

4

I. Basic Between Subjects Designs

B. Between Subjects designs versus a grouping variable

Examples:
males versus females
kindergarten versus second graders

5

I. Basic Between Subjects Designs

C. Multiple levels of the independent variable

- 2 levels: free versus cued recall
- 3 levels: free, cued, and recognition test

The independent variable (type of test) can have several values.

6

I. Basic Between Subjects Designs

D. Multiple levels versus multivariate designs.

Multiple levels of the **same independent variable** (type of test). Only one dependent variable (number of words recalled.)

Multivariate: more than one **dependent variable** is recorded (e.g., number of words recalled and rate of recall)

7

II. Between Subjects Factorial Designs

A. Definition: when more than one independent variable is evaluated in an experimental design. Each level of each independent variable is combined with each of the levels of the other independent variables.

Note: only one dependent variable

8

II. Between Subjects Factorial Designs

B. Example:

Independent variable 1:
type of test (cued recall or free recall)

Independent variable 2:
category size (1 or 4 items per-category)

9

II. Between Subjects Factorial Designs

C. Representation of the design:

Factor A (first independent variable)
Type of test:
A₁ = free recall
A₂ = cued recall

10

II. Between Subjects Factorial Designs

C. Representation of the design (cont)

Factor B (second independent variable)

Category Size

$B_1 = 1$ item-per category

$B_2 = 4$ items-per category

11

Representation of the design

		Number of Words Per category	
		1	4
Type of Test	Free	A_1B_1	A_2B_1
	Cued	A_1B_2	A_2B_2

2 X 2 Between Subject Factorial

12

D. Interpreting the Outcomes of Factorial Designs

		Number of Words Per category	
		1	4
Type of Test	Free	10	10
	Cued	20	20

E. Example

Bower, Gilligan, & Monteiro (1981)

Method: participants hypnotized to induce either a happy or a sad (depressed) state

Read a story about two characters:

Andre (happy things happened to him)

Jack (sad things happened to him)

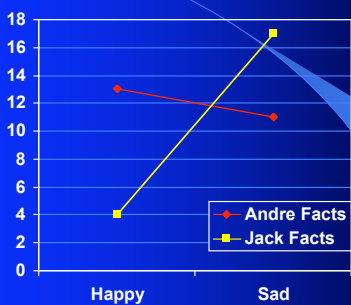
Then, they were asked to recall the story

Bower, Gilligan, & Monteiro (1981)

Mood of Subject

Happy Sad

		Happy	Sad	
Story Facts	Andre (happy)	13	11	12
	Jack (sad)	4	17	10.5
		8.5	14	



F. Three Factors

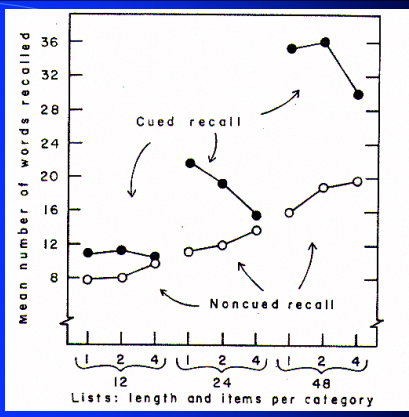
Tulving and Pearlstone (1966)

Factor A: Type of Test (free vs. cued)

Factor B: Category Size (1, 2, 4)

Factor C: List Length (12, 24, 48)

2 X 3 X 3 Factorial Design!



G. Advantages of Factorial Designs

1. Uses fewer subjects than separate experiments
2. Avoids between experiment comparisons
 - selection confound
 - cohort effects

H. Disadvantages

1. Large designs require a large number of participants
2. Between subjects design lack statistical power
3. Researchers must address selection issue (e.g., random assignment to treatments)

III. Within Subjects Designs

A. Definition:

Each research participants provides data for all the levels of the independent variable.

Example: Stroop Effect demonstration

Independent variable: counting +’s
counting numbers

III. Within Subjects Designs

B. Multiple levels versus multivariate designs.

You can measure the subjects repeatedly on the same dependent variable (i.e., univariate) under different conditions.

Example: reading time

III. Within Subjects Designs

C. Also referred to as:

Repeated Measures designs

Split-Plot designs (agriculture)

III. Within Subjects Designs

D. Advantages of within-subjects designs

1. Holds subject variables constant

2. Increases statistical power by reducing random variation

D. Advantages of within-subjects designs

3. Reduces the number of subjects needed:

2 X 2 Between Ss Design

n=20	n=20
n=20	n=20

2 X 2 Within Ss Design

n=20	n=20
n=20	n=20

25

E. Disadvantages of the Within Subjects Design

Introduces several potential threats to validity:

1. Imitation (lasting effects of) treatments
2. Maturation and other time sensitive effects (e.g., fatigue)
3. Testing effects.

26

I.V. Mixed Designs

A. Definition:

Multifactor experiments in which some of the independent variables are manipulated between subjects, whereas some of the independent variables are manipulated within subjects.

More common than you can imagine!

27

I.V. Mixed Designs

B. Classic Example of a Mixed Design: (Weinstock, 1954)

Subjects: Rats, L-shaped runway

Four groups: 30, 50, 80, 100 % reward

Each groups given 75 training trials.

Then, all groups put on extinction (no reward)

Running speed measured for 20 extinction trials.

(Weinstock, 1954)

Experimental Design:

4 (Schedules of reinforcement) between subjects

X 20 (trials) repeated measures

	Trials																				
Schedule	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
30																					
50																					
80																					
100																					

