RANDOM BLOCKING FACTORS

Contrast the two examples:

A. Seedlings are being grown in a greenhouse. Since variables such as light, heat, humidity, and pests might vary according to location in the greenhouse, the greenhouse is divided into blocks by location, and treatments are randomly assigned within each block.

B. The candle experiment (Problem 6, p. 326): Color of candle is the treatment factor, burning time of the candle is the response, and the blocks are the experimenters.

Candle experiment:

1. Treating block as fixed

Factor	Type Leve	ls Vo	alues					
BLOCK	fixed	4	1	2	3	4		
COLOR	fixed	4	1	2	3	4		
	.	-						
Analysis o	Analysis of Variance for TIME							
Sourco	DE		çç		мс	г	п	
Source	DF		22		ND2	Г	P	
BLOCK	3	15:	1659	505	553	29.58	0.000	
COLOR	3	60	0345	202	L15	11.77	0.000	
BLOCK*COLO	R 9	1	5821	17	758	1.03	0.431	
Error	48	87	2025	17	709			
Total	63	309	9850					

2. Treating block as random (unrestricted model):

Factor BLOCK COLOR	Type Lev random fixed	vels Va 4 4	lues 1 1	2 2	3 3	4 4	
Analysis	of Variand	ce for	TIME				
Source	DF		SS		MS	F	Р
BLOCK	3	151	L659	505	553	28.76	0.000
COLOR	3	60)345	201	L15	11.44	0.002
BLOCK*COL	OR 9	15	5821	17	758	1.03	0.431
Error	48	82	2025	17	709		
Total	63	309	9850				

3. Treating block as random (restricted model):

MTB > ANOVA 'TIME' = BLOCK|COLOR; SUBC> Random BLOCK; SUBC> Restrict.

Analysis of Variance (Balanced Designs)

Factor	Туре	Levels	Values			
BLOCK	random	4	1	2	3	4
COLOR	fixed	4	1	2	3	4

Analysis of Variance for TIME

Source	DF	SS	MS	F	Р
BLOCK	3	151659	50553	29.58	0.000
COLOR	3	60345	20115	11.44	0.002
BLOCK*COLOR	9	15821	1758	1.03	0.431
Error	48	82025	1709		
Total	63	309850			