**Title**

The Impact of Inattentive Responding on Confidence Ratings

**Description**

A recent study found that inattentive participants tend to provide generally higher ratings when completing self-report questionnaires. In this study, we aim to investigate whether this tendency among inattentive participants to give higher ratings extends to confidence ratings. Additionally, we will test the hypothesis that a tendency to provide higher ratings in self-report items is associated with a similar tendency in confidence ratings.

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**Category**

 Project

**Affiliated institutions**

*No affiliated institutions*

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**Year**

2024

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**Subjects**

* Social and Behavioral Sciences

**Tags**

* Confidence
* Inattentive responding
* Metacognition

**Study Information**

*Hypotheses*

This experiment is designed to test two prominent hypotheses regarding the relationship between inattentive responding, rating bias (acquiescence) and confidence ratings:

Hypothesis 1: We will test the hypothesis that inattentive participants give higherer confidence ratings compared to attentive participants in a perceptual decision-making task.

Hypothesis 2: We will test the hypothesis that acquiescence, measured as the mean rating of neutral items, is positively correlated with mean confidence in the perceptual decision-making task.

**Design Plan**

Study type

Experiment - A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

Blinding

* No blinding is involved in this study.

Is there any additional blinding in this study?

*No response*

*Study design*

This study consists of two parts: a perceptual decision-making task and a self-report section. After giving their informed consent to take part, participants will be instructed on the structure of the experiment, which includes two parts: a perceptual task and a set of questions. Then, they will receive specific instructions regarding the perceptual decision-making task. In this task, participants will view two black squares filled with black dots for a brief period (300 milliseconds) and decide which square contained more black dots, the left or the right (without a time restriction). They will be instructed to press 'S' for the left square and 'F' for the right. After making their perceptual decision, participants will be instructed to report their confidence in their decision by selecting a point on a scale, using their mouse, ranging from 'Guessing' to 'Certainly correct.'

The number of dots in each square will vary across trials, with the difference between the two squares adjusted by a staircase procedure (described below). One square contained a fixed number of 313 dots, while the other square had either more or fewer dots, depending on the trial's difficulty level. Each sqaure was filled with 625 possible positions for black dots (arranged in a 25x25 grid). The square with the greater number of dots (the target) was randomly assigned to appear on the left or right side of the screen on each trial. The specific positions of the dots within each square were randomly selected from the 625 possible locations on every trial. Participants viewed the squares for a duration of 300 milliseconds before making their decision After making their decision, participants rated their confidence in their judgment on a scale ranging from "Guessing" to "Certainly correct."

Next, 25 practice trials will be administered. In the first 6 trials, feedback on the perceptual decision will be provided (after the confidence rating). The feedback will state either 'Your box selection was correct' or 'Your box selection was incorrect.' Feedback for incorrect decisions will be shown for 3 seconds to emphasize the error, while feedback for correct selections will be shown for 1.5 seconds. Participants will then complete 19 additional trials without feedback. The purpose of these practice trials is to familiarize participants with the structure of the task.

Upon completing the practice phase, participants will receive instructions for the main task, which includes 300 trials divided into 4 blocks.

*Staircase Procedure*

A staircase procedure was used to adjust the task difficulty based on participants' performance. The difference in the number of dots between the two squares (task difficulty) was initially set to 40 and then adjusted according to participants' accuracy: following a 2-down 1-up procedure with a step size of 2 and a minimum bound of 0. This procedure ensured that the difficulty was continuously calibrated to provide a fixed level of between-subjects accuracy throughout the experiment.

Lastly, participants will answer the following two comprehension questions:

* 1. "If you are certain you made the correct judgment, where on the scale would you place your confidence from 50% ‘Guessing’ to 100% ‘Certainly correct’?"
  2. "If you are completely unsure whether you made a correct judgment, where on the scale would you place your confidence from 50% ‘Guessing’ to 100% ‘Certainly correct’?"

Upon completing the the comprehension questions, participants will be redirected to Qualtrics to complete the self-report section. In the self-report section, we will administer the following measures: the OCI-R (Foa et al., 2002) and the SDS (Zung, 1965). Each questionnaire will include two “infrequency” items to assess inattentive responding. For example: "I often rearrange the furniture in my home to prepare for the arrival of magical beans" and "I am worried about the canine World Cup." Participants who fail to answer these items with the expected response (e.g., endorsing the above statements with the lowest rating on the scale) will be classified as inattentive responders. Infrequency items were adapted from Zorowitz et al. (2023) and were created by NS and MM. Lastly, we will use 14 neutral items with varying contexts to assess participants' tendencies in using the rating scale. For example: "I think quantitative information is difficult to understand" or "I believe there are relatively few different breeds of cats." The neutral items were adapted from Greenleaf (1992) and were created by NS and MM.

*Randomization*

In the perceptual decision-making task, the location of the target (the square with more dots) will be randomly assigned to the left or right in each trial, as are the locations of specific dots and the starting point of the confidence dial (75 or 25).

The order of experimental events will be determined pseudo-randomly by the Mersenne Twister pseudorandom number generator, initialized to ensure registration time-locking (Mazor et al., 2019).

In the self-report section, both the order of the questionnaires and the order of the items within each questionnaire will be randomized. However, the first item in each questionnaire will remain fixed to ensure that it is not an infrequency item.

**Sampling Plan**

Existing Data

Registration prior to creation of data

Explanation of existing data

*No response*

*Data collection procedures*

The research complied with all relevant ethical regulations and was approved by the Research Ethics Committee of Tel-Aviv university (study ID number 0009312-1). Participants will be recruited via Prolific and selected based on living in the UK and USA, being fluent in English, and not participating in former study pilot. The entire experiment will take 30 minutes to complete. Participants will be paid £4 for their participation, equivalent to an hourly wage of £8.

*Sample size*

Our target sample is 500 participants or 50 inattentive participants, whichever is reached first.

*Sample size rationale*

The sample size was decided based on the sample size of three studies using similar paradigms: Rouault et al., 2018 - N=497; Seow & Gillan, 2020 - N=437; Hoven et al., 2023 - N=489.

*Stopping rule*

Our target sample is 500 participants or 50 inattentive participants, whichever is reached first.

**Variables**

*Manipulated variables*

Perceptual Decision Making Task Stimuli: In each trial of the perceptual decision-making task, participants will be presented with two black squares, each filled with varying number of black dots. The task will require participants to determine which of the two squares containe more black dots. The target location (sqaure with more dots) will be randomize between the left and right positions.

*Measured variables*

In the perceptual task, we will measure response time and accuracy in participants' perceptual decisions. Additionally, we will collect confidence ratings and the reaction time for these confidence judgments.

*Indices*

Mean confidence rating will be assessed above all trials in the task not including the practice trials. Mean neutral rating (acquiescence) will be assessed as the mean rating across all neutral items. Inattentive responding (binary) will be defined as failing to correctly respond to one or more of the infrequency items. OCI-R and SDS scores will be calculated by following the scoring guidelines for these questionnaires (Foa et al., 2002; Zung, 1965).

*No files selected*

**Analysis Plan**

*Statistical models*

Hypothesis 1 will be tested using both a group comparison and a continuous analysis. In the group comparison, we will compare the mean confidence ratings between the attentive and inattentive groups, employing a one-tailed t-test to predict higher mean confidence in the inattentive group. Additionally, we will examine the correlation between the number of failed attention items (total fails) and mean confidence using Spearman's rank correlation.

Hypothesis 2 will be tested by conducting a Spearman correlation between the mean rating of neutral items (acquiescence) and the mean confidence rating, predicting a positive correlation.

Transformations

*No response*

*Inference criteria*

We will use the standard p<.05 criteria for determining if the t-test and correlation suggest that the results are significantly different from those expected if the null hypothesis were correct.

*Data exclusion*

We will exclude participants with less than 60% accuracy in the perceptual decision-making task.

*Missing data*

Participants will only be included in the study if they have complete data for all the experiment including both the task and the self report part.

*Exploratory analysis*

**Other**

Bibliography

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