Experimental design

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Variables

- Independent variable
- Dependent variable

Independent variable = explanatory variable, predictor variable

Dependent variable = response variable

- The independent variable must have at least two levels (= conditions)
- The dependent variable must allow for at least two different types of responses

Example 1

Subjects are given two types of constructions and are asked to decide whether the given sentence is grammatical:

(1)	a.	I gave it him.	Construction 1
	b.	I gave the book her.	
	c.	…	
(2)	a.	I gave it to him .	Construction 2
	b.	I gave the note to her .	
	c.	…	

Example 1

IV (two conditions)	DV (forced choice task)
Construction 1 Construction 2	a. grammatical b. ungrammatical

Example 2

Subjects are asked to complete copular sentences with a relative clause. The predicate nominals of the copular clauses belong to three different semantic types: (1) animate/human (2) inanimate/object (3) place.

(1) This is the man __
(2) This is the ball __
(3) This is the place __

Example 2

Subject's responses can be divided into five different types:

(1)	This is the man …	who talked to Jane. who I met. whom I gave the book. to whom she went. whose cat died.

Example 2

IV	DV
1. This is the man __ 2. This is the ball __ 3. This is the place __	a. SUBJ relative clause b. DO relative clause c. IO relative clause d. OBL relative clause e. GEN relative clause

Example 2

IV	DV
1. This is the man __ 2. This is the thing __ 3. This is the place __	a. SUBJ relative clause b. DO relative clause c. IO relative clause d. OBL relative clause e. GEN relative clause
1. I saw the man __ 2. I saw the thing __ 3. I saw the place __	

Data types

- Nominal data
- Ordinal data
- Interval data

Different data types in linguistic research:

- Nominal data: case, gender, types of RCs
- Ordinal data: ??? -> in experiments
- Interval data: length of utterance (measured in msc)

Categorical data: Any variable including a meaningful category

Categorical data can be nominal or ordinal

Confounding variable

(1) This is the man who talked to the woman.

(2) This is the woman who the man talked to.

(3) This is the woman who I talked to.

Confounding variable

Control: Keep the confound constant!

1. Only lexical NPs
2. Equal number of lexical and pronominal NPs in both conditions

Related and independent design

- Within subjects design – related design – repeated measures design
- Between subjects design – unrelated design – independent design

Related and independent design

Advantages of a within subject design:

- Reduction of inter-individual differences
- Fewer subjects

Disadvantages of a within subject design:

- Subjects recognize the purpose of the study.
- Subjects get tired, frustrated, excited.
- Subjects get habituated to the task.

Differential test and correlational analysis

Advantages of a within subject design:

- Correlational analysis (observational statistics)
- Differential test (inferential statistics)

Correlational procedures	Differential tests
Pearson	T-test
Kendell‘s tau	ANOVA