Autologic E3 (#155649)

Author(s)
This pre-registration is currently anonymous to enable blind peer-review.
It has 3 authors.

Pre-registered on: 12/17/2023 06:44 PM (PT)

1) Have any data been collected for this study already?
No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?
Visual scenes and events are often ambiguous. For example, if one among different-looking objects (e.g., a rock or a jewel) is covertly moved into a box, the scene is compatible with multiple interpretations (i.e., the identity of the object in the box is uncertain). In some cases, we can determine which possibility is realistic with a logical inference, for example, if we receive disambiguating evidence that rules out one of the alternatives (e.g., we see that the rock is not inside the box, so we infer that the object inside the box must be the jewel). Previous developmental research has shown that this basic logical inference is spontaneously deployed by infants (Cesana-Arlotti et al., 2018. 2020), suggesting that it does not require the use of logical language, intentional effort, or adult-like working memory resources. In a previous study, we found initial evidence that this logical process may operate spontaneously or automatically in adults. Here, we are testing a control condition to rule out an alternative interpretation of that earlier result. Subjects will be shown similar events used in the infant studies. In all movies, there are two objects (e.g., a snake and a ball). In one block of the trials, one of the objects is scooped by a cup ("scooping" trails); in the other block, the cup does not scoop either of the objects, but it contains a third, half-hidden object from the beginning of the movie ("no-scooping" trials). In every movie, one of the initial two objects (e.g., the snake) will reveal itself outside of the cup, and then the object in the cup will be visually revealed. Half of the time, the revealed object will be the same type of object (e.g., a snake) as the object outside of the cup ("same" trials), and half of the time it will be a different type of object ("different" trials).
On each trial, subjects will be asked simply to report the actual identity of the revealed object, regardless of what events came before. Our main question is whether the logical inference adults can draw in the "scooping" trials will affect the ease with which the adult subjects make these reports, and in particular whether this effect differs from any analogous effect in the "no scooping" trials. If the preceding events bias their responses - even when there is no statistical connection between the preceding events and the outcomes to be reported - this would suggest that logical inferences in the processing of visual events proceed automatically in adults. More specifically, if participants make inferences about the contents of the cup during "scooping" trials, they may answer more quickly in the "different" trials than in the "same" trials. Furthermore, if such an effect reflects an inference, the effect may be absent or reduced in the "no-scooping" trials. Our experiment is primarily concerned with the difference between these two effects.

3) Describe the key dependent variable(s) specifying how they will be measured.
Response time: The time, in milliseconds, between the object being revealed and the subject indicating which object it is.

4) How many and which conditions will participants be assigned to?
There will be four within-subjects conditions and four between-subjects conditions:
Within subjects, there are four conditions comprising a 2x2 factorial design. A trial will either display "scooping" movies (e.g., the cup scoops one of the original two items) or "no-scooping" movies (e.g., the cup contains another item from the beginning of the movie). Secondly, either the object that appears is a different type from the item revealed outside of the cup (e.g., a snake is revealed inside the cup after a ball is seen outside the cup), or the same type (e.g., a snake is revealed inside the cup after a snake is seen outside the cup).
Between subjects, approximately half of the participants will either complete a block of "scooping" trials followed by a block of "no-scooping" trials, or they will complete the "no-scooping" block followed by the "scooping" block. Secondly, the participants will have the '1' key indicate that the object is a snake and the '2' key indicate that the object is a ball, and approximately half of subjects will have them reversed. However, this condition will be collapsed for our analysis.
There are also other factors that vary across trials, including the left-right position of the objects at the beginning of the scene before they are occluded, and which object is revealed to be outside of the cup. These conditions are fully counterbalanced within subjects and collapsed for our analysis.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
We will compute a difference score for the scooping and no-scooping condition, for each participant. Specifically, we will calculate the difference between average response time in the same trials and in the different trials in the scooping condition. We will do the same for the trials in the no-scooping condition.
Then, we will use a paired-difference test to compare these two difference scores. The nature of the test used will depend on whether the data are normally distributed, which we will determine based on a Shapiro-Wilk normality test. If the data are normally distributed, we will use a paired t-test; if they deviate from normality, we will use the Wilcoxon signed rank test. If performance in our task is driven in part by inferences about the contents of the cup, we would expect the "scooping" difference score to be greater than the "no scooping" difference score.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
At the level of entire subjects, we will exclude anyone from whom we receive incomplete data or who answers less than 80% of the trials correctly.

At the level of individual trials, we will exclude trials where the response time is shorter than 200 milliseconds. If a participant does not respond within 2 seconds, the trial will end and they will be prompted to respond faster, so the maximum response time is 2 seconds.

Subjects will each perform 6 attention check trials, which ask for the identity of the revealed object outside of the cup. Subjects with lower than a 66% success rate (i.e., missing more than 2 attention check trials) will be excluded from the sample.

We will also discard the first 4 trials from each subject, treating them as practice trials.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

We will continue to collect data until we reach a sample of 200 participants post-exclusions.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

We will run a three-way mixed factor ANOVA with BlockType (Scooping/NoScooping) and TrialType (Same/Different) as within-subjects factors and BlocksOrder (ScoopingFirst vs NoScoopingFirst) to explore the effect of the order of the blocks.