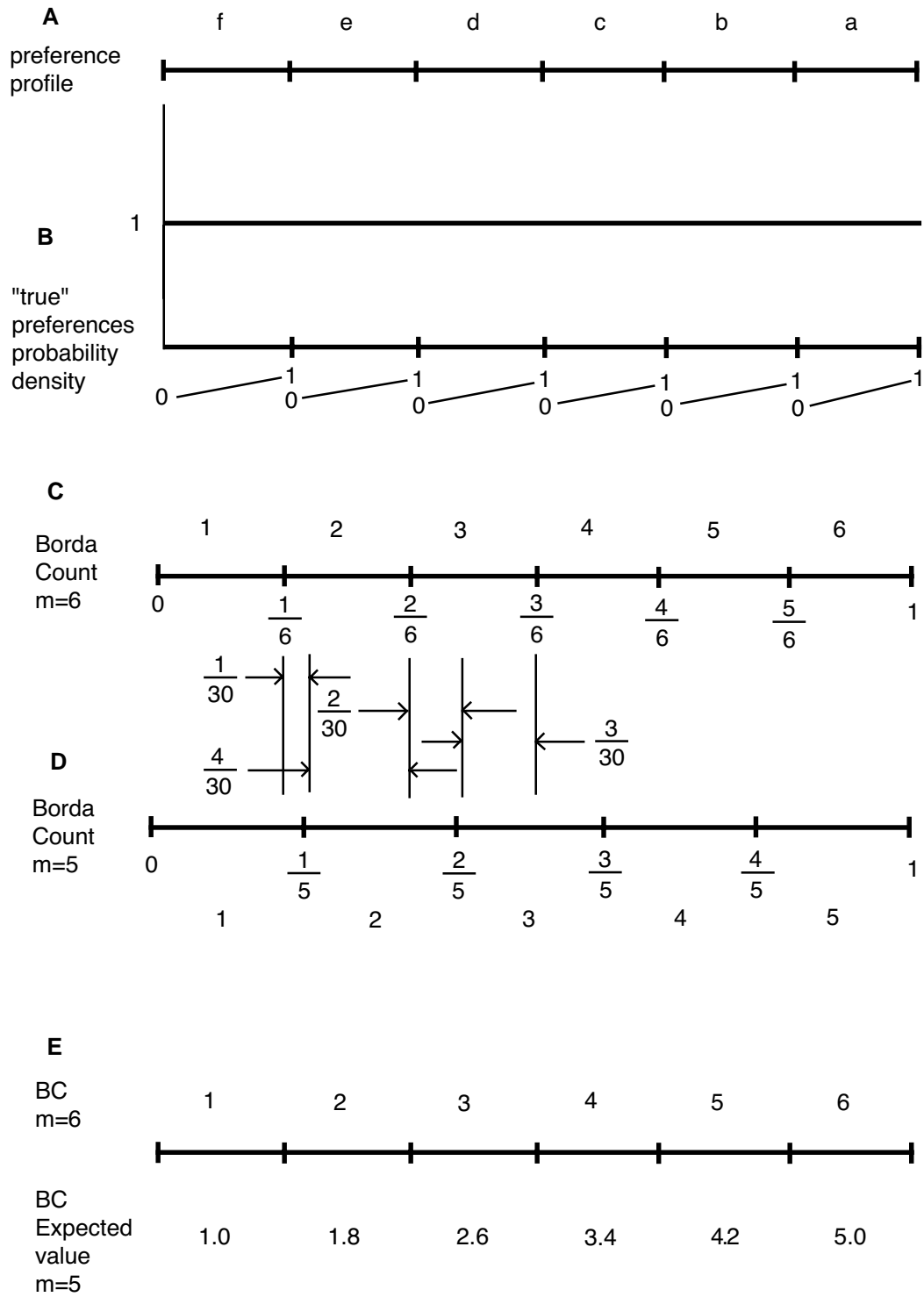
$$P(z l w P_x P_b) = \frac{2}{9}$$

**Fig. 8**

## Appendix 1

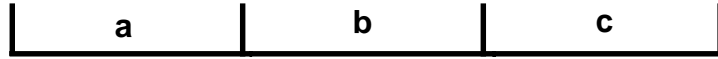
Case	Voter 1	Voter 2	Voter 3	Borda Counts			Social Ordering Winner	Top Slot	Probability of Occurrence
				w	x	z			
1	xPzPw	xPzPw	zPwlxPb	4	8	7	xPzPw	x	$\frac{16}{81}$
2	xPzPw	xPzPw	zPwPx	4	7	7	xlzPw	x,z	$\frac{8}{81}$
3	xPzPw	xPzPw	zlwPbPx	5	7	7	xlzPw	x,z	$\frac{4}{81}$
4	xPzPw	xPzPw	zlwPxPb	5	8	7	xPzPw	x	$\frac{8}{81}$
5	xPzPw	xPbPzlw	zPwlxPb	4	8	6	xPzPw	x	$\frac{8}{81}$
6	xPzPw	xPbPzlw	zPwPx	4	7	6	xPzPw	x	$\frac{4}{81}$
7	xPzPw	xPbPzlw	zlwPbPx	5	7	6	xPzPw	x	$\frac{2}{81}$
8	xPzPw	xPbPzlw	zlwPxPb	5	8	6	xPzPw	x	$\frac{4}{81}$
9	xPbPzlw	xPzPw	zPwlxPb	4	8	6	xPzPw	x	$\frac{8}{81}$
10	xPbPzlw	xPzPw	zPwPx	4	7	6	xPzPw	x	$\frac{4}{81}$
11	xPbPzlw	xPzPw	zlwPbPx	5	7	6	xPzPw	x	$\frac{2}{81}$
12	xPbPzlw	xPzPw	zlwPxPb	5	8	6	xPzPw	x	$\frac{4}{81}$
13	xPbPzlw	xPbPzlw	zPwlxPb	4	8	5	xPzPw	x	$\frac{4}{81}$
14	xPbPzlw	xPbPzlw	zPwPx	4	7	5	xPzPw	x	$\frac{2}{81}$
15	xPbPzlw	xPbPzlw	zlwPbPx	5	7	5	xPzPw	x	$\frac{1}{81}$
16	xPbPzlw	xPbPzlw	zlwPxPb	5	8	5	xPzPw	x	$\frac{2}{81}$





**Fig. 9**

Voter 1:  
 $aP_1bP_1c$



Case 1a



or

Case 1b



Voter 2:  
 $bP_2cP_2a$



Case 2a



or

Case 2b



Voter 3:  
 $bP_3cP_3a$



Case 3a



or

Case 3b

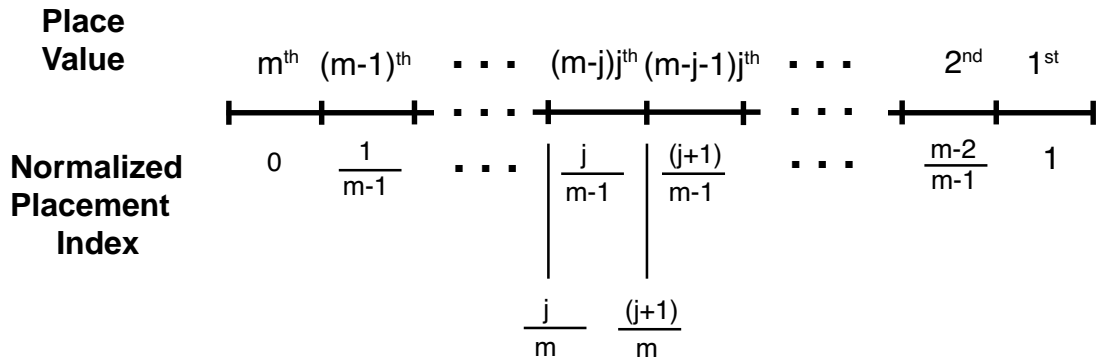


**Fig. 10**

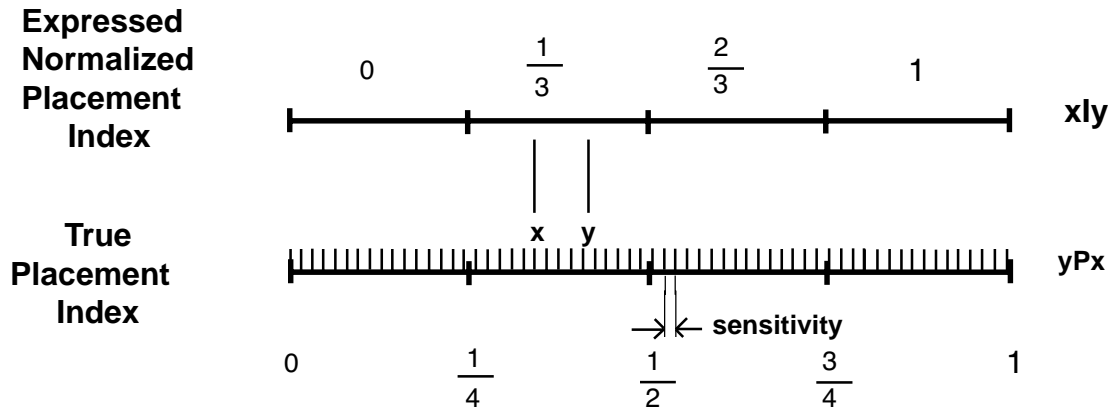
## Appendix 2

**Note:**  $xy = xPy$ ,  $(xy) = xly$

Cases from Fig. 10	Orderings with a removed	BC b c	Social Ordering	Orderings with b removed	BC a c	Social Ordering <sub>a</sub>	Orderings with c removed	BC a c	Social Ordering	P(c)
1a, 2a, 3a	bc, (bc), cb	5, 5	b c	ac, ca, (ca)	5, 5	a c	(ab), ba, ab	5, 5	a b	1/8
1a, 2a, 3b	bc, (bc), cb	5, 5	b c	ac, ca, ca	4, 5	c P <sub>a</sub>	(ab), ba, (ab)	4, 5	b P <sub>a</sub>	1/8
1a, 2b, 3a	bc, bc, cb	5, 4	b P <sub>c</sub>	ac, (ca), (ca)	5, 4	a P <sub>c</sub>	(ab), ba, ab	5, 5	a b	1/8
1a, 2b, 3b	bc, bc, cb	5, 4	b P <sub>c</sub>	ac, (ca), ca	4, 4	a c	(ab), ba, (ab)	4, 5	b P <sub>a</sub>	1/8
1b, 2a, 3a	(bc), (bc), cb	4, 5	c P <sub>b</sub>	ac, ca, (ca)	5, 5	a c	ab, ba, ab	5, 4	a P <sub>b</sub>	1/8
1b, 2a, 3b	(bc), (bc), cb	4, 5	c P <sub>b</sub>	ac, ca, ca	4, 5	c P <sub>a</sub>	ab, ba, (ab)	4, 4	a b	1/8
1b, 2b, 3a	(bc), bc, cb	4, 4	b c	ac, (ca), (ca)	5, 4	a P <sub>c</sub>	ab, ba, ab	5, 4	a P <sub>b</sub>	1/8
1b, 2b, 3b	(bc), bc, cb	4, 4	b c	ac, (ca), ca	4, 4	a c	ab, ba, (ab)	4, 4	a b	1/8



**Example:**  $m=4$



**Fig. 11**