Apply at random each design factor treatment with each alternative of the blocking variable

4 alternatives for the undesired factor (e.g. team exp

e.g. Team (experience)

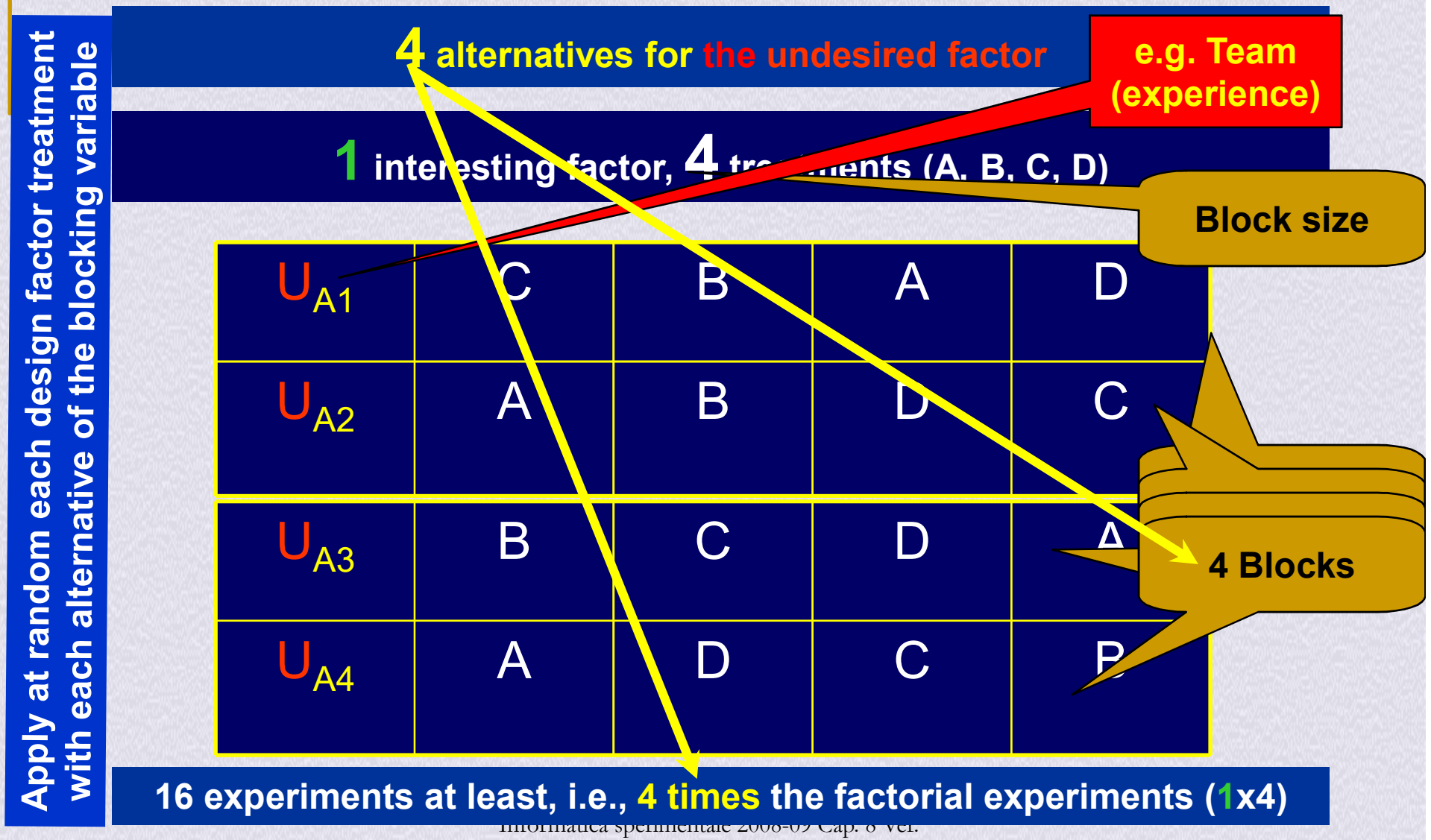
1 interesting factor, 3 treatments (A, B, C)

Block size

U_{A1}	C	B	A
U_{A2}	A	B	C
U_{A3}	B	C	A
U_{A4}	A	C	B

4 Blocks

12 experiments at least, i.e., 4 times the factorial experiments (1x3)


Apply at random each design factor treatment with each alternative of the blocking variable
4 alternatives for the undesired factor
e.g. Team (experience)
1 interesting factor, 4 treatments (A, B, C, D)
Block size
U A1 C B A D
U A2 A B D C
U A3 B C D A
U A4 A D C B
4 Blocks
16 experiments at least, i.e., 4 times the factorial experiments (1x4)

Reduce the complexity of the experiment but still have the uninteresting factor to influence equally all treatments.

Block design with
two sources of undesired variability

4 alternatives for each of the 2 undesired factors

Each interesting treatment 1 time both per row and column

1 interesting factor, 4 treatments (A, B, C, D)

U1 \ U2	VS	S	L	VL
U1.1				
U1.2				
U1.3				
U1.4				

e.g. Project size

16 experiments at least

LATIN SQUARE

4 alternatives for each of the 2 undesired factors

Each interesting treatment 1 time both per row and column

1 interesting factor, 4 treatments (A, B, C, D)

U1 \ U2	VS	S	L	VL
U1.1	A	B	C	D
U1.2	D	A	B	C
U1.3	C	D	A	B
U1.4	B	C	D	A

e.g. Project size

16 experiments at least

LATIN SQUARE

Block design with three or more sources of undesired variability

3 undesired factors; 4 alternatives for each of such factors

1 interesting factor, 4 treatments (α, β, χ, δ)

Each interesting treatment 1 time both per row and column

U1 \ U2	VS	S	L	VL
U1.1	Aα	Bβ	Cχ	Dδ
U1.2	Dδ	Aα	Bβ	Cχ
U1.3	Cχ	Dδ	Aα	Bβ
U1.4	Bβ	Cχ	Dδ	Aα

U3

U3: {A, B, C, D}

GRECO-LATIN SQUARE

4 alternatives for each of the undesired # 4 factors

1 interesting factor, 4 treatments (α, β, χ, δ)

U2 / U1	VS	S	L	VL
$U1_1$	aAα	bBβ	cCχ	dDδ
$U1_2$	bCδ	aDα	dAβ	cBχ
$U1_3$	cDχ	dCδ	aBα	bAβ
$U1_4$	bDβ	cAχ	bDδ	aCα

?

U3U4

4 undesired factors; 4 alternatives for each of such factors

1 interesting factor, 4 treatments (α, β, χ, δ)

U1 \ U2	VS	S	L	VL
T1	aAα	bBβ	cCχ	dDδ
T2	dDδ	aAα	bBβ	cCχ
T3	cCχ	dDδ	aAα	bBβ
T4	bBβ	cCχ	dDδ	aAα

?

U3U4

4 alternatives for each of the undesired # 4 factors

Each treatment & each alternative 1 time both per row and column, and each couple of alternatives 1 time

1 interesting factor, 4 treatments (α, β, χ, δ)

U1 \ U2	VS	S	L	VL
$U1_1$	$X_1Y_1\alpha$	$X_2Y_2\beta$	$X_3Y_3\chi$	$X_4Y_4\delta$
$U1_2$	$X_2Y_3\delta$	$X_1Y_4\alpha$	$X_4Y_1\beta$	$X_3Y_2\chi$
$U1_3$	$X_3Y_4\chi$	$X_4Y_3\delta$	$X_1Y_2\alpha$	$X_2Y_1\beta$
$U1_4$	$X_2Y_2\beta$	$X_3Y_1\chi$	$X_2Y_4\delta$	$X_1Y_3\alpha$

U3U4

HYPER-GRECO-LATIN SQUARE

4 alternatives for each of the undesired # 4 factors

1 interesting factor, 4 treatments (α, β, χ, δ)

Each treatment & each alternative 1 time both per row and column, and each couple of alternatives 1 time

U1 \ U2	VS	S	L	VL
$U1_1$	$aA\alpha$	$bB\beta$	$cC\chi$	$dD\delta$
$U1_2$	$bC\delta$	$aD\alpha$	$dA\beta$	$cB\chi$
$U1_3$	$cD\chi$	$dC\delta$	$aB\alpha$	$bA\beta$
$U1_4$	$bB\beta$	$cA\chi$	$bD\delta$	$aC\alpha$

U3U4

HYPER-GRECO-LATIN SQUARE

Incomplete block design

4 treatments for the desired factor and 1 blocking variable

Factor / Block	A	B	C	D
1	X	X	X	
2	X	X		X
3	X		X	X
4		X	X	X

4 blocks, 12 experiments: each pair of treatments occur the same number of times in the blocks.