



External Control of the Stream of Consciousness: Stimulus-Based Effects of Unintentional Thought Sequences



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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 conditions, 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 that is presented on-screen. Invariably, participants fail to do so, and subvocalize the name of the object on the majority of trials.

Studies 1 and 2 build upon the RIT paradigm in order to further examine the predictable and automatic nature of conscious contents elicited by external stimuli.

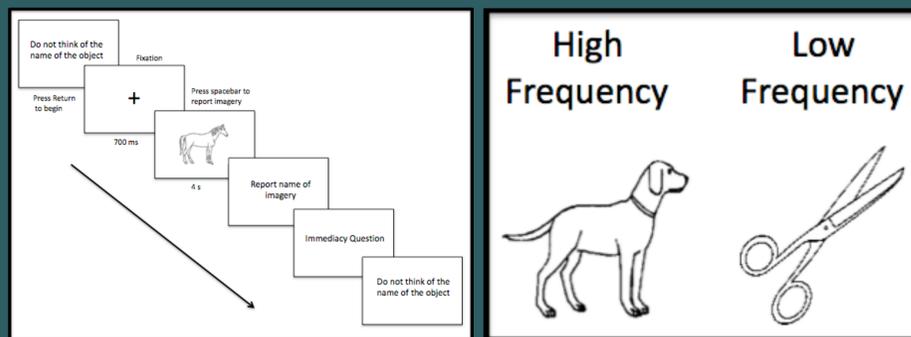
In Study 1, the word frequency of the object name is manipulated within the RIT paradigm. In this study, we examined if the word frequency of object names could affect the rate and the speed at which object names are subvocalized.

In Study 2, we examined if two unintentional thoughts could be elicited from a single stimulus, similarly to the way one thought follows another in the stream of consciousness.

Method: Study 1

Participants

33 San Francisco State University undergraduate students participated for course credit.



Stimuli: The stimuli ($n = 80$) were black-and-white line drawings of well-known objects. The stimuli had been used successfully in previous research (Allen et al., 2013; Morsella & Miozzo, 2002; Snodgrass Vanderwart, 1980).

The visual objects were separated into two equal groups based on word frequency.

Procedures: Upon being presented with an object, participants were instructed to press the spacebar as soon as they thought of the name of the object. Before each trial, the phrase “Do Not Think of the Name of the Object” was displayed in the center of the screen.

After each trial, participants were presented with two questions: “If you thought of the name of the object, please type the name that came to mind” and “If you thought of the name of the object, did the name come to mind immediately?”.

Results: Study 1

Proportions

A dependent t -test revealed that participants subvocalized the name of the object significantly more on High Frequency trials than on Low Frequency trials, $t(32) = 3.07, p = .004$.

Latency

A dependent t -test revealed that participants subvocalized significantly quicker on High Frequency trials compared to Low Frequency trials, $t(32) = 2.625, p = .013$.

Immediacy

A dependent t -test concluded that participants indicated the immediacy of the subvocalization of the word on High Frequency trials significantly more than on Low Frequency trials, $t(32) = 3.599, p = .001$.

Condition	Proportion of Subvocalizations	Latency (ms)	Immediacy
High Frequency	0.74 (.049)	1,726.53 (95.37)	0.75 (.029)
Low Frequency	0.67 (.052)	1,819.94 (94.98)	0.67 (.035)

SE indicated in parenthesis

Method: Study 2

Participants

36 San Francisco State University students participated for course credit.

Stimuli

The stimuli ($n = 52$) were black-and-white line drawings of well-known objects. The stimuli had been used successfully in previous research (Allen et al., 2013; Morsella & Miozzo, 2002; Snodgrass Vanderwart, 1980).



Procedures

After two training sessions, participants were informed that they would be shown a new series of images and were instructed, “Try to NOT think of the NAME of the object. And try to NOT think of the NUMBER of letters in the name of the object.”

Participants indicated via button press if they experienced conscious content of the name of the object and the number of letters in the object name.

Results: Study 2

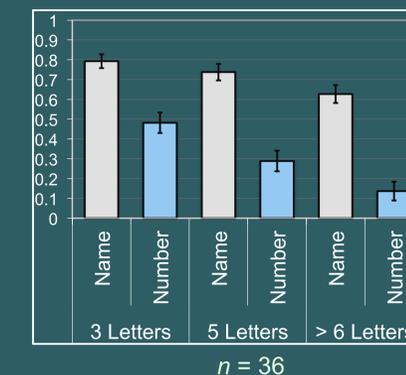
Proportion

Across trials, participants subvocalized the name of the object ($M = .72, SE = .04$) more often than the number of letters in the object name ($M = .30, SE = .04$), $F(1,35) = 85.87, p < .001, \eta_p^2 = .710$.

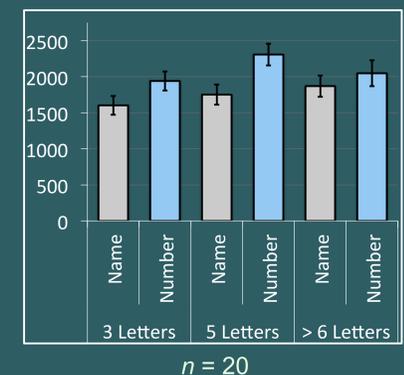
Additionally, word length was examined, with shorter words having higher proportions of subvocalizations than longer words, $F(2,70) = 47.36, p < .001, \eta_p^2 = .575$.

Importantly, there was a significant interaction between the type of imagery (Name vs. Number) and the length of the word (3 letters vs. 5 letters vs. 6 or more letters), $F(2,70) = 7.35, p = .001, \eta_p^2 = .174$.

Proportion of trials with subvocalization



Latency of subvocalization



Latency

Subvocalizations of the object name ($M = 1742.14, SE = 137.05$) occurred quicker than subvocalizations of the number of letters in the object name ($M = 2099.24, SE = 116.39$), $F(1,20) = 13.50, p = .002, \eta_p^2 = .403$.

Additionally, word length was examined, with shorter words having shorter latencies than longer words, $F(2,34) = 34.14, p < .001$.

Unlike with the proportion data, no significant interaction was found, $F(1.66,40) = 2.480, p = .108$.

Discussion

In study 1, participants reported conscious content significantly more during the High Frequency condition than the Low Frequency condition.

- These results suggest that the unintentional subvocalizations found in the RIT are not due to some type of intentional strategy.

In Study 2, on average, participants reported a sequence of involuntary conscious contents elicited from a single stimulus on one third of the trials.

- Importantly, subvocalization of the number of letters was drastically reduced when the number of letters exceeded the subitizing range.