



Brief article

Mnemonic accessibility affects statement believability: The effect of listening to others selectively practicing beliefs

Madalina Vlasceanu, Alin Coman*

Princeton University, United States



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ABSTRACT

Belief endorsement is rarely a fully deliberative process. Oftentimes, one's beliefs are influenced by superficial characteristics of the belief evaluation experience. Here, we show that by manipulating the mnemonic accessibility of particular beliefs we can alter their believability. We use a well-established socio-cognitive paradigm (i.e., the social version of the selective practice paradigm) to increase the mnemonic accessibility of some beliefs and induce forgetting in others. We find that listening to a speaker selectively practicing beliefs results in changes in believability. Beliefs that are mentioned become mnemonically accessible and exhibit an increase in believability, while beliefs that are related to those mentioned experience mnemonic suppression, which results in decreased believability. Importantly, the latter effect occurs regardless of whether the belief is scientifically accurate or inaccurate. Furthermore, beliefs that are endorsed with moderate-strength are particularly susceptible to mnemonically-induced believability changes. These findings, we argue, have the potential to guide interventions aimed at correcting misinformation in vulnerable communities.

1. Introduction

Does ingesting sugar cause hyperactivity in children? The belief that it does is widespread in the population, despite scientific evidence to the contrary. On the one hand, answering the question in the affirmative could be because one has information that is supportive of the belief. On the other hand, belief endorsement could be due to superficial characteristics of the belief evaluation experience. Among these superficial characteristics, the ease with which information comes to mind has been found to influence one's judgments (Tversky & Kahneman, 1973). This ease of retrieval is taken as an internal cue as to whether one endorses it: high endorsement if the belief comes to mind easily, low endorsement otherwise.

Most of the experimental studies aimed at exploring the relation between memory and belief focuses on the up-regulation of memory. That is, increasing a belief's mnemonic accessibility has been shown to result in its increased believability (Ozubko & Fugelsang, 2011). No research to date has explored how the down-regulation of memory (i.e., mnemonic suppression) can lead to corresponding changes in belief endorsement. This latter investigation is important for both theoretical and practical reasons. On the theoretical side, the argument that mnemonic accessibility causally influences believability has to necessarily explore both sides of the mnemonic accessibility continuum:

up-regulation and down-regulation. On the practical side, at a societal level decreasing the believability of inaccurate beliefs in the population might be as important as increasing the believability of accurate beliefs.

To explore the relation between mnemonic down-regulation and believability, we build on a well-established literature that shows that selective practice of previously encoded information can result in better memory for practiced information – a rehearsal effect – and can also induce forgetting in unmentioned, but related to the mentioned information – a retrieval-induced forgetting effect (Anderson, Bjork, & Bjork, 1994). In a typical selective practice paradigm, participants first study category-exemplar pairs (e.g., the “Nutrition” category contains the “Carrots are rich in vitamins” and “Broccoli is rich in iron” exemplars; the “Hydration” category contains the “Milk is rich in calcium” and “Coconut water is rich in potassium” exemplars) and then receive selective practice for half of the exemplars from half of the categories by way of a stem completion task (e.g., “Carrots are rich in v__”). Analyses of a final cued-recall test show that practiced items (Rp+ items: *Nutrition-Carrots/Vitamins*) are remembered better than unpracticed unrelated items (Nrp items: the exemplars in the *Hydration* category)—a rehearsal effect. Unpracticed items related to those practiced (Rp– items: *Nutrition-Broccoli/Iron*) are remembered worse than Nrp items—a retrieval-induced forgetting effect (RIF). The rehearsal effect has been explained by trace strengthening (Karpicke & Roediger, 2008), whereas

* Corresponding author at: Department of Psychology, Princeton University, Peretsman-Scully Hall, #529, Princeton, NJ 08540, United States.
E-mail address: acoman@princeton.edu (A. Coman).

RIF is thought to arise because of inhibitory processes triggered by response competition during the practice phase (Kuhl, Dudukovic, Kahn, & Wagner, 2007; but see Mensink & Raaijmakers, 1988). Of note, RIF is a well-established phenomenon that is reliably obtained with various stimulus materials and delay intervals (Murayama, Mityatsu, Buchli, & Storm, 2014, for a meta-analysis). It has also been consistently found when the selective practice of information occurs in a conversational setting (Coman, Manier, & Hirst, 2009). That is, when listeners monitor the speaker selectively practicing previously encoded information they experience what Cuc, Koppel, and Hirst (2007) call socially-shared retrieval-induced forgetting. This phenomenon, they showed, is due to the fact that under certain circumstances, listeners concurrently retrieve the information along with the speaker, which, like in the case of RIF, triggers response competition from related memories.

In the current study we reasoned that the easiness with which a belief comes to mind should affect its believability. The two cognitive processes triggered by selective retrieval practice (i.e., strengthening and suppression) should lead to corresponding effects on believability. Because repeated exposure to a belief leads to increased mnemonic accessibility, one would expect an increase in its believability, a prediction consistent with research on the illusory truth effect (Fazio, Brashier, Payne, & Marsh, 2015). At the same time, beliefs related to those practiced should experience suppression of their mnemonic representations, which should in turn result in decreased believability.

But not all information can be suppressed. Recent research has found that moderately activated memories are most susceptible to forgetting (Newman & Norman, 2010; Poppenk & Norman, 2014). This is due to the fact that weakly activated memories do not have the strength to trigger competition among memory traces, while highly activated memories are too strong to experience suppression. During the selective practice phase, therefore, weakly activated Rp – memories are unlikely to compete for activation, while strongly activated Rp – memories will exceed the activation threshold. For these reasons, neither should experience suppression following selective practice. Transferring this reasoning in the domain of beliefs, it follows that only moderately held beliefs should experience suppression following selective practice. In other words, if one strongly endorses or strongly opposes the belief that “sugar makes kids hyperactive,” than this endorsement/opposition might make the belief chronically accessible, and, therefore, less susceptible to suppression.

Several findings in the retrieval-induced forgetting literature are consistent with this prediction. Evidence for a relation between belief strength and probability of retrieval comes from research on memory

for stereotypes. Dunn and Spellman (2003) found that the more strongly participants endorsed a stereotype, the less suppression of stereotype-relevant information they exhibited. Similarly, Coman and Hirst (2012) found that the participants who held extreme views on a topic (i.e., legalization of euthanasia) were less likely to experience retrieval-induced forgetting in topic-relevant information compared to participants who held moderate views. Based on this research we hypothesize that only moderately-held beliefs will be susceptible to forgetting and its hypothesized believability decrement. To test these hypotheses, we conducted two studies. After collecting data for the main study between October 2017 and January 2018, we conducted an exact replication study between March and May (2018) with a separate sample of participants recruited from the same population (i.e., Princeton students).

2. Methods

2.1. Participants

2.1.1. Main study

To detect a moderate effect size of 0.30 for paired-sample comparisons with 0.80 power, we collected data from 80 participants. Pilot testing the procedure indicated that finishing the task in less than 15 min constituted inadequate study engagement. We therefore used this pre-established criterion to discard participants. The final sample was comprised of 58 participants affiliated with Princeton University (66% women; Mean-Age = 21.76).

2.1.2. Replication study

For the replication study, we recruited 100 participants, with similar calculations for the projected sample size. Eighty-eight participants affiliated with Princeton University (56% women; Mean-Age = 20.58) completed the study and passed our pre-established exclusion criterion.

2.2. Stimulus materials

A set of 24 statements distributed in four categories (i.e., *nutrition, allergies, vision, health*) was selected to be used in the main study (Appendix A). Each category was comprised of 2 myths and 4 correct pieces of information. The myths were comprised of statements commonly endorsed by individuals as true, but in fact are false, whereas the facts were scientifically accurate statements. For example, a myth was that “reading in dim light can damage children’s eyes,” while an

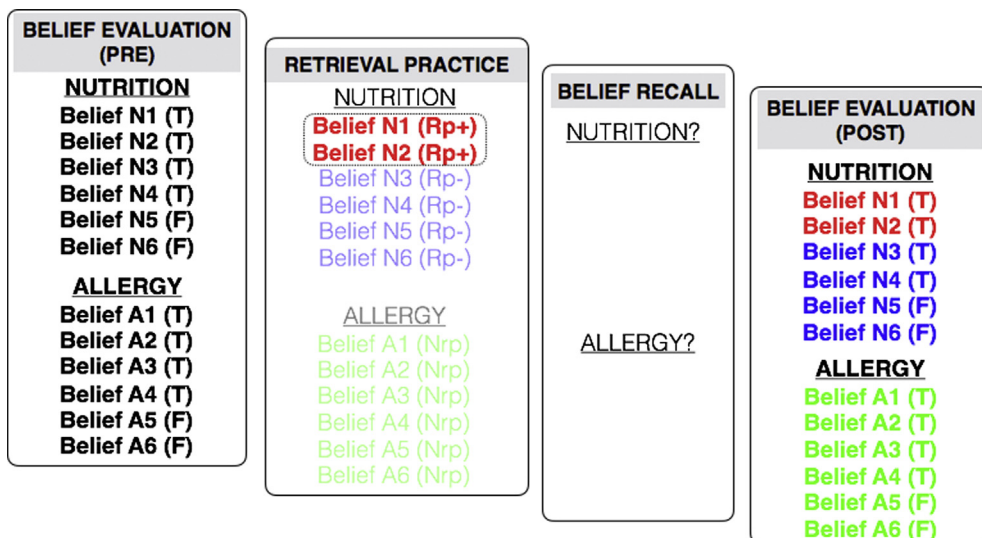


Fig. 1. An illustration of the phases of the experimental procedure. Presented here, only 2 categories in the study phase (from a total of 4). Belief N1 corresponds to one statement in the Nutrition category and the T and F designation stands for true (accurate statement) and false (myth), respectively. In the Retrieval Practice phase and in the Belief Evaluation-Post, the color scheme indicates Rp+ beliefs (red), Rp– beliefs (blue), and Nrp beliefs (green). The Rp+ statements were the only statements included in the audio (the Rp– and Nrp beliefs are shaded to indicate that they were not mentioned in the practice phase). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

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