

Autologic E1 (#116246)

Author(s)

This pre-registration is currently anonymous to enable blind peer-review.
It has 2 authors.

Pre-registered on: 12/12/2022 12:45 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 possible interpretations (i.e., the identity of the object in the box is uncertain). In some cases, we can determine which possibility is actual 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, suggesting that it does not require the use of logical language, intentional effort, or adult-like working memory resources.

Here, we ask whether this logical process operates spontaneously or automatically in adults. Subjects will be shown the same events used in the infant studies. In the movies, one of two objects (e.g., a snake or a ball) is scooped by a cup, and then one of the objects (e.g., the snake) is found outside the cup, the infants correctly infer the identity of the hidden object (here, the ball) – the same sequences of events that triggered logical inference in infants; then, the object in the cup will be visually revealed to them. Sometimes, the revealed object will be consistent with the identity predicted by the inference, but sometimes it will be inconsistent. Subjects will be asked simply to report the actual identity of the revealed object, regardless of what events came before. Our question is whether this (in)consistency will affect the ease with which the adult subjects make these reports. 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.

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 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 is "congruent" with the preceding events (e.g., a snake is revealed inside the cup after a ball is seen outside the cup), or "incongruent" (e.g., a snake is revealed inside the cup after a snake 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. Each participant has an average reaction time from their congruent and incongruent trials, and these averages will be compared. (This analysis will collapse over the two between-subject conditions.)

The nature of this test 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.

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.