

9.63 Laboratory in Cognitive Science

Fall 2005

Lecture 4a

Factorial Design:
Interaction

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Factorial Design

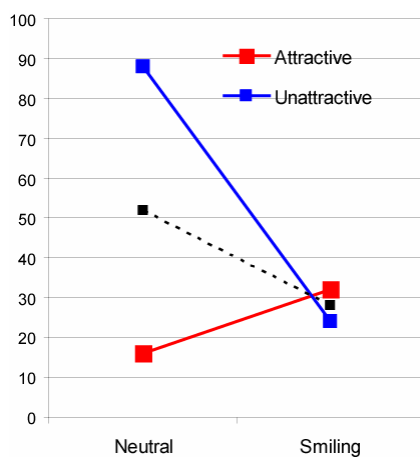
- Two or more factors in such a way that all the possible combinations of selected values of each variable are used
- Simplest case: a 2 x 2 design

Effect of Attraction x Emotion Project 2 😊

- How can the physical characteristics of a person influence judgments of how guilty you think a person is?
- Factor (Independent V.) 1 Attractiveness: Attractive vs. Unattractive
- Factor (Independent V.) 2 facial expression: neutral vs. smiling
- How many groups of faces do you need?
- Which ones?

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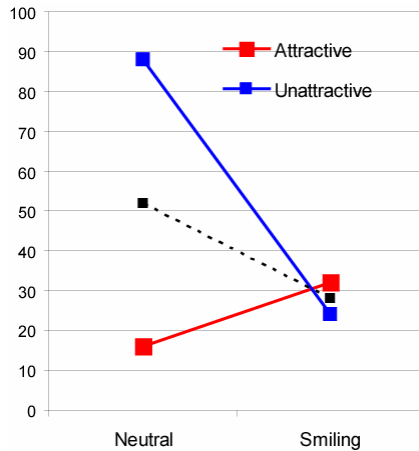
Effect of Attraction x Emotion: Possible outcomes



- Interpretation?
- Blue line?
- Red line ?
- Dark dashed line?

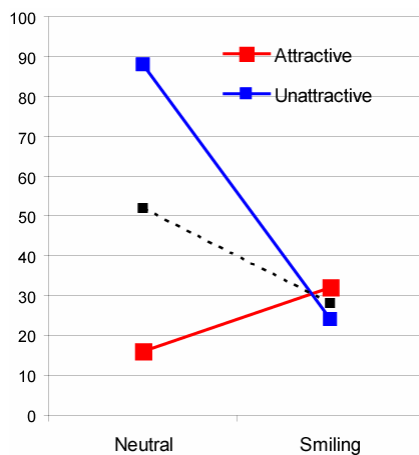
- What's missing from the graph?
- Lines graph: is this correct?

Effect of Attraction x Emotion: Possible outcomes



- Main effect (effect of one factor, averaged over all levels of the other factor): What is the effect of the facial expression?
- Interaction: when the effect of one factor depends on the level of the other factor
- Smiling reduces judgments of guiltiness is true only for the unattractive faces

Effect of Attraction x Emotion: Possible outcomes



- Conclusion:
- An unattractive face is judged less guilty if it is smiling, but
- an attractive face is judge less guilty if it has a neutral expression.

Interaction effects: Implicit and Explicit memory tests

- **Textbook: chapter 12: pages 200-303**
- Background:
- Explicit memory measures are those that require a person to consciously recollect the materials that she/he studied during an earlier part of the experiment
- Implicit memory test: tasks that can be performed without specific reference to the previous experiences in the lab.

Recall Tasks

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Recognition Tasks

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Implicit Memory Tests

- (1) The word fragment completion task .
complete the letters by the first word that comes
to mind
(e.g. _ l _ p _ a _ t)

 - (2) The word stem completion test: e.g.
ele_____
- Complete the stem with the first word that comes
to mind

Word completion study

- The facilitation to supply the missing information is called priming
- Fragments of words can be from new words or words previously seen. Subjects are not told that some words might have been in the initial list (this is an implicit memory test).
- Priming for fragments completion does not lessen over time (hours vs. days)
- But performance in a recognition task (explicit test) does decrease over time

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Amnesia

- Amnesia: deficits in memory as a function of brain damage, disease or psychological trauma
- Amnesia can involve either the inability to learn new things or a loss of previous knowledge, or both
- Amnesia can differentially affect short-term/working memory and long term memory abilities
- Amnesia types and the type of memory tests can show all types of interaction between 2 variables

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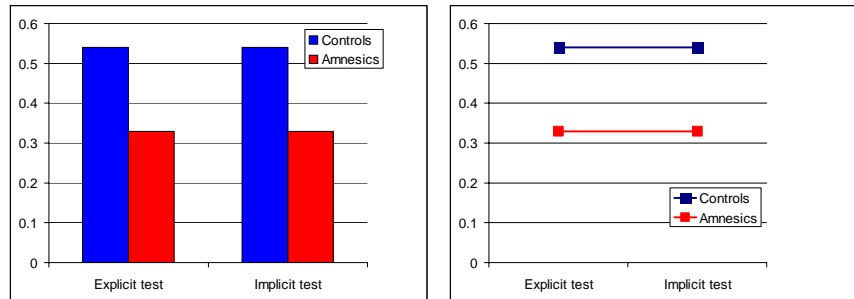
Amnesia

- Retrograde amnesia
 - Impairment of memories before onset
(lost of memory for events prior to whatever trauma)
- Anterograde amnesia
 - Impairment of memories after onset
(difficulty in remembering events after the trauma)
 - Patient H.M.
 - Movie: *Memento*

Interaction

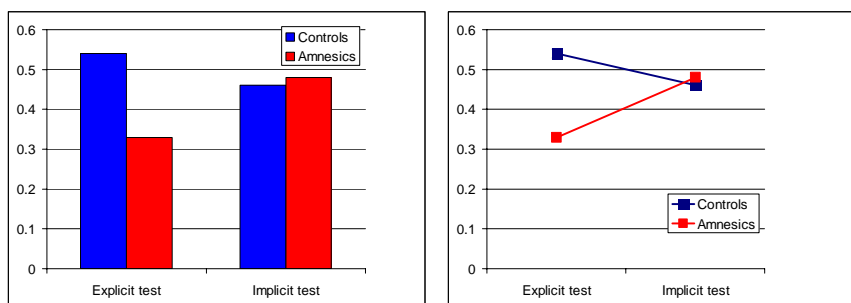
- Goal: In an experiment, you compare the explicit and implicit memory of amnesic and control subjects.
- Experiment design (2 x 2): Amnesic patients and control subjects studied 24 words.
- Factor 1: Group (amnesic vs. control)
- Factor 2: Type of test (memory): implicit (word identification) vs. explicit (free recall)
- Word identification test: subjects saw perceptually degraded word (pieces of each letter were obliterated) and were instructed to name the word (measure of priming)
- Dependent variables: Proportion correct

Interaction A



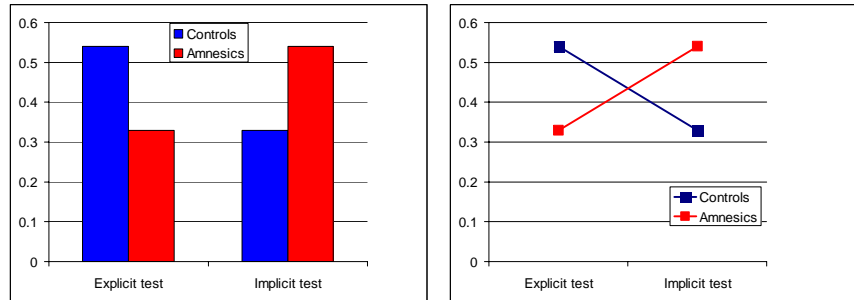
There is no interaction between the variables.
Main effect of types of subjects: the control group perform better than the amnesics on both the explicit and implicit tests.

Interaction B



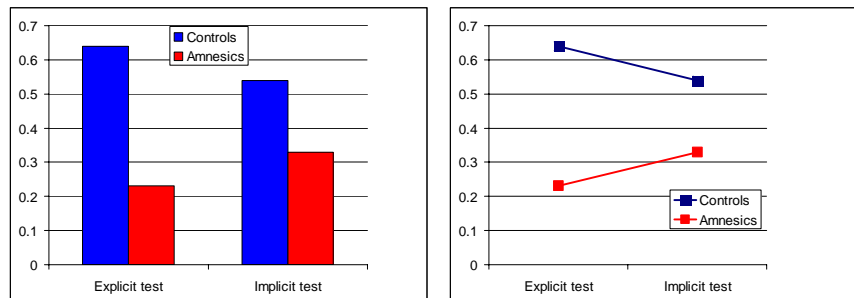
Interaction: controls performed better than amnesics on the explicit free recall test. But amnesics perform as well as controls on the implicit test.
The difference between amnesic and control group disappears when memory is measured implicitly.
-> the effect of one independent variable (presence or absence of a memory deficit) changes depending on the level of the other independent variable (test type)

Interaction C



A cross over interaction: the control show better memory than amnesics on the explicit test. But the amnesics show better memory than the controls on the implicit test.

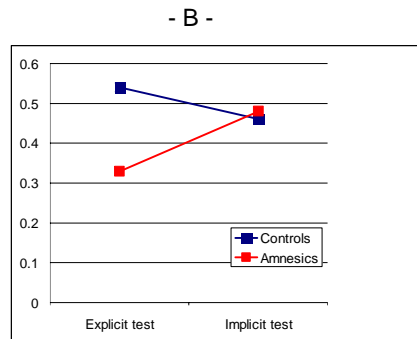
Interaction D



Interaction: the amnesic deficit is more pronounced on the explicit test than on the implicit test. Although control subjects performed substantially better than amnesics on the implicit test, the superiority of control's memory to amnesics' memory is even greater on the explicit test. These data would suggest that the implicit test is a less sensitive measure of amnesic deficits than is the explicit test.

Amnesia and Memory Warrington & Weiskrantz

Interpretation: Although amnesic perform poorly on the explicit recall test, the amount of priming they showed on the word fragment recognition task was identical to performances of normal subjects.
Conclusion: the amnesic's problem seems to lie in gaining conscious access to these stored experiences.



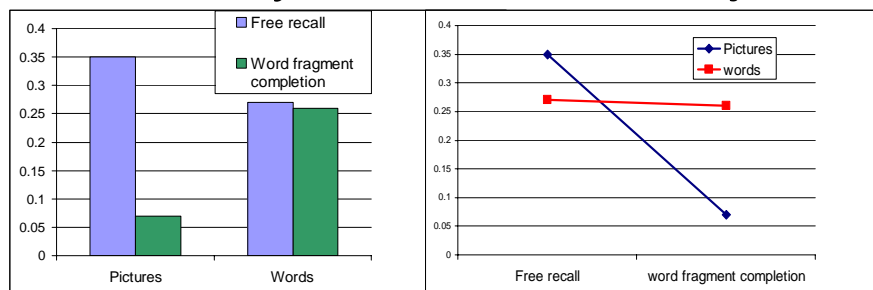
Memory and Normal subjects

- Weldon and Roediger (1987) studied the picture superiority effect, the finding that pictures are remembered better than words.
- (Theory) this effect of pictures has typically only been studied with explicit memory test (recall and recognition).
- Here the authors wanted to extend the study to implicit tests
- Hypothesis: The picture superiority effect would not be found on implicit tests

Memory and Normal subjects

- College students studied along series of pictures and of words in anticipation of a later memory test.
- There were three sets of items: subjects studies one set as pictures and one set as words and did not study the third set.
- The items sets were counterbalanced across subjects, so that if subjects in one group saw a picture of an elephant, those in another group saw the word elephant, and those in a third group did not see the item in neither form.
- After studying the words and pictures, subjects took either an explicit free recall test or an implicit word fragment completion test.
- In the free recall test, subjects were given a blank sheet of paper and asked to recall the names of the pictures and words as well as possible.
- In the word fragment completion test, subjects were given a series of fragmented words (e.g. _l_p_a_t) and told to complete each one with a word. Here the measure of interest was priming – the advantage in completing a fragment when its prior presentation was either a picture or a word, relative to the case when neither form has been studied.

Memory and Normal subjects



- Is there a main effect of mode of presentation ? (pictures vs. words)
- Is there a main effect of type of tasks? (free recall vs. word completion)
- Is there an interaction?

There is an interaction (crossover interaction) between explicit and implicit retention in normal subjects. Words produced more priming than pictures on the implicit word fragment completion test.