Autologic E2 (#144557)

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

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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 running 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) and a cup which contains a third, half-hidden object. In every movie, the two initial objects are occluded and 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 repeated appearance of the same object type will affect the ease with which the adult subjects make these reports. If the feature repetition between the two sequentially revealed objects is sufficient to interfere with object recognition, participants will answer more quickly on "different" trials than on "same" trials. On the contrary, if a logical inference – like the one in the example above – is required to interfere with object recognition, participants may not be quicker in the "different" trials.

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 two between-subjects conditions and two within-subjects conditions:

Between subjects, approximately half of subjects 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. Subjects will be randomly assigned to either condition with equal probability, and they will remain in that condition throughout the experiment.

Within subjects, there are two conditions that vary randomly by trial (though this is not explicitly stated to the participant): either the object that appears from the cup is the same type of object as the one previously revealed (e.g., a snake is revealed inside the cup after a snake is seen outside the cup), or is a different type of object (e.g., a snake is revealed inside the cup after a ball is seen outside the cup).

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. However, these conditions are collapsed for the purpose of our analyses.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
We will use a paired-difference test comparing the reaction time for correct responses across the two within-subject conditions: different object type and same object type trials.

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.

We will then conduct a Bayes Factor analysis to test for a null hypothesis that the same object type condition does not interfere with object recognition. We will interpret the evidential strength of the BF analysis based on conventions proposed by Andraszewicz et al. (2015).

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.

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 collect data from 200 subjects, before exclusions.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)
Nothing else to pre-register.