



# Habituation Effects on Involuntary Cognitions: Evidence from the Reflexive Imagery Task

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## Introduction

The contents of our conscious mind can often seem unpredictable, whimsical and free from external control. Despite these intuitions, previous research utilizing the Reflexive Imagery Task (RIT) has shown that, under certain circumstances, an individual thought can be elicited reliably and unintentionally by external stimuli (Allen et al., 2013).

In the RIT, participants are instructed to not think of the name of an object image that is presented on-screen. However, participants invariably fail at the task and subvocalize the name of the object on the majority of trials.

In the current study, we examined whether the subvocalization effects found in the RIT can be diminished through continuous exposure of the same visually presented object. Participants were shown line drawings of well-known object images and were instructed to not think of the name of the object. Each object was shown in ten consecutive trials to ensure that the object images would be susceptible to habituation.

## Method

**Participants.** San Francisco State University undergraduate students ( $n = 44$ , 32 Females,  $M_{age} = 22.33$ ,  $SD_{Age} = 5.60$ ) participated for course credit.

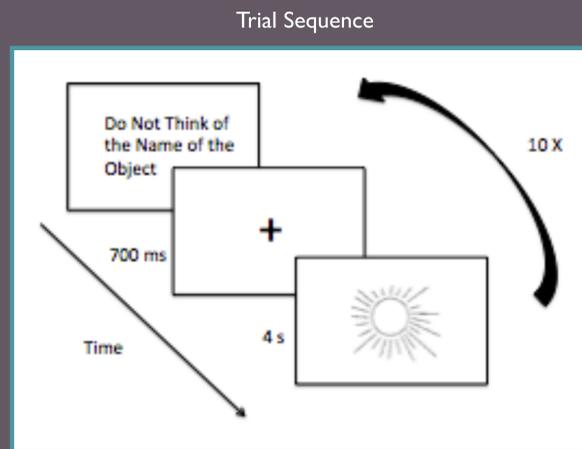
**Stimuli.** The stimuli were black-and-white line drawings of 40 well-known objects that yield high name agreement. The stimuli had been used successfully in previous research (Allen et al., 2013; Morsella & Miozzo, 2002; Snodgrass & Vanderwart, 1980). The stimuli were presented in random order.

**Procedures.** All instructions were presented on the computer screen. Participants were informed that they would be presented with a series of objects and to not think the name of the object presented. If participants did experience subvocalization of the presented object, then they pressed a button to report when the subvocalization occurred.

Each of the 40 objects was presented over a series of ten consecutive trials. Before the presentation of each object, the instruction 'Do Not Think of the Name of the Object' was displayed in the center of the screen. Once participants indicated their readiness, a fixation cross [+] appeared in the center of the screen. Then, the object appeared (4 s). During the presentation of the object, participants indicated by button press when they subvocalized the name of the object.



Sample Visual Objects



## Results

### Proportion

Participants indicated experiencing mental imagery on .45 of the trials ( $SE = .05$ ).

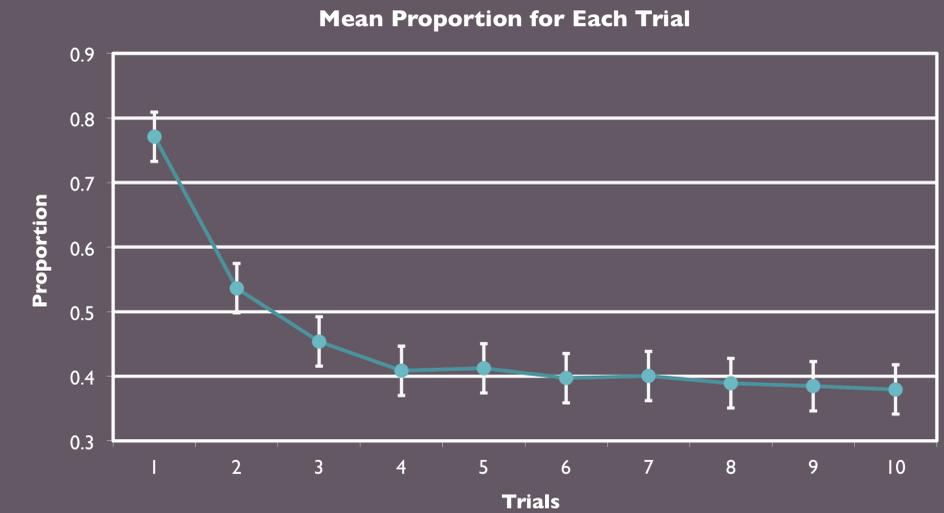
A paired samples  $t$ -test revealed that there was a significant difference between the proportion in the first five trials ( $M = .52$ ,  $SE = .05$ ) and the last five trials ( $M = .39$ ,  $SE = .05$ ),  $t(43) = 8.79$ ,  $p < .001$ .

### Latency

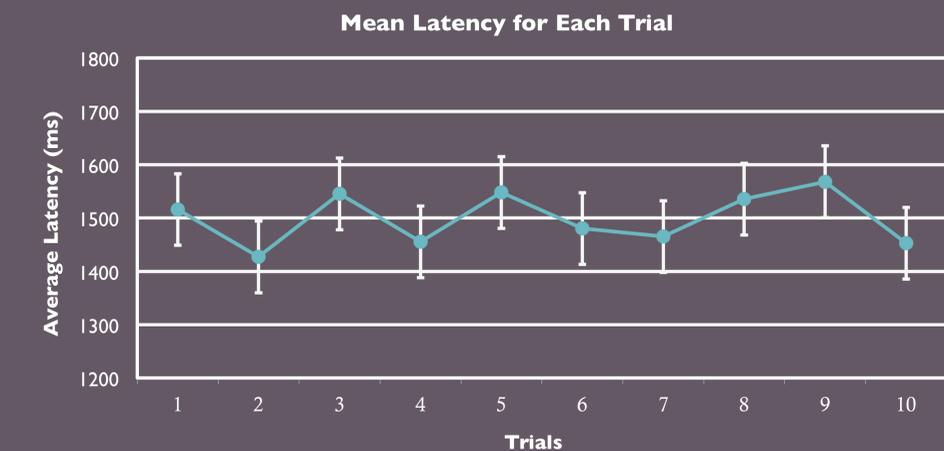
The mean latency for the subvocalizations experienced by the participants was 1,491.59 ms ( $SE = 78.63$ ).

A paired samples  $t$ -test revealed that there was no significant difference in latency between the first five trials ( $M = 1,480.88$ ,  $SE = 73.07$ ) and the last five trials ( $M = 1,559.82$ ,  $SE = 98.23$ ),  $t(43) = -1.73$ ,  $p = .092$ .

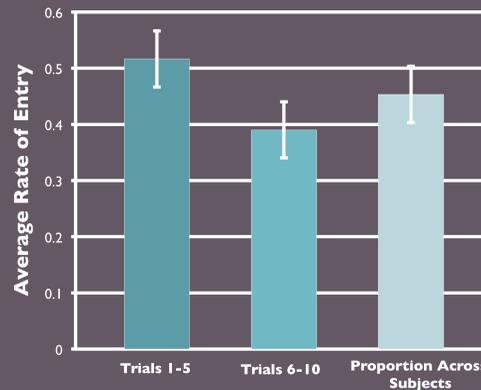
The graph below illustrates the mean proportion of unintentional subvocalizations across the 10 trials in which the same object was shown. Importantly, as trials progressed, participants experienced fewer subvocalizations.



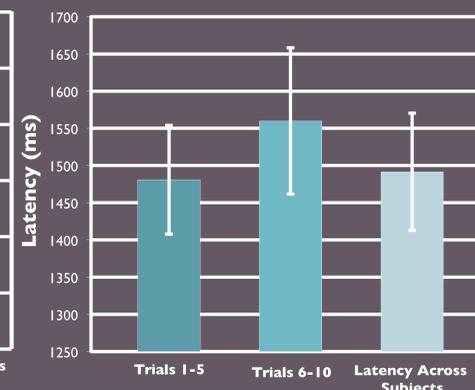
The graph below illustrates the mean latency (when unintended subvocalization occurred) across the 10 trials in which the same object was shown. Even though participants experienced lower rates of entry, the latency of subvocalizations remained consistent.



Proportion of Involuntary Subvocalizations



Latencies of Involuntary Subvocalizations



## Discussion

This study reveals that, in the RIT, habituation can be induced through continuous exposure of the same visual object. As the trials progressed, participants subvocalized the object name less frequently, indicating that the effect observed in the RIT can be diminished systematically.

This study has implications for further understanding cognitive control. More specifically, this study can be utilized to better understand the undesired and intrusive cognitions that arise under certain psychopathological conditions.