An investigation of the assimilation effect, the contrast effect, and autocorrelation in within-subject experimentation

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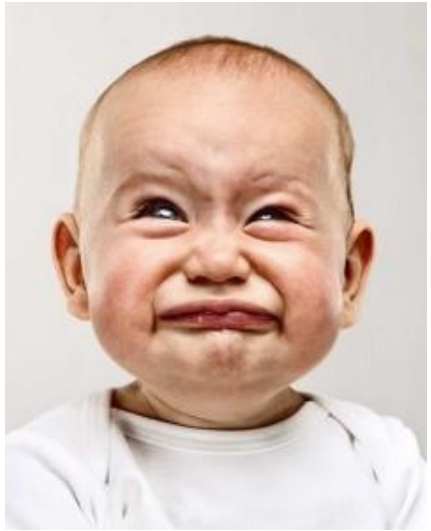
1. Introduction

- Compared with experiments in engineering and other fields, psychological experiments are considered "nosier" due to the presence of human factors.
- The assimilation effect and the contrast effect are two well-known carry-over effects that could bias participants' judgments when they are asked to rate their experiences after receiving multiple treatments or stimuli in a within-subject experiment.



2. Contrast effect

- The contrast effect might produce a bias as a result of a negative correlation between the two. For example, after eating a dish cooked by me, you would give a high rating to MacDonald or Burger King.

3. Assimilation effect

- The assimilation effect might happen due to a positive correlation between the present and the previous experiences
- e.g. after trying a Macbook Pro, you would give a very high rating to Mac Air)

Macbook Air Macbook Pro

4. Remedies

- Findings from numerous studies conducted in experimental psychology, social psychology, political science, and consumer research on these two contradictory effects are too diverse to form a consensus.
- Various remedies, such as random assignment of treatment/stimuli order and the cross-over design, have been proposed.

	Period1	Period 2	Period 3
Subject 1	Treatment A	Treatment B	Treatment C
Subject 2	Treatment A	Treatment C	Treatment B
Subject 3	Treatment B	Treatment A	Treatment C
Subject 4	Treatment B	Treatment C	Treatment B
Subject 5	Treatment C	Treatment A	Treatment B
Subject 6	Treatment C	Treatment B	Treatment A

5. Remedies

- Random assignment of the sequence is not a viable option in some psychological experiments because certain conceptually related entities must be presented in a sequence.
- As a compromise related treatments/stimuli can be grouped as a testlet, and only two or several testlets are presented in a cross-over fashion.

6. Literature Review

- Douglas & Gutierres (1980)
- In the first study 81 male students were asked to rate a photo of an average woman after watching a TV show whose main characters were three very beautiful females, These subjects rated the target female as significantly less attractive than did a comparable control group.
- Two other studies with 146 undergraduates demonstrated corresponding effects in a more controlled setting.

7. Literature Review

- Wedell, Parducci & Geiselman (1987)
- In the first Experiment, faces were presented individually. The same face elicited higher ratings when less attractive faces predominated in the experimental series: successive contrast.
- In the second Experiment, two faces were presented side by side. The same face yielded lower ratings when presented concurrently with a less attractive face: simultaneous assimilation.

8. Literature Review

- Rodway, Schepman & Lambert (2013)
- The middle position influenced the perceived attractiveness of the target face. Attractive faces were perceived as less attractive when being inserted in the middle of unattractive or average faces.
- Conversely, unattractive faces were perceived as more attractive when being placed in the middle of other unattractive faces.
- It suggests that the more central a stimulus is in a context, the greater the influence of the context on the judgment of that stimulus.

9. Literature Review

- Yeates, Cardell, Byrne, & Eva (2015)
- Participants were presented with identical videos of good, borderline, and poor performances by first-year doctors in different sequences.
- When a good performance was preceded by a poor performance, ratings were higher than when observation of the good performance was. Borderline performance was rated lower when preceded by good performance.
- The magnitude of contrast effects is determined by an averaging of recent experiences.

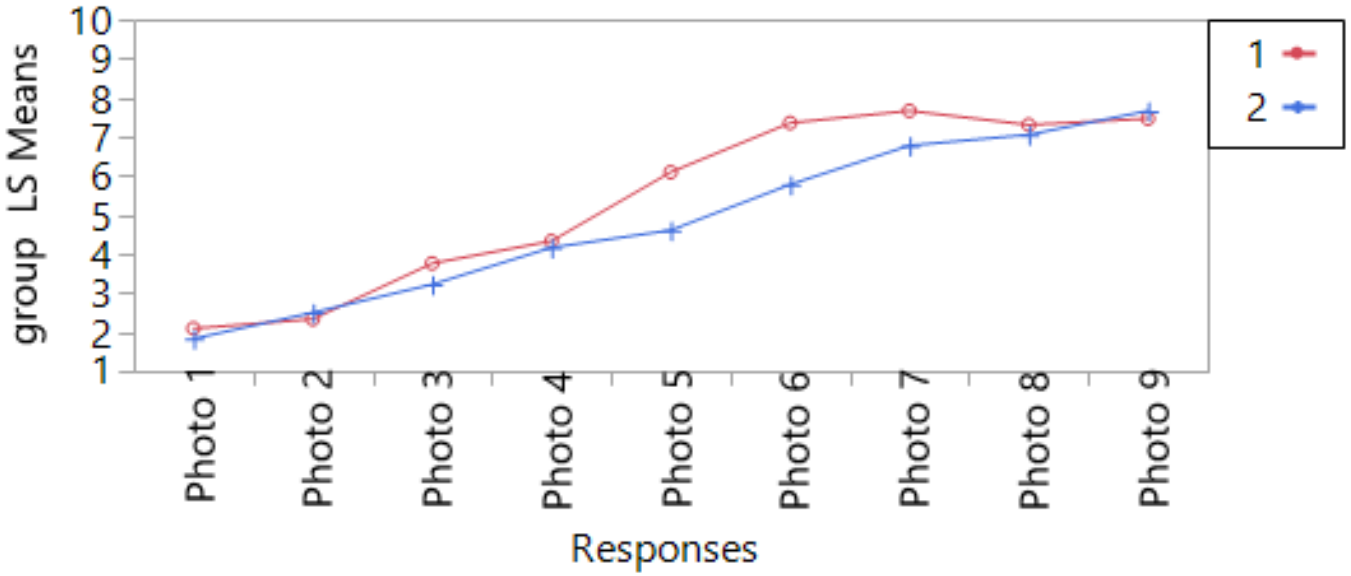
10. Method

- 39 university students in four classes were split into to two groups to examine the influence of different carry-over effects on ratings of attractiveness.
- Nine photographs were presented to participants in a cross-over fashion that included: four oddly dressed females, four beautiful females, and one average female.
- Group 1 looked at the oddly dressed females first, then the average female, and the beautiful females last.
- Group 2 looked at the photos in a reversed sequence.

11. Results

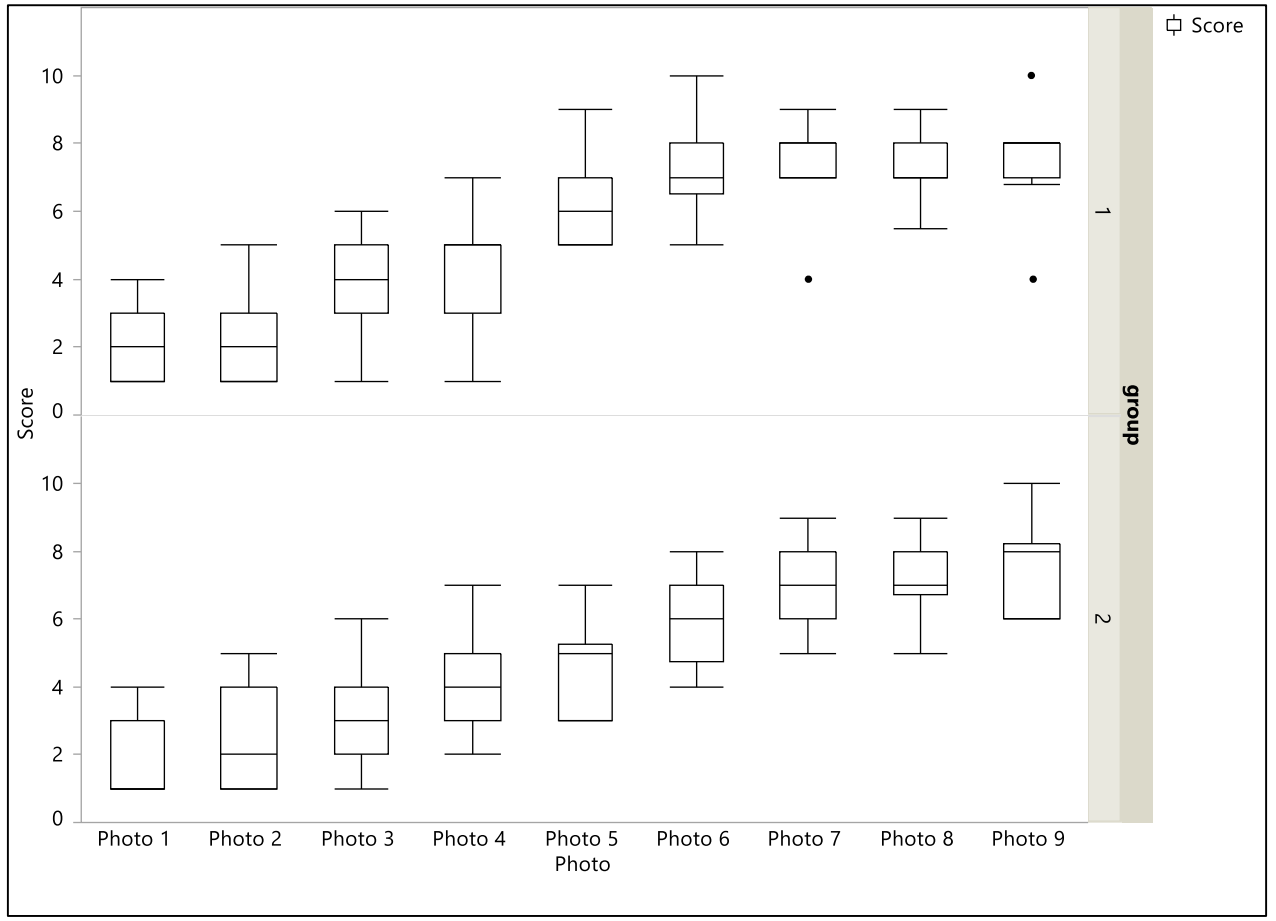
- Group effect is significant; $F(1, 37) = 5.10$, $p = 0.0299$
- Order effect is significant; $F(8, 30) = 62.37$, $p < .0001$
- Order * group interaction effect is significant; $F(8, 30) = 4.18$, $p = 0.0019$

12. Results



- Neither the hypothesis of assimilation effect nor that of contrast effect was supported by the data.
- The least-square mean plot indicates that
  - in Group 1 an upward trend in ratings was present, but scores went down near the end.
  - in Group 2 an overall downward trend was observed.

13. Box plot


Score
10
8
6
4
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10
8
6
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2
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Score
group
1
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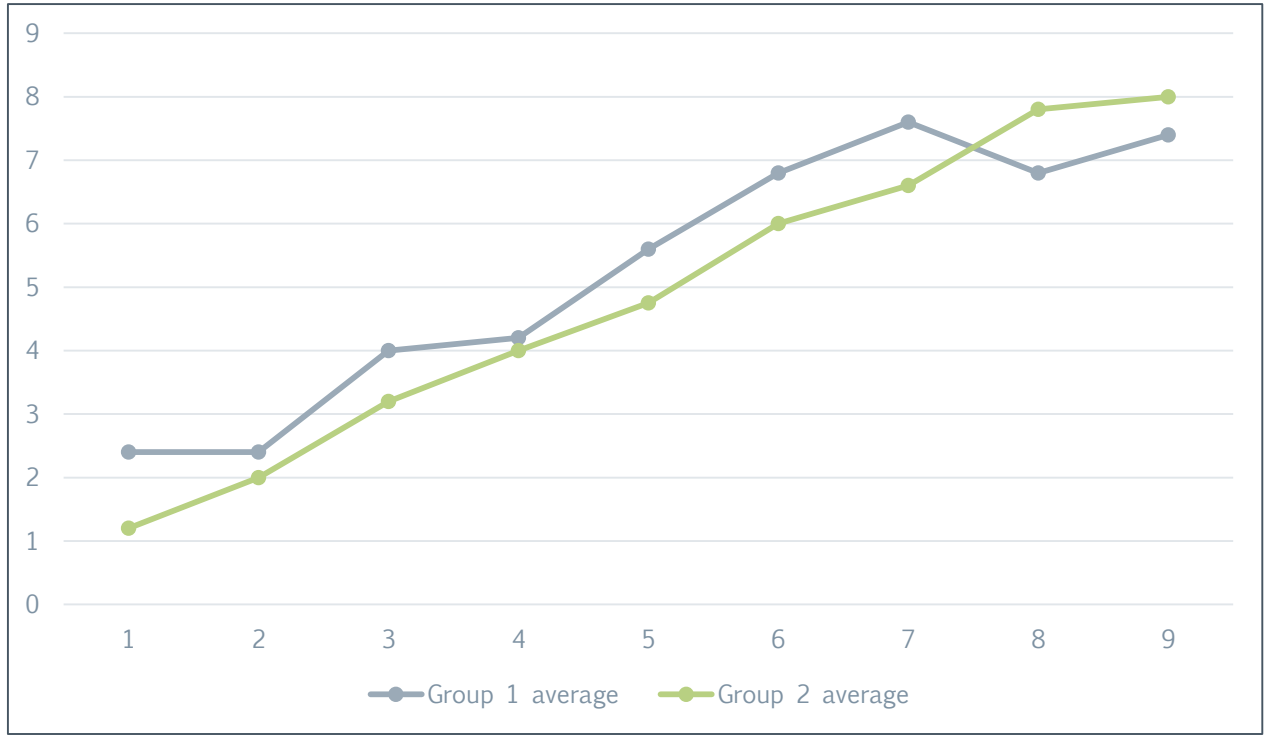
Photo 1
Photo 2
Photo 3
Photo 4
Photo 5
Photo 6
Photo 7
Photo 8
Photo 9
Photo

14. 2015 Fall evening class

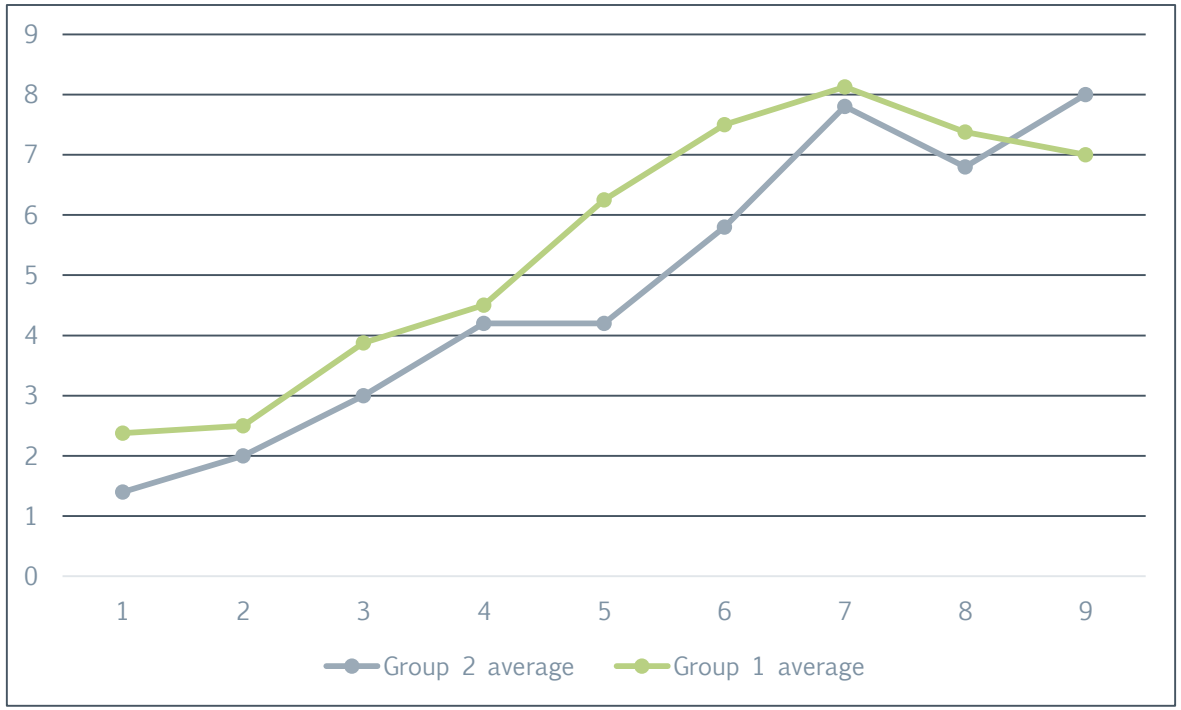


- The data were collected in four different classes at different times. Each class is independent from each other.
- The pattern is consistent across all four classes.

15. 2015 Fall semester afternoon class

› In Group 1 the average rating has a sharp drop in Photo 7 and then rises again.

16. 2015 Spring semester class



› This has a similar pattern: Both group ratings peak at Photo 7 and then drop near the end.

17. 2015 Summer class

› The same pattern is found. Some students said that they felt their scores are too high and thus scaled back.

18. Qualitative response

- According to some students, the sequence implicitly suggested that the images would get better and better, and therefore their ratings are getting higher and higher.
- Some said that they didn't want to give an extremely low score when they saw the first oddly dressed image because they didn't want to offend anyone.
- Some said they didn't want to want to give a very high score to the first beautiful woman because they didn't know whether more attractive women might show up later and would like to reverse the highest score to the best.

19. Limitation

- Repeated measures GLM is limited by parametric assumptions, such as compound symmetry.
- But the current sample size is insufficient for running mixed modeling.
- The sample is not diverse. All are young college students. Generalization is limited.

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