How Not to Fall for the White Bear: Flexible Control of Negation Processing.

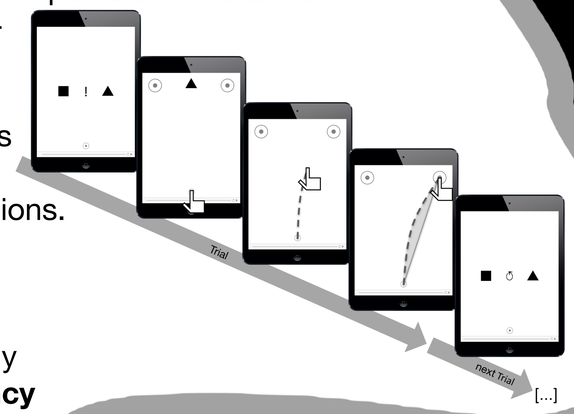
Robert Wirth
Wilfried Kunde
& Roland Pfister

Introduction

"Don't pay attention to the huge white bear in front of you!" Already a single negation requires effortful cognitive processing that may at times even produce the **exact opposite result** (the white bear effect; Wegner, 2009). Negation effects also behave ironically when subjected to **high-frequency training**, which increases rather than decreases processing costs (Gawronski et al., 2008). Here, we present a novel approach to mitigate negation costs: Based on models of executive control, we hypothesized negation effects to diminish when negations have to be resolved not only frequently, but also just recently.

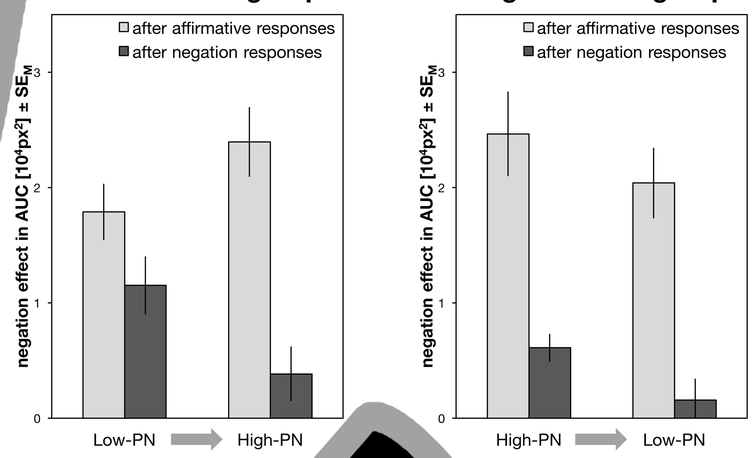
Method

Participants performed a two-dimensional finger-tracking task that mapped two stimuli (■,▲) to two responses (left, right). This mapping had to be either **affirmed** (i.e., enacted; !) or **negated** (Ⓘ). Affirmation and negation instructions were randomized from trial to trial, the proportion of negations (PN) was manipulated between blocks (25%: **low-PN**; 75%: **high-PN**). Participants either started with the low-PN and switched to high-PN (low-PN-first) or vice versa (high-PN-first). We analyzed the area under the trajectory curve (**AUC**, shaded in gray). Higher values for AUC indicate a stronger influence of the original semantic content during negations.



Results

We analyzed AUCs in terms of **negation effect** = **$AUC_{negation}$** – **$AUC_{affirmative}$**



When participants start with the low-PN condition, they show strong negation effects irrespective of whether they follow affirmative or negated responses.
Only after having experienced a high-PN, they show adaptation to recency.

Participants that start with the high-PN condition show adaptation to recency from the start, negation effects diminish after negated responses but not after affirmative ones.
Adaptation carries over to the low-PN condition.

Conclusion

Negation effects can be reduced drastically via the proposed **combination of frequency and recency** of negation processing. Still, they **never vanished entirely**, indicating that negations inherently comprise a cognitive detour via the affirmative statement, producing the ironic effects. Furthermore, unlike in most executive control tasks (Funes et al., 2010), frequency and recency seem to **play in concert** in the observed adaptation effects: While experiencing (or having experienced) a high frequency seems to signal the necessity for adaptation, recency seems to provide the mechanism for adaptation.

Do not scan this QR code!

References:

Funes, M. J., Lupiáñez, J., & Humphreys, G. (2010). Sustained vs. transient cognitive control: Evidence of a behavioral dissociation. *Cognition, 114*(3), 338-347.
Gawronski, B., Deutsch, R., Mbirkou, S., Seibt, B., & Strack, F. (2008). When "just say no" is not enough: Affirmation versus negation training and the reduction of automatic stereotype activation. *Journal of Experimental Social Psychology, 44(*2), 370-377.
Wegner, D. M. (2009). How to think, say, or do precisely the worst thing for any occasion. *Science, 325*, 48-50.